Report of the Inquiry into the 2002-2003 Victorian Bushfires

State Government Victoria

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Letter of Transmission

The Hon. Steve Bracks, MLA
Premier of Victoria
1 Treasury Place
Melbourne, 3002

Dear Premier

Report of the Inquiry into the 2002-2003 Victorian Bushfires

The Victorian environment is one of the most bushfire prone areas in the world. Victoria has met the challenge of unplanned fires in a variety of ways, including the establishment of legislative and organisational structures for fire prevention planning, mitigation and suppression, as well as emergency management legislation to ensure a co-ordinated approach to prevention, response and recovery. More recently, Victoria has fostered an active fire management partnership with the community; no longer seeing the community as simply a passive recipient of services. Victoria is working to empower and support its citizens in making informed choices in both developing a personal fire plan, and being confident to institute safe behaviours when confronted by fire.

This Inquiry is the fifth major inquiry resulting from significant bushfire events in Victoria. We follow the 1939 (Black Friday) and the 1944 Stretton Royal Commissions, the 1977 (Black Saturday) Esler Barber Board of Inquiry and the Inquiry conducted by the Chief Commissioner of Police and Co-ordinator of the Victorian State Disaster Plan, S.I. Miller following the Ash Wednesday fires of 1983.

In addition to these major Inquiries there have been a number of comprehensive reviews following other fire events, as well as significant Coronial Inquests; the most recent being the investigations and inquests into the death of 5 firefighters at Linton.

Victorians respond seriously to the threat of fire and to the fire event itself. The emergency services invest significant effort into learning from emergency events in Victoria, interstate and internationally. Victoria has not been afraid to actively and independently review fire events and then engage in dialogue with the community to establish a better way forward. For example, the Stretton Royal Commissions resulted in the creation of the CFA in 1945; the 1977 Inquiry strengthened municipal fire prevention arrangements and critically commented on the State Electricity Commission and the role of power lines in fire causation. The *Emergency Management Act 1986* resulted from criticisms of the co-ordination and integration of fire response identified by the 1983 Miller Bushfire Review Committee.

The issue that differentiates this Inquiry from those of our predecessors is that we were not inquiring into a major disaster in terms of deaths, injuries and homes and property lost. On the contrary, a critical review of recent experience in Australia and overseas, points to a high degree of professionalism in emergency response that is assessed as equal to 'worlds best practice'. In saying this, however, community expectations of government and its emergency services have also changed and there is an understandably higher expectation of the quality of

fire mitigation/prevention, emergency response and recovery. Lessons have been learnt, fire prevention/mitigation can be enhanced, and organisational structures and systems can be further improved.

Over the last six months we have had the privilege of working with the Victorian community to search for a constructive way forward following the traumatic fires over the summer of 2002-2003. That the fire agencies and firefighters, paid and especially volunteers, and the many other support and ancillary services did an outstanding job for Victoria and Victorians is without debate. Many Victorians, in the path of the fires, willingly worked in partnership with the fire agencies and their communities, to protect their homes and their businesses. Empowering Victorians to be able to make an informed choice on whether to stay or evacuate has been a successful policy initiative arising from research into previous fatal bushfires including the Ash Wednesday Fires of 1983.

Those parts of Victoria not directly impacted by the fires were not neglected. While significant emergency response effort was deployed to the North East and Gippsland fires from early January until late March, the emergency service agencies maintained full service to the rest of Victoria. In the 4 months to end March 2003 the fire agencies attended 25 769 incidents including bushfires, structural fires and other emergencies.

The Victorian bushfires of 2002-2003, and those in New South Wales and the Australian Capital Territory, were started by lightning strikes from dry thunderstorms that swept South East Australia. All three jurisdictions were experiencing long periods of drought and all were involved in arduous and protracted fire campaigns. The fires of the Australian summer preceded catastrophic fire events that unfolded in the northern summer in Europe, Canada and America. While bushfires are not confined to the Australian continent, it was the first time that Victoria had called upon interstate and overseas firefighters for assistance. Victoria, prior to this event, had been a supplier of skilled personnel to the other States, particularly New South Wales (four recent major deployments), New Zealand and United States of America.

