



**Report on
Grose Valley Fire Forum**

**Mount Tomah Botanic Garden
Saturday 17th February 2007**



Report on Grose Valley Fire Forum – Saturday 17th February 2007

The Grose Valley Fire Forum and report were undertaken by the Blue Mountains World Heritage Institute at the request of the NSW Minister for the Environment, the Honourable Bob Debus.

Dr Rosalie Chapple & A/Prof Sandy Booth
Blue Mountains World Heritage Institute
PO Box 576, Katoomba NSW 2780 Australia

16 March 2007

* The content of this report reflects the Forum discussion and outcomes and does not necessarily reflect the views of the Blue Mountains World Heritage Institute.

Table of Contents

List of Acronyms	3
1. Introduction	4
2. Overview	7
3. Forum Discussion and Agreed Actions	13

Tables

1.1 Forum participants	10
1.2 Issues of community interest and concern	11
1.3 Problem orientation process	12

Appendices

APPENDIX 1 – The 5R Risk-Management Framework	31
APPENDIX 2 – Grose Valley Fire Forum Agenda	32
APPENDIX 3 – Action Plan - consolidated list of goals and actions	33

LIST OF ACRONYMS

AFAC	Australasian Fire Authorities Control
ARC	Australian Research Council
BFCC	Bush Fire Coordinating Committee
BM	Blue Mountains
BMCC	Blue Mountains City Council
BMWHI	Blue Mountains World Heritage Institute
BFMC	Blue Mountains District Bush Fire Management Committee
BMCS	Blue Mountains Conservation Society
CERMB	Centre for Environmental Risk Management of Bushfires, Faculty of Science, University of Wollongong
CRC	Cooperative Research Centre
DEC	NSW Department of Environment & Conservation
GBMWA	Greater Blue Mountains World Heritage Area
GIS	Geographic Information System
NCC	NSW Nature Conservation Council
NPWS	NSW National Parks & Wildlife Service, Department of Environment & Conservation
RAFT	Remote Area Fire-fighting Team
CRAFT	Catchment Remote Area Fire-fighting Team
RFS	NSW Rural Fire Service

Section 1. Introduction

In November 2006, fire caused by lightning strikes burnt a significant area of the Grose Valley in the upper Blue Mountains of the Greater Blue Mountains World Heritage Area (GBMWhA). Like many areas throughout the GBMWhA, the Grose Valley is an area of high natural and cultural value, including the iconic Blue Gum Forest. The two original ignitions were designated as the Burrakorain Fire and the Lawson's Long Alley Fire, and they came jointly under the jurisdiction of an emergency declaration under Section 44 of the Rural Fires Act.

Community members called on the State Government to undertake a thorough and independent review of the management of this fire, involving all stakeholders. Principal among the issues raised by the concerned residents were backburning, impacts of frequent fires, under-utilisation of local expertise, and economic costs. The community members also called for adequate funding for rehabilitation and environmental restoration works, to conduct more research and training in certain areas of fire management, to improve pre-fire planning and to develop management systems to better capture and utilise local knowledge.

Local Member for the Blue Mountains and Minister for the Environment, Hon. Bob Debus responded to these concerns by proposing that community members be given an opportunity to discuss their concerns with fire authorities and be encouraged to contribute to the development of revised fire management strategies, policies and procedures which may arise from the routine internal reviews of the 2006-07 fire season, and particularly the Grose Valley fire. The Minister also noted the opportunity for the community to be informed of, and contribute to, the development of future research projects concerning climate change and fire regimes.

The Minister invited the Blue Mountains World Heritage Institute (BMWHI) to organise and chair a forum of representative community members and fire authorities. The Institute is an independent non-profit organisation that supports the conservation of the natural and cultural heritage of the GBMWhA, with a key objective to "support the integration of science, management and policy within and adjoining the GBMWhA properties." The purpose of the forum was to:

- Brief the community on the management of the Grose Valley fire and the framework and context for the management of fire generally within the World Heritage Area;
- Identify any issues that relate specifically to the management of the Grose Valley fire, and that haven't already been captured and/or responded to within the s.44 debrief report;
- Identify longer term and landscape scale issues relating to the management of fire in the Greater Blue Mountains WHA, particularly in this time of climate change;
- Develop an action plan, which responds to any unresolved issues identified above.

In accordance with the Minister's brief, the following organisations were represented at the forum: NSW Dept of Environment and Conservation; NSW Rural Fire Service; Blue Mountains Conservation Society; Nature Conservation Council of NSW; Blue Mountains City Council; NPWS Regional Advisory Committee and the GBMWA Advisory Committee. A list of the participants is shown in Table 1.1. In addition to senior representatives of the agencies involved, representatives also came from the principal community-based organisations that had expressed concern and called for a review process. It should be noted that one of the main public calls for a review was made by an informal coalition of residents that was not formally represented at the forum, but a number of these residents were members of those organisations represented.

Forum Process

An open invitation was given to the community organisations to identify the issues of community interest and concern to be discussed at the Forum. From these issues, a consolidated list of 22 issues (Table 1.2) was prepared by the Institute, and then circulated to all participants prior to the forum. To facilitate the workshop discussions and the detailed consideration of the identified issues, the 5R risk-management framework (Appendix 1) was used to group the issues.

A copy of the Forum Agenda is in Appendix 2. Following a Gundungurra and Darug 'Welcome to Country' by Carol Cooper, and an introduction by the Forum Chair, self-introductions and personal opening statements were made by each participant without comment. These were followed by a series of briefings on management of the Grose Valley Fire and fire management generally within the World Heritage Area. The Forum began by acknowledging that fire management in the Blue Mountains is close to best practice in many ways. It was unfortunate that copies of the Section 44 debrief report were not available for the forum as anticipated. While this was partly overcome through verbal presentation and comment, it limited the ability to reach consensus on the factual basis of what happened on the fire ground and to move forward productively from this point of consensus. Community representatives expressed their dissatisfaction with this situation, and it must be noted that the forum was therefore not able to engage effectively on specific issues of the control strategies used on the Grose Valley fire.

After a brief session on points of clarification, the issues presented to the forum (Table 1.2) were explored in detail by working through a problem orientation process (Table 1.3) that asked a series of questions about each issue, to reach consensus on the exact nature of the problem. As this work progressed, a series of agreed actions were identified to effectively address key aspects of the issues as these unfolded. It is noted that the issues addressed toward the end of the day were examined in less detail due to time constraints, but warrant further attention (e.g. the issue about remote area fire-fighting teams). The original list of 22 issues was consolidated into 11 goal statements, with 50 associated actions (Action Plan in Appendix 3). Section 3 is the main body of this report and presents the goals and actions along with documentation of the discussion that took place on the day. It utilises the structured approach outlined in Table 1.3 to systematically work through the issues, and identify the actions required to bring about more sustainable bushfire management for the Blue Mountains. Within a

Report on Grose Valley Fire Forum – Saturday 17th February 2007

week of the Forum, the Institute circulated a copy of the forum proceedings (section 3) to all participants for comment and clarification. The Institute also sought identification of responsibilities for the 50 Actions identified by the Fire Forum.

It is strongly recommended that implementation of the Action Plan (Appendix 3) be reviewed annually by the representative organisations, to assess progress and effectiveness of actions. It is proposed that the BMWH Institute coordinate this review process in partnership with the Nature Conservation Council, with a workshop held after the 2007/08 fire season, to readdress the issues and their progress.

Section 2. Overview

A big challenge in bushfire management is how to better integrate valid community interests with those of fire management agencies. Over recent years, the public has come to demand and expect a greater say in decision-making processes that impact upon their local environment. The Grose Valley Fire Forum represents a step forward in this process of better integrating community knowledge and interests into local natural resource management.

The Forum also illustrated that the Blue Mountains community is both a great supporter of fire authorities, and of the role of volunteer firefighters for the outstanding effort that they are prepared to undertake on behalf of the community.

