



Select Committee on the Recent Australian Bushfires

Submission by

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1. *Professor Rob Whelan*

My name is Robert John Whelan. I am Dean of the Faculty of Science at the University of Wollongong. My area of research specialty is fire ecology. I have conducted fire ecology research in eastern and western Australia, in Florida and California in the USA, and in the cerrado (savannas) of Brazil. I have published numerous scientific articles focusing on the effects of different fire regimes on plants and animals. These are listed in *Appendix 1*.

2. *Previous statements on 2001-02 fires*

I made a number of comments in the press following the 2001-02 bushfires in the Sydney region. Copies of these are attached as *Appendix 2*. The purpose of these articles was to counter the ill-informed criticism of the National Parks and Wildlife Service after those fires, by explaining the potential for detrimental ecological impacts as a result of broad-scale,

frequent, hazard-reduction burning. I published a more thorough explanation of these issues in the international journal *Conservation Biology* and a commentary in the Journal "Nature" (*Appendix 3*).

3. Public Statement by Scientists on 2003 fires

I am the spokesperson for a group of 16 professional ecologists from around Australia, in many universities and other research institutions, who expressed their concern at the inappropriate demands for simplistic solutions that accompanied the 2003 fire event. The press release from this group of scientists is attached as *Appendix 4*. An ABC Radio National Commentary appears at the following web site – <http://www.abc.net.au/rn/talks/perspective/stories/s789557.htm> and a transcript is presented in *Appendix 4*.

4. Institute for Conservation Biology & Law

I am a member of the Institute for Conservation Biology and Law (formerly its Director) at the University of Wollongong. This Institute includes 16 teaching and research staff in Science and in Environmental Law, and over 30 postgraduate research students. A major emphasis of the Institute revolves around biodiversity conservation in terrestrial systems.

I consider that I am therefore well placed to make some relevant comments to the Committee, especially in relation to three of the Select Committee's terms of reference:

- (c) the adequacy and economic and environmental impact of hazard reduction and other strategies for bushfire prevention, suppression and control;
- (d) appropriate land management policies and practices to mitigate the damage caused by bushfires to the environment, property, community facilities and infrastructure, and the potential environmental impact of practices;
- (e) any alternative or developmental bushfire mitigation and prevention approaches, and the appropriate direction of research into bushfire mitigation.

5. Biodiversity

Our society has, in general terms, identified protection of the environment and conservation of biodiversity as fundamental objectives. The National Strategy for the Conservation of Biodiversity and the various State

strategies acknowledge this fact and attempt to identify procedures for achieving effective conservation. The principles of Ecologically Sustainable Development are expected to underpin any activities, at national, state and local levels, that may affect the environment.

I argue, therefore, that Biodiversity should be considered as an *asset*, just as public and private property, installations, pine plantations, native production forests, and other human activities are considered assets.

In most of the environments of Australia, the various human and biodiversity assets have one feature in common... they are all exposed to the threat of wildfire from time to time. Management of fire must therefore be an integral part of managing each of these assets.

6. National Parks

One key element of the nation's biodiversity conservation strategies is the national parks and other reserves. For example, the Corporate Plan of the NSW National Parks & Wildlife Service identifies their principal objective as "...to protect and conserve natural and cultural heritage." This includes conservation of biodiversity, and species and communities that are listed as vulnerable and endangered.

A major challenge for any individual or land management agency charged with conserving biodiversity, under threatened species legislation and state or national biodiversity strategies, is the lack of detailed knowledge about the responses of many vulnerable animal and plant species to different types of fires.

7. Fire regime

Previous research, pioneered by Dr Malcolm Gill of CSIRO Division of Plant Industry, has demonstrated clearly that the long-term responses of plant and animal populations, and of ecological communities, to fire are determined by the *fire regime*. This represents the various characteristics of fire, including intensity, interval between fires (also called 'frequency'), season of burning, and type of fire (e.g. crown fire, vs. surface fire).

A range of studies in several parts of Australia reveals that high intensity wildfires kill many individual animals and plants. However, it is rare for *populations* of species to become locally extinct as a result of a single wildfire. Reproduction and, in some cases, recolonisation, rebuilds populations.

8. Effects of inappropriate fire regime

Although incomplete, research has revealed many plant and animal species that persist through a single high-intensity fire event can nevertheless be threatened by too-frequent fires. *Appendix 5* presents the results from several studies to illustrate this point.