We wish to report to you that, in the response to the fires, we found no evidence of major systemic failure. While systems can be improved and there are opportunities for improvement identified in a number of areas, we found a generally strong commitment to agency co-operation and collaboration, a much improved sharing of common goals and an application to task that was unwavering. There was a commitment to keep the general public, and especially those directly affected, informed during all stages of the fires. This will set a benchmark for all such future events.

Public land management practice will benefit by a greater emphasis on prevention/mitigation, and more research into fuel reduction burning. Our conclusion can be summarised as recommending both the development of procedures to maximise the ability to achieve the strategic fuel reduction targets objectively established, and processes to measure and ensure that such programs are effective in mitigating the risk of unplanned fires. Our Interim report was described as recommending that it was 'not necessarily about burning substantially more land, but rather, burning smarter'. We stand by this assessment.

State agencies were not alone in this commitment during the fires. Other organisations, especially the Australian Broadcasting Corporation through local radio in Victoria, other media agencies, the Bureau of Meteorology, information and telecommunication companies (supplying equipment and services to support fire agencies and the community) and the power

companies (for quickly enhancing and restoring services) were repeatedly commended. The Inquiry would also like to highlight the support from Victorian businesses both for goods and services, **but more particularly**, for their willingness to release their staff to engage as volunteers in fire control and recovery. Without volunteers, the fire and emergency service capability of Victoria and of all other jurisdictions in Australia would be substantially compromised.

Behind the volunteers stand the unsung heroes - the families and employers who make sacrifices to enable volunteerism to be sustained. We believe they are owed a special debt of gratitude.

As, with any emergency situation, regardless of duration, there are lessons to be learnt. This is true for the fires of the summer of 2002-2003 that raged in Victoria's North West, North East, Gippsland and Southern Gippsland. The Inquiry, in its analysis of submissions, the research commissioned and community consultations has made many recommendations in relation to the events that unfolded and problems that were encountered during the fires.

It is axiomatic that when one strives for continuous improvement there will be instances, especially when viewed with the benefit of hindsight, where one may question the decisions and judgements made. The impressions and conclusions reached in this analysis have been explored in depth with the fire agencies and the wider Victorian emergency management agencies, with other stakeholders and with the communities affected by the fires. This process informed the conclusions and recommendations of our Report. Not all conclusions resulted in a recommendation and in places the Inquiry has raised issues that we would like to bring to your attention but that did not warrant the formality of a recommendation.

The recommendations of the Inquiry fall into three distinct groups.

The first group related to issues that required action prior to the forthcoming fire season and these were presented to you in the August Interim Report and formally accepted by the Victorian Government on August 26, 2003. We have begun to discuss the implementation of these recommendations with the agencies concerned and have been pleased with their support and commitment.

The second group of recommendations are contained in Parts A – D of the current report and cover a broad spectrum of matters from the partnership roles of local government, Departments, agencies, industry and communities in planning and mitigation, community education and response, firefighting strategies, command and control on the fire ground and other organisational issues. Part B is a scientific overview of the role of prescribed burning and other fuel reduction strategies for the mitigation of unplanned fires. All recommendations in Parts A – D require detailed strategic implementation plans and community engagement. Implementation should not be attempted for the forthcoming fire season as all participants would not be fully trained in the new approach and safety could then be compromised. Most should be fully operational by the 2004-2005 fire season.

The third group of recommendations contained in Part E, if adopted, will position Victoria's emergency management arrangements at 'worlds best practice'. These recommendations provide a way forward for the next 5 – 10 years. Some would require changes to legislation while others, a commitment of resources for a more integrated approach to information management.

Finally, we believe there could be individuals who will attempt to use this report to apportion blame. This would be disappointing.