The concerns and questions addressed at the forum included:

- Identifying weaknesses and gaps in fire management plans and processes. How well are plans being implemented and what are the barriers to implementation e.g. financial, institutional, political? How should fire authorities and land managers respond to climate change impacts?
- Integrating scientific knowledge into fire management plans. How can bushfire management policy allow for the incomplete knowledge of complex ecological systems? What roles should science and other research play in decision processes, given the uncertainty arising from incomplete understanding of ecosystem dynamics and insufficient scientific information?
- The role of fire as an ecological process. How do we resolve the conflict between rapid fire suppression to reduce risk versus the fire-dependency of the ecosystem? What does it take to more effectively mitigate against the risk?
- Concern that fire control strategies do not compromise the significant natural and cultural heritage values of the Greater Blue Mountains region. How can bushfire management policy better account for protection of World Heritage values? How adaptive is bushfire management and policy to the specific circumstances of the Blue Mountains?

The Forum recommended actions in relation to:

- Better interpretation of ecological data into decision-making and practical fire-fighting procedures;
- Improvements in bushfire risk management planning;
- Better translation of legislated objectives for protection of natural and cultural values into operational guidelines;
- Improved information flow between fire authorities and the community during and after major fires, including more transparency and public involvement in the review processes;
- Increasing funding for fire-related research, planning, risk mitigation, and post-fire ecological rehabilitation;

Report on Grose Valley Fire Forum – Saturday 17th February 2007

- Enhancing the preparedness, detection and rapid fire response capacity of fire authorities in response to fire ignitions;
- Modelling the effects of different control strategies and suppression.

The Forum acknowledged the increasing and serious challenges arising from risks associated with liabilities and litigation. These trends are of principal concern to fire management agencies and the fire fighters themselves, and many in the general community share these concerns.

Bushfire management is a cultural phenomenon, inextricably bound up between nature and culture. It involves the interaction of multiple, complex systems, including:

- organisational/institutional behaviour and decision-making;
- fire fighting strategies and technologies;
- science, research and ecosystem behaviour;
- variable fire behaviour and weather, including climate change;
- politics; and
- personal values and attitudes.

The complexity is increasing, especially with climate change, along with pressure for bushfire management to be more adaptive and responsive to the needs of the present and the future.

Facilitating the necessary changes in the behaviour of any of these systems is highly challenging for both government and the community. These systems often have severe constraints including limited resources, threats of litigation, and limited data on which sound decisions can be confidently made. Where these systems are not continuing to learn and adapt, is where attention is needed, not on individual accountabilities. Sound decision-making at the time of a fire event is crucial and the process by which these decisions are made requires careful analysis. The system should be able to support open reflection after a fire, without blame or litigation. This is where a process of scientific analysis should come into its own: what the fire did, what was done to control it, what worked, what didn't, why or why not, and what can be done to make things better. How can the system be changed and improved to make success more likely?

Research and adaptive management are essential in helping to address both current challenges and the issues arising from climate change. But alone, these will not bring about the required changes as neither of these domains explicitly addresses the overall policy process or the political realm in which bushfire management happens. Conflict and uncertainty are becoming increasingly common, as evidenced by the Four Corners Program "Firestorm" broadcast on Monday 12th March. The program featured the 2004 Canberra Bushfires and also raised the Grose Valley fire and resulting Fire Forum.

To overcome the key problems identified by the Grose Valley Fire Forum and achieve real and lasting triple bottom line outcomes, change and innovation need to take place in the realm of governance. This is particularly the case in the areas of science, policy and decision-making.

The Grose Valley Fire Forum has brought fire management agencies and interested representatives of the community together in a spirit of co-operation

to consider issues critical to the management of bushfires. Driven by the high conservation values of the Greater Blue Mountains World Heritage Area, the implications of the issues raised at this Forum have obvious relevance to other regions and states. Protecting people as well as the environment should not be mutually exclusive. Our efforts to address this challenge in the Blue Mountains will increasingly come in for close scrutiny.

Notwithstanding the existing mechanisms of review and community consultation surrounding bushfire management, the Institute recommends to the Minister that the issues and actions identified herein by the Grose Valley Fire Forum warrant special consideration and support.

Properly pursued with senior political and agency commitment and support, they offer key insights and potential pathways for the continued adaptive development and implementation of state of the art fire fighting for which NSW, and in particular, the Blue Mountains are justifiably renowned.

Report on Grose Valley Fire Forum – Saturday 17th February 2007

TABLE 1.1 Forum Participants

NAME	TITLE
A/Prof Sandy Booth	Forum Chairman and Facilitator, BMWH Institute
Professor Ross Bradstock	Centre for Environmental Risk Management of Bushfires, University of Wollongong
Mr Ian Brown	BM Conservation Society
Mr Don Cameron	BM Conservation Society
Mr Matthew Chambers	Environmental Scientist, Blue Mountains City Council (Observer)
Dr Rosalie Chapple	Forum Co-Facilitator, BMWH Institute
Mr Bob Conroy	Director Central, Parks and Wildlife Division, DEC
Ms Carol Cooper	Darug and Gundungurra Nations (Observer)
Superintendent Mal Cronstedt	Blue Mountains District, Rural Fire Service
Mr Grahame Douglas	Acting Chair, BM Regional Advisory Committee
Group Captain John Fitzgerald	Blue Mountains District, Rural Fire Service
Mr Shane Fitzsimmons	Executive Director Operations, Rural Fire Service (Observer)
Mr Richard Kingswood	Area Manager Blue Mountains, Parks and Wildlife Division, DEC
Mr Geoff Luscombe	Regional Manager Blue Mountains, Parks and Wildlife Division, DEC
Dr Brian Marshall	President, BM Conservation Society (Observer)
Mr Hugh Paterson	BM Conservation Society & NSW Nature Conservation Council
Dr Judy Smith	GBMWH Advisory Committee Member
Inspector Jack Tolhurst	Blue Mountains District, Rural Fire Service
Mr Haydn Washington	GBMWH Advisory Committee Member
Mr Pat Westwood	Bushfire Program Coordinator, Nature Conservation Council

TABLE 1.2 Issues of Community Interest and Concern

Research, information and analysis
1. Commitment in fire management to conservation of natural and cultural values of World Heritage Area as well as human life and property.
2. Understanding and consideration (including on-ground knowledge) both by those involved in pre-fire planning and those required to make operational decisions during fire events - of the WH values for which the GBMWHA was inscribed on the world heritage list, and of other values, such as geodiversity, cultural values and beauty, which have the potential to be nominated for World Heritage listing in the future.
3. Biodiversity impacts of frequent fires in Grose Valley for last 40 years, including impacts of the recent fire on World Heritage values.
4. The ecological basis for fire policy (knowledge base for response of local biota to fire regimes) e.g. biodiversity loss associated both with high fire frequency and intensity, and with fire exclusion.
5. Translation of NPWS Blue Mountains Fire Management Plan (e.g. risks to natural heritage particularly World Heritage values) to S.52 operational plans during Grose Valley fire.
6. Effectiveness of review processes in generating real improvements for the future; current debriefing process performed by BFMCs [i.e. BFCC Policy 2/2006].
7. Assessment of community values – protection of property versus protection of the natural environment.
8. Implications of climate change for increased fire frequency and intensity.
9. Adequate funds for fire suppression versus inadequate funds for research, planning and fire mitigation.
Risk modification
10. Effectiveness of current risk strategies in managing fire regimes for biodiversity and community/asset protection (e.g. upper Grose Valley).
11. Implications of climate change for risk modification (e.g. fuel reduction).
Readiness
12. Skills in implementing fire control strategies for large bushland areas e.g. back-burning.
13. Ecological sustainability of current responses to fire (both suppression & bushfire risk management) e.g. knowledge and skill of plant operators in sensitive environments (environmental damage from machine work e.g. bulldozer lines).
14. Community understanding of control strategies used.
15. RAFT capacity (e.g. for night-time work).
16. Efficiency of fire detection technologies.
Response
17. Back-burn control strategy from “Northern Strategic Line” and Bell’s Line of Road in large bushland area: over-riding consideration for asset protection versus lack of consideration and recognition of impacts on ecological values.
18. Application of planning, guidelines, procedures & local information & expertise during fire suppression.
19. Rapid containment of lightning strike or arson fires.
20. Aerial attack efficiency and effectiveness.
21. Media – inaccurate and misleading use of language and presentation of information.
Recovery
22. Funding for post-fire assessment, strategy review and ecological restoration including addressing activation of weed seed banks.

