

Fire in south eastern Australia: a discussion summary and synthesis

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Abstract

An overview of the complex issues related to the management and ecological roles of fire in south eastern Australia includes a summary of major topics raised at a symposium held in Melbourne by the Field Naturalists Club of Victoria in late 2003. (*The Victorian Naturalist* 121 (3), 2004, 136-139)

Introduction

The issues outlined in the presentations at this symposium and summarized in this issue of *The Victorian Naturalist* are complex, controversial, and of considerable practical interest to all Australians. They devolve on two main themes, and the variety of opinions and established facts which can inform them. First, we live in an environment in which fire is natural and largely inevitable. Fire, therefore, is a feature to which much Australian biota is finely attuned and on which it may depend. Second, wildfires can destroy human assets, property and livelihoods. Thus, on the one hand, fire has potential to be a critical and manipulable component of managing Australia's ecosystems and biodiversity; and on the other hand is a feared threat to human life and wellbeing. Controversies and strongly held views on the management of fire are largely inevitable. Extensive media debate following the devastating bushfires in early 2003 centred on whether more extensive 'control' or 'fuel reduction' burning (i.e. deliberately imposed management burning) could have reduced the subsequent tragedies in the region. This, and related debates, are fuelled by strong opinion, even passion (but more commonly without strong objective evidence). They endorse the general agreement on the importance of fire in Australia's ecology and economy, and the need to understand it more effectively, perhaps in part by drawing more substantially on the knowledge of

traditional land management practised by early Australians.

Levels of understanding

However, 'understanding fire' is a deceptively simple task – not least because of the difficulties of planning adequate replicated long-term experiments to quantify and determine ecological effects. This aspect is clearly a priority for those interested in using fire as a sensitive management tool but may receive little sympathy from those whose priority is personal asset protection. Literature on fire ecology in Australia is immense and burgeoning (see, for example, Bradstock *et al.* 2002), but each new published study reveals new trends and aspects, so that many such studies are context- or site-specific. Attempts to generalise, to seek to impose more widespread protocols for management of highly disparate and dynamic systems are indeed difficult, as Whelan *et al.* (2002) emphasised. The more obvious variables between studies (site, intensity of fire, season, mosaic patch size, vegetation type(s), fuel load) are inevitably augmented by others less tangible (such as weather, moisture levels, aspect and topography) to the extent that replicated or controlled studies are difficult to pursue. Many published studies are opportunistic in the sense that they appraise the after-effects of fires, but lack convincing pre-fire control data. Even though this may be extrapolated from nearby unburned sites, the unknown spatial heterogeneity of many organisms (perhaps, particularly of invertebrates) renders many such comparisons involving species abundance and diversity unconvincing. Some

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speakers in this symposium (Cheal, Friend) emphasised the variety of responses to fire that different plant or animal species may exhibit, and the differing levels of vulnerability they may suffer, together with the range of time scales that may be relevant in appraising effects of burning. We thus need to consider the following:

1. Management burning may need to consider a diverse array of individual species responses or, at least, to encompass these broadly and simultaneously in addressing condition of ecological communities. Management for particular focal species may differ substantially from the needs of broader community management;
2. The intervals between optimal management burns may be very difficult to define in the absence of precisely-defined management targets. Many fuel reduction burns (asset protection) are undertaken simply when ground fuel reaches particular threshold levels, and these frequencies may not be consistent with ecological optima;
3. In the absence of such knowledge, even the best-intentioned management burns may be suboptimal, but without precise management targets the 'success' of burning operations is difficult or impossible to evaluate.

Practical steps

We know far more of the responses of plants to fire than those of most animals. In part, this reflects the difficulties of pursuing long-term ecological studies in Australia. As Whelan *et al.* (2002) noted, part of this bias reflects the relatively greater suitability of plants for honours and graduate student projects extending from 1-4 years, often the greatest periods for which research funds can be assured. Some important exceptions exist. Several were noted by Friend, and York (1996) and Neville (2000) refer comprehensively to invertebrate studies. Ideally, studies should be replicated and include at least two years' (preferably more) pre-burn data and the same length of post-burn data on responses in treatment and control plots. However, and as noted above, such detail is seen commonly as low priority, and ecological consequences may be considered

unimportant in relation to protection of property, so that calls for more frequent control burns (as insurance) will remain. There may well be common ground. A recent report (DNRE/PV 2002) on addressing optimal fire regimes for ecological management suggested 'that the threat which fire frequency poses to species composition and community composition in Victoria is in fact from under-exposure to fire: i.e. fire frequency is too low across the landscape'. Many ecologists would hesitate to endorse such a suggestion fully on present evidence, and considerable further research may be necessary to validate this claim.