We found no evidence to suggest that the individuals involved in the fires from either the fire services, or the public land management agencies, worked with anything other than a complete dedication to the task. While policies can be changed, and systems and structures further strengthened, individuals must work with the policies and systems at their disposal.

The recommendations made in this Report will not be effective without a partnership at the community level. In those areas where relationships have been strained by the experience of the fires, communities, fire agencies, public land managers and other government agencies must work together to rebuild those relationships. It is time now to move forward.

We commend all recommendations to you.

We also take the opportunity to acknowledge the May 2003 report of the Auditor-General of Victoria. The Report, *Fire Prevention and Preparedness,* investigated and researched many issues directly relevant to our Inquiry. We reviewed the Report of the Auditor-General in detail and support the recommendations made.

Finally, we would like to thank the staff of the Secretariat. Their commitment, expertise and dedication to the task was outstanding. Their sensitivity in working with communities and individuals still affected by their experiences during and immediately after the fires was even more impressive. Without their hard work this report would not have been written. We therefore express our sincere thanks to Cathryn Pilioussis, Geoff Conway, Bruce Gardner, John Houlihan, Suzanne Dixon and Karen Cleave, Secretariat Director. They in turn would like to thank David Roche, Helen Stitt and Ben Miller. Appreciation is also extended to those officers in the Department of Sustainability and Environment and the Country Fire Authority who were an on-going source of materials, information and experience.

Yours sincerely

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Table of Contents

Executive Summary

Part A Setting the Scene

2 Overview of Part A

Chapter 1 **4** **Introduction**
4 Overview
4 The 2002-2003 Bushfires at a Glance
4 After the Fires: Questions
5 Terms of Reference
5 How the Inquiry was Conducted
7 Aims of this Report
7 Interim Report: August 2003

Chapter 2 **8** **The Changing Victorian Environment**
8 Overview
8 The Victorian Landscape
9 Fire in the Victorian Environment
15 Exposure of People and Assets to Bushfire Risk
16 Population and Cultural Change
17 Changes in Victorian Response to the Threat of Unplanned Fire
19 Conclusion

Chapter 3 **20** **Current Legislation and Co-operative Arrangements**
20 Overview
20 Victorian Legislation
20 Emergency Management Act 1986
20 The Fire Agencies
22 Other Agencies and Organisations in Fire Management
27 Conclusion

Chapter 4 **28** **The Story of the 2002-2003 Victorian Fires**
28 Overview
28 Drought – A Key Context for the Fires
30 The 2002-2003 Fire Season
30 The North East and Gippsland Fires
37 Agency Response to the Fires
37 Keeping the Community Informed
41 Impacts of the Fires
42 Conclusion

Chapter 5 **44** **Submissions and Community Consultation**
44 Overview
44 The Submission and Community Consultation Process
45 Origin of Submissions
45 Key Themes
48 Term of Reference 1
48 Land Management/Preparedness
50 Agency Preparedness
53 Term of Reference 2
53 Response
56 Management of Resources
58 Recovery Issues
60 Conclusion

Chapter 6 **61** **Weather Conditions Before and During the Fires of 2002-2003**
61 Overview
61 Statewide Weather Conditions
62 Weather Conditions in the Fire-Affected Areas
66 Comparison of Weather Conditions Among Years of High and Low Areas Burned
69 Conclusions

Part B Term of Reference One: Fire and Public Land

72 Overview of Part B

Chapter 7 **74** **Background to Prescribed Burning in Forests**
74 Overview
74 Background
74 Who does Prescribed Burning? Where?
75 The Prescribed Burning Debate
75 Forest Types
75 Fuel Types and Loads
77 Fire Behaviour and Fire Weather
77 Rationale for Prescribed Burning
78 Intervals Between Prescribed Fires
80 DSE's Fuel Management Zones
80 Tracks
82 Conclusion

Chapter 8 **84** **Fuel Management in the 'High Country'**
84 Overview
84 Burning and Grazing in the High Country
86 Conclusion