TABLE 1.3 Problem Orientation Process

GROSE VALLEY FIRE FORUM PROBLEM ORIENTATION & ISSUE EXPLORATION PROCESS *	
1. Clarify goals in relation to the issue	<p>What goals or ends do we want?</p> <p>Are people's values clear?</p> <p>(there may be an over-riding goal and then more specific goals to operationalise the over-riding goal)</p>
2. Describe trends	<p>Looking back at the history of the issue, what are the key trends?</p> <p>Have events moved toward or away from the specified goals?</p> <p>Describe both past and current trends.</p>
3. Analyse causes and conditions	<p>What factors, relationships, and conditions created these trends, including the complex interplay of factors that affected prior decisions? (e.g. environmental, social, political factors)</p> <p>i.e. what explanations are there for the trends?</p> <p>What management activities have affected the trends?</p> <p>What are the conflicts about different approaches to address the issue?</p>
4. Projection of developments (e.g. if no action is taken to address the issue)	<p>Based on trends and conditions, what is likely to happen in the future (e.g. if nothing is done differently).</p> <p>If past trends continue, what can we expect?</p> <p>Is the likely future the one that will achieve the goals?</p> <p>What future possible developments are there (e.g. politically, environmentally e.g. how will climate change affect the problem)?</p>
5. Decide on any actions to address the problem	<p>If trends are not moving toward the goal, then a problem exists and actions need to be considered.</p> <p>What other policies, institutional structures, and procedures might move toward the goal?</p> <p>What research, analysis, or public education may be needed?</p>

* Adapted from Clark, T.W. 2002. "The Policy Process: a practical guide for natural resource professionals." Yale University Press. U.S.

Section 3. Forum Discussion and Agreed Actions

ISSUE 1. Concern about the lack of priority given to protection of the ecological values of the World Heritage Area, in the face of an overriding priority for protection of human life and private property.

GOAL: To protect natural and cultural heritage values, consistent with the protection of human life and property, by ensuring that bushfire management strategies:

- take a risk management approach toward protection of these values;
- improve access to and interpretation of natural and cultural heritage values when deciding on fire suppression strategies and tactics;
- ensure that these natural and cultural heritage guidelines for fire management are integrated throughout the entire planning framework for short, medium and long-term bushfire management and operational strategies.

TRENDS

1. Commitment to values: the commitment to protection of ecological and cultural values is currently embedded within visions, plans and strategies, but there is sometimes a lack of transparent application and implementation during fire events; the community do not see the commitment taking place; there is an underestimation of the extent to which the community highly values the natural environment; there is sometimes a belief that the priority for protecting human life and property overrides any need to consider environmental values.
2. Communication: there appears to be a lack of dissemination of information identifying these values in efficiently applicable form to those on the fire ground undertaking fire suppression; a need to improve communications to certain fire suppression people (e.g. education of contractors).
3. Risk management approach: there is a need for a more risk management oriented approach to the protection of ecological and cultural values; for example strategies to protect threatened species and/or ecological communities and Aboriginal sites before, during and after a fire incident. The values need to be enhanced within existing operational plans (better use of existing registers/resources).
4. Resource use: improvements are needed in the efficiency of resource usage.

CAUSES AND CONDITIONS

1. Ecosystem complexity: biodiversity values are complex therefore a whole-of-landscape approach is needed which includes addressing the needs of individual species i.e. species-specific conditions; lack of solid data to guide the protection of ecological (and World Heritage) values; due to the detail and complexity of biodiversity information, it gets overlooked; lack of capacity to respond so as to meet the adequate protection of the range of values.
2. Fire regime approach: Land managers tend to measure and respond to the impacts of fire on natural heritage values at much greater spatial and

temporal scales than does the general community, which tends to focus more on the short-term impacts of individual fires, rather than the impacts of fire regimes.

3. Data interpretation: related to the lack of linkages between plans are the difficulties in translating ecological information and objectives (such as threatened species protection) into decision-making and on-ground actions; it is hard to interpret data; there is difficulty in making sense of the complexity of information; issues such as scale, priority, and practicality. There is often limited time and capacity during emergency events to access, interpret and apply information and guidelines.
4. Linkages between plans: a basis for the lack of communication about ecological and cultural values is a lack of clear and unambiguous linkages between the NPWS Reserve Fire Management Strategies and the local Bush Fire Risk Management Plan; and the linkages need more of a risk-based management approach; it was noted that although the NPWS Fire Strategies also use a zoning approach, the two planning processes need to be better integrated; management plans lack cross-referencing thus leading to lack of implementation of objectives across plans; the details are in the NPWS plan but a more effective link needs to be made with guidelines in the local Bush Fire Risk Management Plan i.e. there is a gap between the plans and this gap needs to be bridged.
5. Strategy options: there are four options for strategic attack (i) direct attack (e.g. close containment in remote areas), (ii) parallel attack (e.g. backburning from constructed tracks, trails and natural barriers), (iii) indirect attack (e.g. distance backburning from the Blue Mountains blackline) and (iv) no active suppression i.e. monitoring of fire behaviour and fire spread only.
6. Values: i.e. which values guide the plans, what are the different sets of values and how should they be integrated. This is a challenging and significant issue.
7. World Heritage: recent declaration of World Heritage status has significant implications in terms of international obligations to protect such values through appropriate fire management, but the methodology for addressing these values has not properly been met. There is a strong economic imperative (e.g. tourism for the Blue Mtns) to do this.
8. Resourcing: the funding and resources required to implement risk management approach; the need to remain realistic in identifying potential resourcing needs (whilst noting the very large costs of fires which are not rapidly contained) and to the need to prioritise such needs.

PROJECTION OF POSSIBLE DEVELOPMENTS (if no action is taken to address the issue)

1. BMCC is developing threatened species/ecological community maps, including dominant vegetation typing, and post fire age mapping for dissemination to RFS brigades.
2. Further developments in environmental risk management planning are underway by the Bush Fire Coordinating Committee that will assist this issue. The BFCC are developing a revised model for environmental risk management, using an inclusive process of template review for fire risk management plans.

3. BMCC is working on the development of a strategic hazard reduction plan that considers risk and environment assets, to sit between the risk management plan and the operations plans.
4. Impacts of fires on ecological values, including the policy and adaptive management frameworks for bushfires, will be addressed within a new three year research project "Managing ecosystem change in the Greater Blue Mountains" (funded by an Australia Research Council Linkage Grant and involving the BM World Heritage Institute, DEC, BMCC, and universities). This project will include compiling new and existing ecological data relating to fire and climate change into a geographic information system.
5. Many Aboriginal heritage sites will degrade beyond recognition within the next few decades.
6. The NCC Hotspots Fire project has demonstrated a capacity to successfully engage communities and translate fire ecology into a management context including ecological messages and into the risk management planning framework.

Some of these developments will contribute to addressing the trends identified above. However, the forum determined it necessary to take specific actions as outlined below.

ACTIONS

1. Data collected within the "Managing ecosystem change in the GBMWSHA" project, including the new GIS, to be effectively interpreted into decision-making and practical fire-fighting terms. [Responsibility for action: BMWHI & CERMB – ARC Linkage project, NPWS, BMCC, BMCS]
2. Monitor impacts of fires on Aboriginal cultural heritage values, and undertake opportunistic mapping of these values post-fire. Translate findings into decision-making and practical fire fighting terms.
 - a. As a priority, undertake an opportunistic survey of Aboriginal cultural heritage post-Grose fire. [Aboriginal communities, BMWHI, NPWS]
3. Greater effort in general to be made in translating and interpreting research and other relevant information on the protection of ecological and cultural values to better inform decision-making and into practical fire-fighting terms wherever required. [CERMB, BMWHI, NPWS, BMCC, BMCS]
4. Consider further developments in environmental risk management planning by the BFCC for inclusion in the Bush Fire Risk Management Plan model template. [BFMC]
5. Effectively integrate the strategic hazard reduction plan being developed by BMCC, into the risk management plan and the operations plans. [BMCC, BFMC]
6. Translate the NPWS Fire Management Strategies objectives for protection of natural and cultural values into operational guidelines across the entire planning framework at all levels, using a risk management approach. [NPWS, BFMC]

7. Continue to identify the best mix of treatments i.e. prevention, mitigation, suppression and recovery, to achieve both fire management and land management objectives. [NPWS, RFS, BFMC]
8. Review risk management and operational plans to include relevant reserve fire management plan information, including aspects of mitigation and appropriate fire management guidelines from the RFS Environmental Code [BFMC].
9. Develop a single map-based approach for inter-agency use that depicts all relevant information in a user friendly way and enables optimal use and consideration of this information under operational conditions. [NPWS, RFS, BMCC, BFCC, BFMC, BMCS]
10. Provide the outcomes of this forum to the BFCC for consideration in developing and reviewing policies and procedures such as for the Bush Fire Risk Management Policy and Bush Fire Risk Management Plan Model template. [NPWS, RFS]
11. Develop a quantitative framework for risk management: undertake research to evaluate the effectiveness of current strategies to inform the resources and strategies required to achieve integrated life, property, cultural and natural value protection outcomes. The research should identify what is the return on current 'investment' and the results then linked back to budgeting systems [BMWHI].
12. Undertake and improve community liaison and surveys to better capture community values within fire management plans [BFMC].