However, the main practical need at present is to maximise use of the somewhat limited experimental detail in planning control burning exercises, and progressively to move toward more general protocols whilst continuing to acknowledge the shortcomings of our capability to do this. It could be argued that (1) any general policy founded on manifestly inadequate information is no better than 'no general policy' and current somewhat *ad hoc* approaches, and (2) the precautionary principle, if applied, should err on the side of asset protection in situations where both this and ecological management co-occur. Unusual, restricted, or especially biologically significant habitats (equated broadly to ecological vegetation classes, but not limited to these) and vulnerable human settlement (typified by affluent urban fringe extensions into natural or semi-natural bushlands) may impose more particular duty of care to regulate or protect them from burning. Both may require establishment and maintenance of buffer zones and other preventative management. But, whereas responsibility for the protection of critical ecosystems falls on 'authority', asset protection also involves people 'learning to live with fire' (Simmons), and a spread of primary preventative responsibility to include also individual landholders. This last point may need to be reinforced by regulation, likely to be unpopular as interfering with individual freedom. In principle it is an extension of existing codes of practice enforced by regulation, such as 'no fire periods' and 'fire ban days', and parallels trends such as area-wide manage-

ment of some agricultural pests in seeking to promote wider scale and more effective management. Low intensity control burning to help prevent high intensity wildfires is one of the most frequently-used tools in Australian land management (Whelan 1995). Community education is essential in further honing such management, and bodies such as the Country Fire Authority (Bull) have taken important leads in creating greater awareness of individual management needs amongst their clientele.

Advance?

Much of what is desirable is patently utopian, and one need for the future is for studies to become more than data-gathering exercises, and to address practical hypotheses relating to management and how to use fire as a wider management tool (with the 'do nothing' option a clear positive alternative to ill-founded action), and with proper appreciation of the effects of scale.

This symposium provided much useful background, with the papers grouped into three main suites (1) historical and traditional perspective of fire and our attitudes toward it; (2) ecological effects; and (3) living with fire and increasing safety and protection of life and assets. Each of these themes, and most speakers, raised points that could occupy a long and valuable discussion; several have been noted above. Issues canvassed include the values of lessons to be learned from aboriginal knowledge and practice; the optimal ways forward and development of general policy; decisions over what (if any) priority to give to particular habitats or protected areas (as the putative conservation estate); and effective and socially effective mechanisms for asset protection from fire. It is highly desirable to be able to justify control burns in ecological terms, and to specify clearly the objectives of such operations beyond bland generalities, so moving beyond prescriptions for simple calendar or interval burning with little regard for the dynamics of the treated environment.

Symposia on fire ecology are by no means novel, and several have addressed the above and related issues in the region. Many of the ideas discussed at this one were raised at a Melbourne meeting held in

1974 (Leonard 1977), for example. A series of Australian Bushfire Conferences extend from 1987, and the Proceedings of several of these (e.g. McKaige *et al.* 1997, Lord *et al.* 1999) provide considerable additional background perspective. Each successive meeting has raised aspects of current best practice in fire management, and fresh viewpoints on the subject. This symposium was not intended to lead to specific resolutions or recommendations, but some of the points summarised at earlier meetings clearly remain highly pertinent. A particularly important framework was set by DEST, in a conference in Melbourne in 1994, and some priorities listed by that gathering sum up well sentiments evident at this 2003 gathering. Thus:

1. Biodiversity conservation in Australia's present landscapes requires a diversity of fire regimes, and these must be flexible;
2. Fire management regimes need to be local to succeed;
3. Fire management for protection of human life and assets can be, and is beginning to be, integrated with management for ecosystem conservation;
4. Identification of key zones for fire protection can allow separation of areas where human-oriented fire protection is of greatest priority from areas where biodiversity maintenance is the main concern. This in turn allows different fire regimes to be developed for different priorities in different places;
5. Land managers are now seeking to incorporate ecological requirements into their fire management plans;

In short, research and effective management are continuing needs in our dealings with fire in south eastern Australia. Expressions of concern that continued reorganisation of relevant state departments and other authorities may effectively preclude long-term coordination of these topics are a salutary warning that such coordination is an integral part of any regional fire management effort, and that capability must be protected and assured.

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