Chapter 9 **87** **Fuel Management in the 'Mallee': Techniques and Approaches**
87 Overview
87 What is Mallee?
87 Fire and Fuel Management in the Mallee
90 Conclusions

Chapter 10 **92** **Constraints on Prescribed Burning in Forests**
92 Overview
92 Constraints on Prescribed Burning
96 Prescribed Burning Realities: Analyses Undertaken for this Report
103 The Weather Envelope for Prescribed Burning
106 Conclusions

Chapter 11 **108** **Measuring the Effectiveness of Prescribed Burning**
108 Overview
108 Introduction
108 Measuring the Effectiveness of Prescribed Burning
109 Effectiveness Measures
113 Philosophical and Comparative Approaches to Determining Effectiveness
113 The Importance of Quantitative Data
114 Conclusions

Chapter 12 **117** **Traditional Burning Practices of Aboriginal People and the Prescribed Burning Debate in Victoria**
117 Overview
117 Arrival of People and Their Possible Impacts
119 Problems of Reconstructing the Past
120 Fire and Change in the Australian Biota
121 Problems for Modern Fire Management
122 Conclusions

Part C Term of Reference One: Community and Agency Preparedness

126 Overview of Part C

Chapter 13 **128 Public Awareness and Preparedness**
128 Overview
128 Community Understanding of Heightened Fire Risk for 2002-2003
129 Understanding Bushfire Options: The Decision to Stay or Go?
131 CFA Community Education and Information Program
132 Four Current Programs
136 Public Awareness Communication Systems
138 Insurance as a Preparedness Measure
138 Conclusion

Chapter 14 **139 Planning for Fire – An Holistic Approach**
139 Overview
139 Municipal Fire Prevention Plan
144 Concerns Relating to Existing Planning Arrangements
144 A New Approach to Municipal Planning
147 Involvement in the New Planning Arrangements
147 Management of the New Planning Arrangements
149 Conclusion

Chapter 15 **150 Agency Preparedness**
150 Overview
150 External Influences on Fire Agencies Prior to the 2002-2003 Fire Season
151 Impact of the Drought on Water Availability for Firefighting
152 Joint Planning
153 Agency Resources
154 Agreements and Memoranda of Understanding
158 Information Management Costs
160 Roads and Access Tracks
161 Aircraft
162 Conclusion

Chapter 16 **163 Emergency Services Preparedness**
163 Overview
163 The Development of Victoria's Emergency Management Arrangements
164 Role of the Minister
164 Victoria Emergency Management Council
164 The Emergency Management Arrangements
165 Emergency Response Arrangements
165 Multi-Agency Exercises
165 Emergency Recovery Arrangements
166 Emergency Management Preparation for the 2002-2003 Fire Season
166 Continuous Improvement
167 Conclusion

Part D Term of Reference Two: Response and Recovery

	170	Overview of Part D
Chapter 17	**172**	**Initial Response to the Fires**
	172	Overview
	172	Factors Affecting Initial Attack
	178	The Fires that Were Not Contained
	179	Conclusion
Chapter 18	**180**	**The State's Emergency Management Arrangements in Action**
	180	Overview
	180	Municipal Emergency Co-ordination
	181	Evacuation
	181	Divisional Emergency Co-ordination
	182	State Level Co-ordination of Emergency Response
	183	Co-operation Between Agencies
	184	Deployment of Metropolitan Fire and Emergency Services Board Personnel
	185	Deployment of Victoria State Emergency Service Personnel
	185	Conclusion
Chapter 19	**186**	**Did the Incident Control System Work?**
	186	Overview
	186	Regional Emergency Co-ordination
	186	Structure of Incident Management Teams
	187	Qualifications for Incident Management Team Members
	187	Incident Control Centres
	188	Transferring Control from One Incident Control Centre to Another
	189	Conclusion
Chapter 20	**190**	**Development and Implementation of Fire Control Strategies**
	190	Overview
	190	Application of the Fire Control Priorities to Incident Action Planning
	191	Aggressiveness of Firefighting
	193	Consistency of Strategy
	194	Use of Local Knowledge
	196	Information Gathering
	196	Cross Border Liaison and Strategy Development
	196	Briefings
	197	'No Go Zones'
	197	Use of Bulldozers
	198	Conclusion
Chapter 21	**200**	**Other Response Issues**
	200	Overview
	200	Keeping Track of Firefighting Resources
	200	Management of Firefighting Resources in the Field
	201	Management of Privately-Owned Firefighting Resources
	202	Firefighting Vehicles
	202	Communications Facilities
Chapter 22	**204**	**Aircraft Operations and the State Aircraft Unit**
	204	Overview
	204	Integrated Firefighting Aircraft Resource
	205	Assessment of Aircraft Requirements for the 2002-2003 Fire Season
	206	State Aircraft Unit and Management of the State (IFAR) Aircraft
	207	Deployment of Aircraft During Operations
	211	Conclusion