ISSUE 2. Biodiversity impacts of frequent fires in Grose Valley.

GOAL: To better understand the role of fire as an ecological process, including the long-term ecological effects of fire regimes on fauna and flora, as a basis for identifying fire regimes that sustain the ecology both locally and across the landscape.

TRENDS

1. Research:
 - a. Research is underway to explore interactions between fire regimes and gradients of available moisture in the environment and how that influences vegetation structure. The forum noted that an Environmental Trust Grant is funding this project, as well as an ARC Linkage grant (as identified for goal #1).
 - b. Ecological models are uncertain.
 - c. More research is needed on what fire produces in terms of landscape management.
2. Mapping:
 - a. Fire severity needs to be mapped and recorded along with other variables of the fire regime (e.g. frequency and area burnt).
 - b. Records and maps of fires across all tenures need to be consolidated into a single shared geographical information system.
3. Information:
 - a. Integrated information is needed for management.

- b. There is a lot of knowledge about the Blue Mountains area, in comparison with other areas.
- c. There is progress being made in use of information by agencies (a positive trend).
- 4. Aboriginal knowledge: There is need for better consideration of Aboriginal cultural knowledge and protection of their heritage in fire management.

CAUSES AND CONDITIONS

1. Long-term evolutionary pressures have given rise to vegetation in the Greater Blue Mountains that are fire-dependent.
2. The use of 'fire stick farming' by Aboriginal people to manage and clear the landscape may have increased frequency of fires in some areas and this may have helped to minimise destructive fires. However there is uncertainty as to the extent to which this was applied in the Blue Mountains.
3. Biodiversity risks are associated with certain combinations of fire frequency and intensity (eg some biota depend on fire for regeneration); it is a fine balance, therefore knowledge of appropriate fire regimes is important and needed.
4. For example, a high level of re-growth of eucalypts and banksias within three years following a major hot fire. However a second hot fire at that stage in the regeneration process can lead to severe stress and a loss of species diversity.
5. It was acknowledged that contrary to popular opinion, there are heterogeneous effects of large fires across the landscape.

PROJECTIONS

1. Ongoing analysis by DEC in relation to fire regime threshold development, mapping and analysis for all vegetation types and possible extension to off-park areas as part of bush fire risk management plans. [DEC, BFMC]

ACTIONS

13. Undertake a research project using the Grose Valley fire as a case study, to ascertain and explore the opportunities to improve fire management for protection of ecological impacts [NPWS, BMCC, CERMB, BMWHI].
14. Development of a threat abatement plan for the ecological consequences of high frequency fires. [DEC]
15. Use the Blue Mountains as a case study for modelling different control strategies and suppression (e.g. analysis of suppression operations) utilising historical raw data for retrospective mapping. [RBradstock/CERMB]
16. Source external funds for priority research and investigation projects [NPWS, RFS, BMCC].
17. Undertake ecological research into the impacts of fire regimes including intervals between fires, ensuring an appropriate focus on large-scale transformation [NPWS, BMCC, CERMB, BMWHI].

18. Undertake the necessary ground-truthing investigations to ascertain whether ecological predictions are being played out. That is, are observed trends in ecosystems matching the predictions from the models? Other research and investigation priorities include:
 - a. Threatened species and communities, including mapping of successional processes (e.g. woodland to heathland shifts and changes to hanging swamp boundaries) and wet sclerophyll forest (e.g. Blue Gum Forest, *E. oreades*) and warm temperate rainforest regeneration;
 - b. Species composition and structure comparison of those areas burnt in 2002;
 - c. Species composition and structure comparison of those fires burnt with high frequency;
 - d. Document / map / audit weed plumes that have occurred after past fires, and similarly for the weed plumes that will already be occurring after the 2006 Grose Valley fire;
 - e. Build upon current research results to further elucidate how the Grose Valley responded to the '94 fire.

[CERMB, NPWS, BMCC & BMWHI via ARC Linkage Grant]
19. Initiate appropriate involvement of the broader community in research and particularly Aboriginal people for Aboriginal cultural heritage research, in all relevant research projects. [BMWHI, NPWS, BMCC]
20. Develop mechanisms to effectively and promptly communicate research outcomes to agencies, fire-fighters and communities, and for application of these to risk management planning and human resource planning and assessment during fires. [BFMC]

ISSUE 3. Effectiveness of review processes in generating real improvements for the future.

GOAL: To ensure effectiveness of fire review and debriefing processes and their communication to the public by:

- communicating to the community the results of interagency review processes;
- including an analysis of fire strategies and environmental impacts within major debriefs and review;
- enabling greater community participation in major fire debriefs and fire reviews.

TRENDS

1. Notwithstanding the deliberate and praiseworthy additional efforts of the RFS in holding community meetings both during and after the Grose Valley, some community sectors were not informed as well as they wanted to be. There was also a less than optimal level of understanding in the community over what was done during the Grose Valley fire and why.
2. While it is acknowledged that there was significant commitment on the part of individuals to respond to community questions after the Grose Valley fire, parts of the community still don't feel confident in the

transparency of the debrief process. They feel that there is a need to be able to better draw out the lessons to be learnt, and to ensure a visible commitment by agencies to resolve actions arising. As a case in point, the Section 44 debrief report is still not available to forum participants.

3. Most debriefs after the Grose Valley fire were technical and operational, however there remains the perception in parts of the community that current processes (agency/interagency debriefs, s.44 reports) can 'tiptoe' around problems and be hampered by interagency issues and lack of information; and that the processes could be improved through greater independent and scientific analysis and transparency.
4. The above needs are highlighted by the increasing tendency of agencies and incident management teams to be exposed to legal action and sometimes ill-informed criticism.
5. Regarding issues centering on impacts of fires and impacts of activities, it is well to remember, that "you can't run a fire by community focus groups" – "the fire fighters must run the fire".
6. Fire fighters in the Grose Valley fire "have been exposed to vitriol in the local paper"; being talked about, not talked to; volunteers dictated to about failure; it was noted that care is needed in these days of litigation; volunteers feel that the so-called independent inquiry is a witch hunt and that those who criticise haven't been in the brigade; there is a need these days for fire fighters to ensure that should coronial or other formal inquiries arise that all relevant matters have been appropriately considered and dealt with in accordance with established protocols, policies and procedures.
7. The Bush Fire Management Committee and ultimately the NSW Bush Fire Coordinating Committee is the forum for agreeing on how bushfires are managed in the future.

CAUSES AND CONDITIONS

1. The significant level of public engagement over large fires.
2. Current processes are inadequate for informing the community at large, in particular about fire management in general. There is a need to explore other mechanisms e.g. what forms of media? It was noted that not all people have access to the internet.
3. The Section 44 report was not made available either before or at the forum and this was of considerable concern to community groups. The only information currently available is that the section 44 report has gone to the RFS Commissioner and it is now up to him what happens to it. The Blue Mountains Conservation Society asked for an interagency technical review with external expert input. The Minister for the Environment's letter to the Society suggested that the Forum was a way of meeting the Society's needs. So far, it would seem that the external input is taking place without the benefit of seeing the section 44 review. It is fundamental in terms of meeting the Society's needs and creating the perception of openness that the Section 44 report is made available as a matter of urgency. Otherwise, there will remain a perception in the community that the RFS and NPWS etc are claiming unqualified success, but they are afraid to take the community into their confidence. The lack of detailed, publicly available information on the fire and its management

creates a perception that known issues are not being addressed. To date, no independent person has had access to the full story of the fire that is being held by the agencies.