Some plant species have seeds that are protected from the heat of fire in the soil or in cone-like fruits, but the adult plants themselves die when burned, even in a low intensity fire. These plants are referred to as "obligate seeders". It is the juvenile period (the time needed for the new recruits to develop a seed bank of their own) that is critical for obligate seeder species. A second fire occurring during this time could cause local extinction. The juvenile period can exceed 10 years for some species (research by Dr Doug Benson, Royal Botanic Gardens, Sydney).

Animals requiring dense habitat are confined to parts of the landscape that do not burn frequently. These species need long unburned refuges from which to reinvade, once the vegetation recovers to an appropriate stage, but frequent fires sustain unsuitable habitat (see study by Catling in *Appendix 5*).

A large-scale, high-intensity fire will open up the habitat and make it unfavourable for many elements of the fauna for a few years in every several decades. Hazard-reduction burning can create these unfavourable conditions for several years out of every five to seven years, and even maintain them permanently.

Research findings such as those illustrated here have led to the declaration of the ecological consequences of high frequency fires as a key threatening process under the NSW Threatened Species legislation¹ and to a position statement on the use of fire in ecosystem management (*Appendix 6*) published by the Ecological Society of Australia² (an organization representing more than 1500 professional ecologists based in a wide range of Universities, research institutes and land management agencies in Australia and overseas).

9. Hazard-reduction burning

Although it is undoubtedly true that fuel reduction can reduce fire intensity and rate of spread, achieving sufficient fuel reduction across a whole landscape to ensure effective wildfire control under severe fire weather conditions will require such frequent burning (perhaps every 5

¹ www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype

² www.ecolsoc.org.au/publications.html

years, or even less in some vegetation types) that the primary, conservation objective of the land will be compromised.

Broad-scale hazard reduction is threatening to biodiversity conservation and must therefore be avoided by land managers and resisted at a political level.

This situation is not unique to temperate Australia. It occurs in all fire-prone regions of the world where large population centres abut native vegetation. Land management agencies in California and South Africa are currently experiencing similar threats to biodiversity because of increasing pressure for wide-scale hazard reduction surrounding expanding urban centres.

10. *Support for research into fire and biodiversity*

I suggest that this enquiry by the Select Committee is an opportunity to display leadership in Australia and internationally by recommending funding for a unified research effort in fire and biodiversity to parallel the proposals for research into fire prevention and control.

11. *Protecting both biodiversity and human assets*

The complex challenge for land managers is how to protect adjacent property and human lives without compromising biodiversity conservation in the areas gazetted to serve just that purpose. The responses to this challenge are not simple. I urge the Select Committee to be wary of simplistic proposals and apparent 'quick fixes' (*Appendix 3 and Appendix 4*).

12. *Boundary protection and zoning – a possible solution*

One strategy that shows promise is directing fire management activities at the boundaries between urban areas and adjacent bushland. This is essentially the objective behind the zoning strategy used in bushfire management planning under the NSW Rural Fires Act. District Bush Fire Management Committees develop management plans, across all land tenures, to address both detection and prevention of bushfires – recognizing the different management objectives of different parts of the landscape.

If the most effective protection is reducing the fuel loads close to houses (combined with 'fire-wise' house and garden maintenance and well trained and prepared fire fighting services), then even greater pressure

will be brought to bear on land managers to create and maintain fuel reduction within the bushland where it abuts urban areas.

This is problematic, especially where the small size of reserves is already compromising conservation objectives. A "sacrificial zone" within a reserve effectively reduces the size of the reserve and alienates part of it from its primary conservation purpose. Future subdivisions must surely contain adequate fuel reduction zones within the subdivision, not in the adjacent bushland.

The urban-bushland interface is a particular problem when development has been permitted on ridgetops and in finger-like subdivisions. This pattern maximises the perimeter-to-area ratio (thus producing more edge to deal with). Some Councils have obviously been unwise in their planning, by allowing urban development in fire-prone areas.

13. *Boundary protection may protect houses but not biodiversity.*

Even if attention to boundary areas, by land management agencies such as NPWS, did achieve enhanced property protection in the 2001-02 fires, it did not appear to defend large bushland areas from fires burning in to them. I believe that this is an increasing problem for near-city national parks and reserves.

Royal National Park, for example, was extensively burned in 1994. A large part of that area had been burned in 1988. A significant portion of the area that burned in both those fires burned again this year - only 6 and 7 years between consecutive fires. This frequency is ecologically unsustainable, and it obviously cannot be solved by frequent hazard-reduction burning! A solution needs to be found. Once again, it will not be a simple one.