Chapter 23 **212** **Communication with the Community**
212 Overview
212 The Challenge: Maintaining Communication with *All* Fire-Affected Communities
213 Radio Coverage in Rural Victoria
214 Mixed Messages Across the Border
214 Local Accuracy for Emergency Announcements
214 Australian Broadcasting Corporation
215 Conclusion

Chapter 24 **216** **Social, Business and Environmental Recovery**
216 Overview
216 The Ministerial Taskforce on Bushfire Recovery
216 Overview of the Recovery Process
219 Response and Recovery: Two Sides of the Same Coin
220 Relief and Recovery – Predictable, Equitable, Consistent
222 A Case Management Approach to Recovery
223 Fencing and Rehabilitation: Private Land Damage Following Fire Suppression Works
223 Conclusion

Part E Term of Reference Three: The Way Forward

226 Overview of Part E
Chapter 25 **228** **The Way Forward: Planning**
228 Overview
228 Emergency Management in Victoria
229 The Balance Between Prevention/Mitigation and Response for Public Land
230 Managing Information
232 Model Of Fire Cover – Fire Safety Victoria Strategy
233 Public Land Stewardship – A New Approach
235 Planning For Emergencies at the Local Level
236 Human Resources
239 Conclusion

Chapter 26 **240** **The Way Forward: Unified Command and Control**
240 Overview
240 A Unified Command and Control Model
242 Response to the CFA Proposal
246 Conclusion

Appendices

251 **Appendix I** Respondents to the Inquiry
255 **Appendix II** Consultations and Meetings
259 **Appendix III** Interim Report of The Inquiry Into The 2002-2003 Victorian Bushfires, August 2003
267 **Appendix IV** Bushfires on Public Land - Historical Data
269 **Appendix V** Climate, Weather and Unplanned Fires in Victoria
275 **Appendix VI** Supplementary Figures for Chapter 6
279 **Appendix VII** A Report on The Aerial Firefighting Resources, Prepared by AVISE, Captain Nick Le-Ray-Meyer AM, APTL

Glossary

319 **Glossary of Terms**

Executive Summary

Backburn
in Big Desert
December 2002
– DSE

Executive Summary

The Inquiry into the 2002-2003 Victorian Bushfires was established to look into all aspects of the preparations for, and response to the fires, and in particular to identify opportunities to learn from them and further improve Victoria's fire management capability - prevention, mitigation and response.

There will be some who attempt to use this report and its recommendations to apportion blame, and to advance their own agendas.

We believe that the overwhelming majority of Victorians including those who contributed in some way to the Inquiry, are more interested in ensuring that their views are appropriately included in the process of better understanding these fires - what worked well, what needs to be improved and what can be done to mitigate the risk of fires like these occurring again.

It is easy to look back at emergencies with the benefit of hindsight, and identify areas that could have been managed differently or handled better. The report of this Inquiry is no different. We have made many recommendations intended to create a more seamless, and a stronger approach to fire management planning on both private and public land, and to improve the effectiveness of mitigation and prevention programs on public land. We have also looked at possible improvements to fire management operational systems and organisational arrangements.