4. Focus on reviewing the technical and operational aspects after a fire overlooks the all-important focus on the broader governance issues e.g. bigger questions about effectiveness of decision-making processes and the support required to optimise suppression.
5. Lack of awareness and communication with community members regarding post-fire recovery and restoration activities. This process is not known to the community, and the basis of this issue is the perception of the system or process; community needs confidence in the process more than the detail.
6. The community is very interested in knowing how fires are fought and what strategies are being adopted.
7. Fire agencies have not yet engaged the community on issues of litigation and liability and the agencies are dealing with them unilaterally.
8. Agencies need to be able to do their own debriefs in a blame-free environment. The continuing improvement of fire fighting strategies and operations requires that some issues remain within internal review processes.
9. The activities of AFAC and the Bushfire CRC (huge funds and long time frame) are critical and relevant to this argument.
10. Elements within the community perceive that there is a lack of commitment within agencies to looking critically and constructively, and without blame, at all aspects of fire suppression.
11. There is a responsibility of key people within the community to inform their constituencies of the debrief and review processes.
12. Time taken for debrief reports to be available to broader community; report sits on Commissioner's desk before release.
13. Increased requirement for NPWS to monitor impacts of fires therefore indicators needed.
14. Volunteer fire-fighters feel that the call for an extended community debrief approach is insulting to their efforts.

PROJECTIONS

1. The new revised version of the risk plan has relevance, as it can better address these issues.
2. Small reference group meetings (BMCC, RFS, NPWS etc) to continue as a constructive process and adaptive management response.
3. The level of community angst is likely to increase in the future if nothing is done to address this problem, with climate change influencing more large fires.

ACTIONS

21. Urgent distribution of the section 44 debrief report to all participants in the forum. [RFS]
22. Greater provision for earlier feedback to and from the community after a major fire, regarding fire control strategies, prior to release of formal

report. Also address what the barriers are to increasing community knowledge and what approaches are most effective. [RFS, BFMC]

23. Request the Coordinating Committee to revisit the s44 debrief policy and procedures and/or other appropriate mechanisms to develop an appropriate means for getting feedback from the community via a system that enables issues to be raised and feedback to be provided. The development of a policy and procedural framework for Incident Controllers may assist here. [NCC/NPWS, BMCS]
24. Undertake promotion and community education programs to familiarise the community with the framework that exists for debriefing processes and the arising information flows and decision-making processes. Incorporate this into existing Firewise program. [BFMC, RFS]
25. Encourage a culture of openness, learning and evidence-based decision-making. [All organisations represented at forum]
26. Continue to undertake interpretation / education / media and fire-related Discovery activities. [NPWS]

ISSUE 4. Implications of climate change for increased fire frequency and intensity.

GOAL: To prepare for the more extreme conditions associated with climate change, by addressing the policy and management implications for control strategies and landscape management.

TRENDS

1. Increased frequency of lightning strikes.
2. Getting better at detection and suppression, but the ante is going up
3. The forum noted that the Australian Government has prepared a report on climate change with implications for the WHA. The GBMWA Advisory Committee has contributed to this strategy. Also John Merson of the BMWHI has prepared a UNESCO paper which was circulated to participants, on impacts of climate change on the Greater Blue Mountains.
4. It would appear that the best way to prepare to change at this stage is to ascertain what are we currently achieving in terms of risk mitigation, as a basis upon which to better prepare for climate change. This is the first step.

CAUSES AND CONDITIONS

1. Complexity
2. It has been difficult to plot the impact of climate change on the broad range of species due to the lack of sufficient baseline data from which to work.
3. Increased long term stress on hanging swamps and the invertebrate species that depend upon them due to hotter and dryer conditions.
4. Climate change models indicate that there could be a significant decline in the number and variety of eucalypts species within the world heritage area in the future, and overall biodiversity significantly reduced. Recent

research (Sonya Ku 2005) modeling the possible impact of increased frequency of fire on the major eucalypt species of the Blue Mountains region, demonstrates that the number and range of species would decline with the increased fire frequency and intensity. i.e. fire could significantly augment species loss already likely under considerable environmental stress due of climatic change.

PROJECTIONS

1. Current research is addressing what potential climate change the GBMWhA is likely to experience.
2. The impacts of increased temperatures and declining rainfall could lead to an increased risk of more frequent, intense and destructive forest fires. Climate change predictions estimate the likelihood of a 10-30% increase in fires in the Greater Blue Mountains due to climate change.
3. Lightning strikes predicted to become even more frequent.
4. Incidence of arson to increase as population size continues to grow.
5. Fragmentation of habitat associated with protected areas provide limited opportunities for species migration to more compatible environments – the GBMWhA is large which is of advantage, but creating corridors to the south, west and north of the WHA will be important.
6. Conflict on all levels is likely to increase.
7. Risk to values is likely to increase.
8. New funding opportunities may arise based on managing natural landscapes such as the GBMWhA for carbon credits.
9. Attention will need to be given to translation of climate change research into policy and management.
10. Potential impact of climate change on important sites of Aboriginal cultural heritage values. For example, rock art is threatened with damage both from the drying of the region as well as by the heat of intense fires causing the surfaces of the sandstone cave in which they have been preserved to flake off or degrade.

ACTIONS

27. Research priorities include:
 - a. Investigate efficacy of current risk mitigation in the Blue Mountains. [NPWS, CERMB]
 - b. Climate change impacts on hanging swamps.
 - c. Build understanding of underlying shifts in environmental conditions and their effects on fire occurrence and fire behaviour.
 - d. Implications of climate change for fire behaviour and invasive species. [CERMB, BMWHI & ARC Linkage project]
 - e. Investigate plant dispersal in relation to climate change, quantifying ecological processes and habitat requirements critical to species persistence and their ability to move to new habitats given climate change. [CERMB, BMWHI & ARC Linkage project]
28. The results of this Forum should be used to advocate and lead improved dialogue and action to address the key issues pertaining to climate

change and start to influence policy change. [NCC, BMWHI, CERMB, BMCS, NPWS, RFS, BMCC]

29. Investigate opportunities for increased resourcing for risk mitigation and for bushfire behaviour research. [NPWS, RFS, CERMB, BMWHI]
30. Enhance the preparedness, detection and rapid fire response capacity of fire authorities in response to fire ignitions. [Fire authorities]
31. Deliver a presentation about this forum, at the May 2007 conference of the Nature Conservation Council of NSW on bushfire and climate change. [DEC, BMWHI, NCC; 31 May-1 June 2007]

ISSUE 5.

Inadequate funding for research, planning and risk mitigation

GOAL: Increase the availability of resources for fire-related research, planning and fire mitigation.

TRENDS

1. Focus of resources is more on suppression e.g. issue of ample funds for fighting the fire (such as for section 44) versus lack of funds for prevention/mitigation/rehabilitation. It was noted that the shift to mitigation spending is more evident now than in past years, although this trend needs to build momentum.
2. NSW Environmental Trust funds are available for chemical spills but not for wildfire damage; could these funds be directed to projects aimed at restoring or rehabilitating environmental damage from fires?

CAUSES AND CONDITIONS

1. Review of BM Bush Fire Management Plan is overdue due to lack of resources and an appropriate and approved template that incorporated the latest BFCC findings and agreement.
2. Need to demonstrate a more apparent return on investments in research to decision-makers.
3. Emergency response and suppression activities are perceived as traditionally having more available resources allocated than for prevention, mitigation and recovery activities.
4. Most of the costs associated with section 44 fires are reimbursed by the Federal Government (quota arrangement); section 44 funds are only available for dealing with the immediate emergency.
5. A percentage of most RFS funds (74%) come from the insurance industry.
6. Performance criteria for cost effective fire management are not well developed across agencies.
7. No-one insures for environmental loss. Costs are borne within agencies.

PROJECTIONS

1. There is now more investment in trail maintenance etc than ever before
2. The tide is shifting in terms of proportion of funding going into non-suppression roles.

3. There is a growing appreciation now of the worthwhile returns on investment in strategic management.
4. All government agencies now have performance criteria as principle mechanisms behind financial allocations.
5. AFAC are currently developing standard performance criteria at a national level and the BFCC are currently developing performance criteria for use in BFRMP's.