This report may appear critical to some, but in focusing on opportunities for improvement, it is inevitable that more analysis will be devoted to what can be improved, rather than to list what went well.

In comparing the conditions leading up to the Black Friday Fires of 1939, and the fires of 2002-2003, the similarities are very apparent. The area of land burnt is also similar. What is substantially and starkly different is the number of deaths and injuries, and the property loss associated with the fires.

We believe the fires were, generally, well managed and analysis of the losses, *and saves*, during the fires supports this conclusion. There has been very significant improvement since 1939, and even since the Ash Wednesday Fires of 1983. However, the expectations of the Victorian community are much higher now than in 1939, and we have identified opportunities to further strengthen our arrangements, and a strong community demand that this be done.

Finally, the Inquiry would like to restate its respect for the commitment and professional way the many firefighters and support staff - paid and especially volunteer - fought the fires of 2002-2003. We have nothing but praise for their efforts.

Part A
Setting the Scene

Overview

The Inquiry was presented with many passionately held views on a broad range of topics relating to bushfires (or 'unplanned' fires) in Victoria. Submissions and discussions ranged from Victoria's history, climate, weather, geography, topography and the introduction of Europeans into Victoria; past and present land management policies and practices; previous reports and inquiries and the command and control system employed to manage unplanned fires today. Much of the debate was informed; some was not.

To effectively respond to the Terms of Reference we thought it necessary to explore the background and history of many of these issues to provide a common platform for future debate and to place the recommendations of this Report in perspective. These explorations are in Part A. How they impacted on the fire and the fire response itself are in Parts B to E.

Finally, in preparing this Report we were not able to investigate and analyse every anecdote and incident brought to our intention; rather we addressed the broad themes and issues. However there were 5 events that warranted scrutiny and these are considered as case studies and are analysed in Parts C and D.

Chapter 1
Introduction

The Victorian summer of 2002-2003 saw bushfires burn the greatest expanse of land (1.3 million hectares) since the 1939 fires (estimated at 1.5-2.0 million hectares). As in 1939 and 1983 the fire season followed prolonged drought.

The scale and duration of the fires across the State tested the capacity of fire agencies and the community. Response to the bushfires ranged from relief that there was not greater loss, given the potential of the fires, through to anger and criticism of Victoria's public land management and the way the fires were fought.

The Inquiry into the 2002-2003 Victorian Bushfires was established to examine the effectiveness of the preparedness for the season and the response to the bushfires, as well as to provide recommendations for the future.

There are no recommendations in this Chapter.

Chapter 2
The Changing Victorian Environment

Victoria has one of the most fire-prone environments in the world due to the combination of its landscape, vegetation, climate and weather conditions. Change in the vegetative cover, land use and management, and population distribution across the State have influenced the fire risk. Victoria's high population density and increasing permanent and weekend communities in areas of high landscape value are often also at high risk of bushfires.

Victorians have responded to fire events and the threat of bushfire by progressively building a sophisticated fire management system based on organisational advances, legislative change, the application of technology and co-operative management models. We should not be complacent.

That change is constant is evident in our climate and we explored the pattern of extreme fire weather associated with El-Niño-Southern Oscillation events. This examination revealed possible increases in fire risk for Victoria as the climate warms, supporting the need for adaptable systems.

Recommendation

2.61 That DSE and CFA as part of their long term planning, and in conjunction with the Commonwealth Bureau of Meteorology, consider ways in which evidence for climate change and El Niño–Southern Oscillation cycle impacts on the likelihood of unplanned fire, can be better incorporated into preparedness and response planning.

Chapter 3
Current Legislation and Co-operative Arrangements

Current Victorian legislative and regulatory arrangements relating to planning and mitigation for unplanned fires, are complex, requiring a high level of co-operation and communication between the many agencies and organisations involved, and do not effectively cover all agencies and utilities in terms of broader regional planning.

The Legislation for suppression of fires is clearer, as it is for the response to, and management of, other emergencies. The three agencies that respond directly to fires: the Metropolitan Fire and Emergencies Services Board (MFESB), the Country Fire Authority (CFA) and the Department of Sustainability and Environment (DSE) have clear legislative accountabilities.

The analysis here is a critical input into development of the proposed new Municipal Fire Management Plan recommended in Chapter 14.

There are no recommendations in this Chapter.

Chapter 4
The Story of the 2002-2003 Victorian Fires

The 'story of the fire' describes the fire event and acknowledges the efforts of the fire agencies, crews and volunteers, those communities affected and Victorians as a whole. We provide an analysis of events, locations, and immediate impacts and begin to address the longer-term effects. This later theme is progressed in Chapter 24.

Overnight on 7 and 8 January, a dry storm ignited over 80 fires in the North East and Gippsland. Location of, and response to, so many fires was a complex task, but by the second day 40 fires were contained or under control. By 14 January, however, a small number of fires, mostly in steep inaccessible forest continued to burn. There have been criticisms of the initial response to the fire suppression effort and these are explored in detail in Chapter 17.

Towards the end of January, deteriorating fire weather saw the fires begin to join up and the area affected by the fires increase exponentially. January 25 and 30 were days of extreme weather, producing intense and erratic fire behaviour and spread. During February the weather was milder, reducing fire activity and enabling gradual control of the fires. On March 7 the fires were declared officially contained.

The North East and Gippsland fires burnt 1.12 million hectares of land, including over 108,000 hectares of private land. No lives were lost as a direct result of these fires. The next largest fire over the 2002-2003 fire season, burnt approximately 181,400 hectares in the Big Desert in the State's North West during December 2002.

There are no recommendations in this Chapter.

Chapter 5
Submissions and Community Consultation

The Inquiry received 273 submissions and consultations occurred with over 400 individuals and representative groups throughout the State. When the community was asked to recommend improvements to the State's fire management arrangements, as expected, the process elicited more negative comments than positive. However, the issues raised and matters of concern were surprisingly uniform from the North West of Victoria to far East Gippsland.

Principal areas of concern included;

- Land management preparedness, principally fuel reduction on public land;
- Agency preparedness;
- Response issues, that is how the fire was fought;
- Management of resources in the fighting of the fires; and
- Recovery issues.

These issues, and their subsets, are detailed within the Chapter. We respond to the matters raised with us in detail throughout the Report with Part B concentrating on land management and Parts C and D on the remaining matters.

There are no recommendations in this Chapter.

Chapter 6
Weather Conditions Before and During the Fires of 2002-2003

Weather and climatic patterns play a significant part in assessing fire risk and in fire suppression. We explored the impact of weather conditions, including drought, leading to the 2002-2003 fire season and those over the last 20 years. The opinion that the summer's weather was 'benign' is not supported by evidence. We conclude that the weather pattern was similar to that of 1983 before and during the fires.

We note one significant difference. In the North East there was no rainfall >5 mm on any day within the 2002-2003 fire period until February 22 (a period of more than 40 days from the commencement of the fires).

Between 1986 and 2002, Victoria experienced a period of very low area burnt by unplanned fires per year with an average to 26,000 hectares per year between 1988 and 1998 compared with the long-term average of around 120,000 hectares. During this time there was an increase in the actual number of fires, particularly in several high fire risk years. Reviewing all relevant parameters, we conclude that successful fire suppression by DSE and CFA is more likely than benign weather as an explanation for this pattern of low burn area years.

Recommendations

6.38 That DSE institute additional routine data storage and analysis to supplement current climate records with at least daily 3 pm values for the Grassland and Forest Fire Danger Index, and Keetch-Byram Drought Index, for selected high quality stations representing a cross-section of environments throughout Victoria.

6.39 That DSE and CFA, recognising that the Bureau of Meteorology does not routinely store all variables required to produce the calculations and indices necessary for research and planning into fire occurrence and behaviour, develop appropriate systems to ensure that such current and historical information is readily available and accessible.