ACTIONS

32. Formally approach the Environmental Trust to consider the allocation of Environmental Trust funds for use in fire related research including investigation of fire impacts. [NPWS]
33. Raise the needs and investigate the opportunities for increased commitment to rehabilitation following fire with the Catchment Management Authorities. [BFMC]
34. Allocation of additional resources for the BFMC to implement the recommendations in this document, particularly for actions resulting in strengthening risk management objectives. [BFMC members]

ISSUE 6. Implementation of strategies for risk mitigation and fire suppression in large bushland areas

GOAL: To develop effective fire risk management strategies for mitigation and suppression in large bushland areas through:

- (i) Evidence-based plans and strategies;
- (ii) Ensuring that fire fighters in wilderness and other remote areas have adequate support and training for safe and effective implementation of fire control strategies.

TRENDS

1. Agencies and incident management teams are being exposed to criticism and legal action.
2. Planning, guidelines, procedures and local information are not always effectively applied during fire suppression strategies and tactics.
3. Questioning of the effectiveness of hazard reduction burning in the upper Blue Mountains (e.g. mosaic burning) over recent years (i.e. has it significantly suppressed/reduced the impact of wildfire events?). Have there been sufficient burns for the inherent dryness of the landscape - only approximately 2-3km of hazard reduction along the urban interface per annum.
4. Maps show areas of high fuel loads adjacent to property/assets. These areas are also a high risk for hazard reduction burning.
5. Skill base with respect to fire strategy planning has not progressed over the last 10 years in NSW - due to ongoing development of national standards and training, and the development and availability of suitable tools.

CAUSES AND CONDITIONS

1. Command and control processes need improving such as 2-way communication between IMT and fire-line.
2. Repeated historic fires in Upper Grose Valley.
3. Performance on perimeter hazard reduction needs to be addressed. There is the need to look at more strategic and broader hazard reduction strategies (e.g. along ridge lines to break-up area into controllable 'cells').
4. Approval from private landholders holds up the process. Council manages enforcement. Frustrated by approval process. Private property approval process needs addressing as a priority.
5. Community members not adequately involved in preparation of local scale fire management risk plans etc. resulting in lack of ownership and understanding.
6. There is a perception in a small proportion of the community that some control options are a cure-all.

PROJECTIONS

1. Corridors of broad area hazard reduction and more strategies for prevention.
2. Community to be part of the formulative process, not just the approval process (relates to point made above). This forum is testament to engagement with community.

ACTIONS

35. Address the issue of risk management planning, including investigating use of corridors for hazard reductions as part of an integrated approach that allows for ecological considerations. [Land managers/NPWS]
36. Seek more funding for community involvement in Local Government Area fire management (i.e. liaison officer position for community engagement prior to release of plan), which will assist administration/enforcement of regulatory processes. [BMCC]
37. Workshops held to provide further information regarding fire suppression in remote/wilderness areas, and BFMC to list potential contractors that could be eligible for such ecologically sound, operational training in fire control strategies for remote/wilderness areas including back-burning and bulldozer lines. [BFMC, NPWS]

ISSUE 7. Capacity of remote area firefighting teams (RAFT)

GOAL: To improve RAFT capacity to deal effectively with most remote ignitions.

TRENDS

1. Catchment RAFT model – small number of people to take initial action then be backed up by others; works well but is expensive to establish.
2. Reluctance to apply RAFT strategies in some instances for safety reasons.
3. Limited availability of trained/certified RAFT firefighters.

CAUSES AND CONDITIONS

- a. Many RFS people capable of RAFT.
- b. Many people previously available to do it, no longer available.
- c. RFS and NPWS have 2 slightly different approaches to RAFT that need to be combined. Night-time RAFT is excluded by policy and this will need to be reviewed.
- d. Recognise industrial climate – capable people not doing it due to their employment. OHS reasons not to go in at night. The location e.g. cliffs, is an OHS issue.
- e. A large amount of training is needed for participation in RAFT, as well as the re-accreditation/maintaining competencies component.

PROJECTIONS

1. S44 debrief states the need to address this (only partly addresses this issue – it addresses the policy).

ACTIONS

38. Facilitate and support more RFS people to participate in RAFT [RFS]
39. Review and combine NPWS and RFS RAFT policy and procedures, including consideration for nighttime RAFT deployment [NPWS, RFS].
40. Address pre-deployment capacity in context of return on investment i.e. economically model across landscape to see how it meets needs and model against suppression costs [NPWS, RFS].

ISSUE 8. Efficiency of fire detection technologies

GOAL: To explore the potential of emerging technologies for higher efficiency in fire detection.

TRENDS

1. The process of detection is not considered adequate and appropriate, yet there are emerging technologies that are not being taken up.

CAUSES AND CONDITIONS

1. New technologies are expensive.

PROJECTIONS

1. New technologies are arising for remote sensing which don't require people present.

ACTIONS

41. Consider the new technologies where appropriate and consider the benefits of Blue Mountains piloting new technologies for broad-scale remote surveillance, and evaluate cost effectiveness. [BF Coordinating Committee and NPWS]

ISSUE 9. Aerial attack efficiency and effectiveness

GOAL: Continue to optimise effectiveness of aerial attack strategies and operations.

TRENDS & CONDITIONS

1. Significant developments over the last decade such as water bombing – technologies for precision and the critical role of aircraft. Now better than ever before. District committee guidelines based on research would help evaluate the cost-effectiveness of water bombing.
2. A Bushfire CRC project is underway on aerial suppression, and it could make a contribution once adequate data are collected. The possibility of using historic data was raised.

ACTIONS

42. Practically strengthen record keeping during operations to assist analysis by identifying a system that is capable of catching data in real-time. [DBFMA, BFCC]
43. Identify and use some simple decision rules for aircraft deployment to maximise aircraft cost-effectiveness. [BFMC]

ISSUE 10. The role of the media

GOAL: To have better processes in place to ensure accurate presentation of fire incident information through the media.

TRENDS

1. Inaccurate and misleading use of language and presentation of information.
2. Dealing more effectively with the media than we have in the past (you can't change the nature of the beast).
3. Huge investment in last 3-5 yrs in educating and training the media.
4. The situation with the media is better than it used to be.
5. Impact on tourism industry – deferred or lost business due to fires. (A fire in Nov has less impact than one in Jan due to amount of tourists at those times. Losses are significant and in the order of \$100,000s.
6. RFS do a local pre-season brief to media e.g. Gazette, 2BLUFM etc.
7. Post-fire walks by Discovery rangers are also undertaken to inform the public of the nature and impacts of fire regimes.
8. In terms of the recent Grose fire, local media was OK but not at the state level. Need to distinguish between role of local and state media.
9. Lack of recognition of impacts on ecological values in media coverage.

CAUSES AND CONDITIONS

1. The very nature of the media itself which is difficult to control, but needs to be managed for the best outcomes for fire fighters, the community and the environment.

2. Assumption that the place is out of bounds to tourists. Need to communicate through the media which parts of the BM are out of bounds, and where they can still come to.
3. Community education – how to get messages across?
4. Maintaining effective park closures in the interests of public safety.

ACTIONS

44. Work with the tourism industry to develop their risk management strategy. [BFMC]
45. Before/during a fire, convey explanations of what control strategies and why, to inform community. [BFMC]
46. Undertake pre-season briefs to journalists; discourage use of sensitised language (e.g. National Parks destroyed, trashed, destruction and horror, fire hell etc). [District Committee, RFS, NPWS, BFMC]
47. Engage local media in communicating exactly which areas are out of bounds, so they people don't stop coming to remaining open areas. [BFMC]

ISSUE 11. Funding for post-fire recovery.

GOAL: To adequately fund ecological restoration after a large wildfire.

TRENDS

1. Restoration effort is lacking.
2. Weeds are a big issue post-fire.
3. Active volunteer effort in the Grose Valley (i.e. the Great Grose Gorse Walk).

CAUSES AND CONDITIONS

1. Funding restoration by land managers is an issue for very large fires in peri-urban areas.
2. Activation of weed seed banks after a fire is significant and requires significant funds to support restoration, but the investment is worth it in the long-term. More knowledge in relation to effective restoration is needed.

PROJECTIONS

1. Capitalise on community goodwill to help with restoration.
2. BMRAC volunteers – dedicated officer within agency to focus on managing volunteers.

ACTIONS

48. Approach the Environmental Trust regarding the establishment of a delineated fund (possibly from Trust Funds) to support ecological restoration which could be needed for several years post-fire and ensure initiative is appropriately linked to Section 44 state level response and

also the SCA for post fire ecological funding to protect catchment values.
[NPWS]

49. Ensure a strategic approach to site rehabilitation e.g. by placing an emphasis on rehabilitation of weedy sites that are a threat to natural values downstream. [Land managers]
50. NPWS to consider establishing a new dedicated staff position to coordinate and manage volunteers undertaking rehabilitation projects and activities within the Blue Mountains region of DEC. [NPWS]

APPENDICES

APPENDIX 1

The 5R Risk-Management Framework

The COAG National Inquiry on Bushfires (Ellis, Kanowski and Whelan 2004) adopted the 5R framework for bushfire mitigation and management. The inquiry considered that this framework integrates all aspects of the risk-management process, and is more suitable for community engagement than previous frameworks.

To help to ensure that the Grose Valley Fire Forum comprehensively covers issues regarding the Grose Valley Fire and fire management in the World Heritage Area generally, the 5R Framework has been used to bring 'like issues' together and to better enable their consideration through focused discussion.

The below identifies the Key Issues of Community Concern under each of the following elements of the 5R Framework.

❖ ***Research, information and analysis***

Effective risk management requires prior knowledge and relevant data and information. For planning and management to be improved, the following aspects of research, information and analysis are important: analysis of past events; research that provides valuable insights into critical factors and causal relationships; research capacity and the ability to sustain research effort; climate change research; communication and uptake of research outcomes; public education about the role of fire in our environment; policy settings and governance arrangements; information on fire regimes; information systems and processes (physical infrastructure and management systems).

❖ ***Risk modification***

Modifying the risk (likelihood and consequence) posed by fire to natural values and to people's assets, has many components: land use planning for fire-prone areas (systematic planning, development constraints and building codes); risk limitation e.g. limiting the number of ignitions by reducing the incidence of arson; risk reduction (e.g. fuel reduction and ecological burning i.e. managing landscapes for biodiversity and protection of World Heritage values; consideration of Indigenous fire management; climate change implications); linking landscape management to protection of community, environmental and economic assets; managing for impacts of fire on water and air quality; reducing the vulnerability of assets through building design and construction regulations.

❖ ***Readiness***

Residents and property owners need information on which to base effective preparation and make informed decisions in the event of a bushfire (community education, information and action). Fire services and recovery agencies also engage in readiness actions, independently and in association with other public and private sector organisations and residents. Capacity development is a key aspect of readiness.

❖ ***Response***

Response is the fire-fighting part of the overall fire management process, which is the role of the fire and land management agencies, along with measures of property owners to protect their property. This component receives the greatest media coverage and attention from the community.

❖ ***Recovery***

Recovery is complex, dealing with social, economic, physical and environmental rehabilitation. It must be an integral part of the whole process and a conscious consideration at each other stage of the process. It calls for a recovery strategy and an operational plan.

APPENDIX 2

GROSE VALLEY FIRE FORUM AGENDA

9.30-10.00 Arrival and morning tea

1. Introduction

10.00 Welcome to Country - Carol Cooper

Introduction by the Forum Chair - Sandy Booth: purpose, process, agreements, outcomes and reporting

10.10 Introduction and opening statement by each participant without comment

2. Briefings on Management of the Grose Valley Fire and Fire Management generally within the World Heritage Area

10.30 Presentations (10 mins each) by:

- Mal Cronstedt (RFS) – report on agency debrief Dec 19
- Richard Kingswood – national parks and fire management
- Blue Mtns Conservation Society - local community perspective
- Ross Bradstock – gaps and priorities in bushfire research for the BM

11.10 Points of clarification

3. Confirmation of Key Issues

11.20 Grose Valley Fire Management (issues not covered in s.44 debrief report)

11.40 Fire Management and the WHA (longer term and landscape scale management issues relating including climate change implications)

4. Key Issue Orientation and Exploration

12.00 Grose Valley Fire Management

1.00-2.00 **LUNCH**

4. Key Issue Orientation and Exploration (continued)

2.00 Fire Management and the WHA

5. Development of Agreed Action Plan

3.00 Identification of agreed list of actions, with nominated organisations and recommended timeframes

6. Close & afternoon tea

APPENDIX 3

ACTION PLAN

1 PROTECTION OF NATURAL AND CULTURAL VALUES

GOAL:

To protect natural and cultural heritage values, consistent with the protection of human life and property, by ensuring that bushfire management strategies:

- take a risk management approach toward protection of these values;
- improve access to and interpretation of natural and cultural heritage values when deciding on fire suppression strategies and tactics;
- ensure that these natural and cultural heritage guidelines for fire management are integrated throughout the entire planning framework for short, medium and long-term bushfire management and operational strategies.

ACTIONS

1. Data collected within the “Managing ecosystem change in the GBMWAH” project, including the new GIS, to be effectively interpreted into decision-making and practical fire-fighting terms. [Responsibility for action: BMWHI & CERMB – ARC Linkage project, NPWS, BMCC, BMCS]
2. Monitor impacts of fires on Aboriginal cultural heritage values, and undertake opportunistic mapping of these values post-fire. Translate findings into decision-making and practical fire fighting terms. As a priority, undertake an opportunistic survey of Aboriginal cultural heritage post-Grose fire. [Aboriginal communities, BMWHI, NPWS]
3. Greater effort in general to be made in translating and interpreting research and other relevant information on the protection of ecological and cultural values to better inform decision-making and into practical fire-fighting terms wherever required. [CERMB, BMWHI, NPWS, BMCC, BMCS]
4. Consider further developments in environmental risk management planning by the BFCC for inclusion in the Bush Fire Risk Management Plan model template. [BFMC]
5. Effectively integrate the strategic hazard reduction plan being developed by BMCC, into the risk management plan and the operations plans. [BMCC, BFMC]
6. Translate the NPWS Fire Management Strategies objectives for protection of natural and cultural values into operational guidelines across the entire planning framework at all levels, using a risk management approach. [NPWS, BFMC]
7. Continue to identify the best mix of treatments i.e. prevention, mitigation, suppression and recovery, to achieve both fire management and land management objectives. [NPWS, RFS, BFMC]
8. Review risk management and operational plans to include relevant reserve fire management plan information, including aspects of mitigation and appropriate fire management guidelines from the RFS Environmental Code [BFMC].

9. Develop a single map-based approach for interagency use that depicts all relevant information in a user-friendly way and enables optimal use and consideration of this information under operational conditions. [NPWS, RFS, BMCC, BFCC, BFMC, BMCS]
10. Provide the outcomes of this forum to the BFCC for consideration in developing and reviewing policies and procedures such as for the Bush Fire Risk Management Policy and Bush Fire Risk Management Plan Model template. [NPWS, RFS]
11. Develop a quantitative framework for risk management: undertake research to evaluate the effectiveness of current strategies to inform the resources and strategies required to achieve integrated life, property, cultural and natural value protection outcomes. The research should identify what is the return on current 'investment' and the results then linked back to budgeting systems [BMWHI].
12. Undertake and improve community liaison and surveys to better capture community values within fire management plans [BFMC].

2 THE ROLE OF FIRE AS AN ECOLOGICAL PROCESS

GOAL:

To better understand the role of fire as an ecological process, including the long-term ecological effects of fire regimes on fauna and flora, as a basis for identifying fire regimes that sustain the ecology both locally and across the landscape.

ACTIONS

13. Undertake a research project using the Grose Valley fire as a case study, to ascertain and explore the opportunities to improve fire management for protection of ecological impacts [NPWS, BMCC, CERMB, BMWHI].
14. Development of a threat abatement plan for the ecological consequences of high frequency fires. [DEC]
15. Use the Blue Mountains as a case study for modelling different control strategies and suppression (e.g. analysis of suppression operations) utilising historical raw data for retrospective mapping. [RBradstock/CERMB]
16. Source external funds for priority research and investigation projects [NPWS, RFS, BMCC].
17. Undertake ecological research into the impacts of fire regimes including intervals between fires, ensuring an appropriate focus on large-scale transformation [NPWS, BMCC, CERMB, BMWHI].
18. Undertake the necessary ground-truthing investigations to ascertain whether ecological predictions are being played out. That is, are observed trends in ecosystems matching the predictions from the models? Other research and investigation priorities include:
 - a. Threatened species and communities, including mapping of successional processes (e.g. woodland to heathland shifts and changes to hanging swamp boundaries) and wet sclerophyll forest (e.g. Blue Gum Forest, *E. oreades*) and warm temperate rainforest regeneration;
 - b. Species composition and structure comparison of those areas burnt in 2002;

Report on Grose Valley Fire Forum – Saturday 17th February 2007

- c. Species composition and structure comparison of those fires burnt with high frequency;
- d. Document / map / audit weed plumes that have occurred after past fires, and similarly for the weed plumes that will already be occurring after the 2006 Grose Valley fire;
- e. Build upon current research results to further elucidate how the Grose Valley responded to the '94 fire.

[CERMB, NPWS, BMCC & BMWHI via ARC Linkage Grant]

19. Initiate appropriate involvement of the broader community in research and particularly Aboriginal people for Aboriginal cultural heritage research, in all relevant research projects. [BMWHI, NPWS, BMCC]
20. Develop mechanisms to effectively and promptly communicate research outcomes to agencies, fire-fighters and communities, and for application of these to risk management planning and human resource planning and assessment during fires. [BFMC]

3 REVIEW PROCESSES AND PUBLIC COMMUNICATION

GOAL:

To ensure effectiveness of fire review and debriefing processes and their communication to the public by:

- communicating to the community the results of interagency review processes;
- including an analysis of fire strategies and environmental impacts within major debriefs and review;
- enabling greater community participation in major fire debriefs and fire reviews.

ACTIONS

- 21 Urgent distribution of the section 44 debrief report to all participants in the forum. [RFS]
- 22 Greater provision for earlier feedback to and from the community after a major fire, regarding fire control strategies, prior to release of formal report. Also address what the barriers are to increasing community knowledge and what approaches are most effective. [RFS, BFMC]
- 23 Request the Coordinating Committee to revisit the s44 debrief policy and procedures and/or other appropriate mechanisms to develop an appropriate means for getting feedback from the community via a system that enables issues to be raised and feedback to be provided. The development of a policy and procedural framework for Incident Controllers may assist here. [NCC/NPWS, BMCS]
- 24 Undertake promotion and community education programs to familiarise the community with the framework that exists for debriefing processes and the arising information flows and decision-making processes. Incorporate this into existing Firewise program. [BFMC, RFS]
- 25 Encourage a culture of openness, learning and evidence-based decision-making, including understanding by volunteer fire fighters that criticism is of the process not of the implementer. [All organisations represented at forum]

- 26 Continue to undertake interpretation / education / media and fire-related Discovery activities. [NPWS]

4 CLIMATE CHANGE AND RISK MITIGATION

GOAL:

To prepare for the more extreme conditions associated with climate change, by addressing the policy and management implications for control strategies and landscape management.

ACTIONS

27. Research priorities include:
- a. Investigate efficacy of current risk mitigation in the Blue Mountains. [NPWS, CERMB]
 - b. Climate change impacts on hanging swamps.
 - c. Build understanding of underlying shifts in environmental conditions and their effects on fire occurrence and fire behaviour.
 - d. Implications of climate change for fire behaviour and invasive species. [CERMB, BMWHI & ARC Linkage project]
 - e. Investigate plant dispersal in relation to climate change, quantifying ecological processes and habitat requirements critical to species persistence and their ability to move to new habitats given climate change. [CERMB, BMWHI & ARC Linkage project]
28. The results of this Forum should be used to advocate and lead improved dialogue and action to address the key issues pertaining to climate change and start to influence policy change. [NCC, BMWHI, CERMB, BMCS, NPWS, RFS, BMCC]
29. Investigate opportunities for increased resourcing for risk mitigation and for bushfire behaviour research. [NPWS, RFS, CERMB, BMWHI]
30. Enhance the preparedness, detection and rapid fire response capacity of fire authorities in response to fire ignitions. [Fire authorities]
31. Deliver a presentation about this forum, at the May 2007 conference of the Nature Conservation Council of NSW on bushfire and climate change. [DEC, BMWHI, NCC; 31 May-1 June 2007]

5 RESOURCING AND INVESTMENT

GOAL:

Increase the availability of resources for fire-related research, planning and fire mitigation.

ACTIONS

32. Formally approach the Environmental Trust to consider the allocation of Environmental Trust funds for use in fire related research including investigation of fire impacts. [NPWS]
33. Raise the needs and investigate the opportunities for increased commitment to rehabilitation following fire with the Catchment Management Authorities. [BFMC]

34. Allocation of additional resources for the BFMC to implement the recommendations in this document, particularly for actions resulting in strengthening risk management objectives. [BFMC members]

6 RISK MANAGEMENT STRATEGIES FOR MULTIPLE OUTCOMES

GOAL:

To develop effective fire risk management strategies for mitigation and suppression in large bushland areas through:

- Evidence-based plans and strategies;
- Ensuring that fire fighters in wilderness and other remote areas have adequate support and training for safe and effective implementation of fire control strategies.

ACTIONS

35. Address the issue of risk management planning, including investigating use of corridors for hazard reductions as part of an integrated approach that allows for ecological considerations. [Land managers/NPWS]
36. Seek more funding for community involvement in Local Government Area fire management (i.e. liaison officer position for community engagement prior to release of plan), which will assist administration/enforcement of regulatory processes. [BMCC]
37. Workshops held to provide further information regarding fire suppression in remote/wilderness areas, and BFMC to list potential contractors that could be eligible for such ecologically sound, operational training in fire control strategies for remote/wilderness areas including back-burning and bulldozer lines. [BFMC, NPWS]

7 RAFT CAPACITY

GOAL:

To improve RAFT capacity to deal effectively with most remote ignitions.

ACTIONS

38. Facilitate and support more RFS people to participate in RAFT [RFS]
39. Review and combine NPWS and RFS RAFT policy and procedures, including consideration for nighttime RAFT deployment [NPWS, RFS].
40. Address pre-deployment capacity in context of return on investment i.e. economically model across landscape to see how it meets needs and model against suppression costs [NPWS, RFS].

8 FIRE DETECTION TECHNOLOGIES

GOAL:

To explore the potential of emerging technologies for higher efficiency in fire detection.

ACTIONS

41. Consider the new technologies where appropriate and consider the benefits of Blue Mountains piloting new technologies for broad-scale remote surveillance, and evaluate cost effectiveness. [BF Coordinating Committee and NPWS]

9 AERIAL ATTACK

GOAL:

Continue to optimise effectiveness of aerial attack strategies and operations.

ACTIONS

42. Practically strengthen record keeping during operations to assist analysis by identifying a system that is capable of catching data in real-time. [DBFMA, BFCC]
43. Identify and use some simple decision rules for aircraft deployment to maximise aircraft cost-effectiveness. [BFMC]

10 THE ROLE OF THE MEDIA

GOAL:

To have better processes in place to ensure accurate presentation of fire incident information through the media.

ACTIONS

44. Work with the tourism industry to develop their risk management strategy. [BFMC]
45. Before/during a fire, convey explanations of what control strategies and why, to inform community. [BFMC]
46. Undertake pre-season briefs to journalists; discourage use of sensitised language (e.g. National Parks destroyed, trashed, destruction and horror, fire hell etc). [District Committee, RFS, NPWS, BFMC]
47. Engage local media in communicating exactly which areas are out of bounds, so they people don't stop coming to remaining open areas. [BFMC]

11 POST FIRE RECOVERY

GOAL:

To adequately fund ecological restoration after a large wildfire.

ACTIONS

48. Approach the Environmental Trust regarding the establishment of a delineated fund (possibly from Trust Funds) to support ecological restoration which could be needed for several years post-fire and ensure initiative is appropriately linked to Section 44 state level response and also the SCA for post fire ecological funding to protect catchment values. [NPWS]
49. Ensure a strategic approach to site rehabilitation e.g. by placing an emphasis on rehabilitation of weedy sites that are a threat to natural values downstream. [Land managers]

Report on Grose Valley Fire Forum – Saturday 17th February 2007

50. NPWS to consider establishing a new dedicated staff position to coordinate and manage volunteers undertaking rehabilitation projects and activities within the Blue Mountains region of DEC. [NPWS]