Part B
Term of Reference One: Fire and Public Land

Overview

Part B explores the technology and science behind the prescribed burning debate, however, it is really a subset of the complex matter of fire and land management. This topic elicits passionate views and this is evident from the submissions and consultations. Part B was written to demonstrate the complex nature of fire and land management issues and in a limited sense, informs the reader of the scientific basis for choices made in the past, in the present system of public land management, and in relation to recommendations for the future.

Managing public and private land to mitigate the threat and impact of fire requires understanding of the inter-relationships between climate, topography, aspect, weather, as well as vegetation, fuel load and fuel moisture content, land use and the proximity of public land relative to that of private landholders and urban developments.

Public land management, as for private, is complicated because reduction in fire proneness and intensity is not a solitary, independent, land management objective. Other objectives concern water quality and quantity, flora and fauna, agriculture, tourism and other commercial enterprises and fires affect them all.

The Inquiry found that Victorian agencies had a growing understanding of the science of fire behaviour, prescribed burning and other fuel management strategies but were hampered by both incomplete and inadequate data holdings, and lack of rigor in ground observations, necessary to best advantage this understanding for future management purposes. Recommendations are made in respect of these issues.

The Chapters of Part B are quite theoretical, however, the prescribed burning debate has been, at times, ill informed and peppered with gross exaggerations and the view by some that 'one size fits all'. These Chapters seek to provide a more objective consideration of the prescribed burning debate and in so doing dispel the myths.

Chapter 7
Background To Prescribed Burning In Forests

'Prescribed burning' is the term used to describe deliberately lighting fires under safe conditions for a variety of land management purposes. Factors that affect prescribed burning are; forest or other vegetation type; fuel types, loads and condition, fire behaviour, climate and weather, the interval between burns, assessment of risk, and availability of trained and qualified crews to manage the event. A number of these factors are explained in detail in this Chapter.

DSE has developed five 'Fuel Management Zones' to deliver a strategic approach to fuel management on public land. The focus of these zones ranges from the Asset Protection (Zone 1) to the Exclusion of Prescribed Burning (Zone 5). These zones provide the framework for decision-making regarding the prescribed use of fire.

Tracks are an important tool for the management of prescribed burning as well as for firefighting. Tracks provide an edge against which ignition for burning out areas of fuel can take place. They define blocks for prescribed burning, as well as providing access for ground crews for ignition or suppression purposes. Submissions to the Inquiry identified tracks and access to public land as a significant issue. Comments to the Inquiry noted that unless essential tracks are well maintained and mapped accurately their usefulness cannot be maximised in suppression activities. The issue of tracks is addressed again in Part C, Chapter 15

There are no recommendations in this Chapter.

Chapter 8
Fuel Management In The High Country

Cattle grazing in the High Country has a long tradition. The practice generates strong and passionate views on the cultural, community and heritage values of grazing and with the value of cattle grazing for fuel reduction. Whether or not grazing should continue at all, or at reduced levels, is outside the scope of our deliberations.

Any approval for High Country grazing should not be based on any effect they may have on unplanned fires.

Burning of the sub-alpine forests by early European settlers to encourage the proliferation of grasses for grazing, appears to have led instead to replacement of grasses by an understory of flammable shrubs. Grazing by cattle on High Country grasslands and herbfields, an evolutionary novelty, does not reduce the flammability of associated shrubs – the most fire prone vegetation - nor appear to prevent the spread of fire above that of ungrazed land.

Recommendation

8.25 That, according to available scientific evidence, a decision regarding cattle grazing in the High Country should not be based on the argument that 'grazing prevents blazing.'

Chapter 9
Fuel Management in 'Mallee': Techniques and Approaches

The nature of the vegetation, its distribution and accumulation in mallee and associated non-eucalypt shrublands requires substantially different approaches to fuel reduction practices for fire mitigation than those used for the forested areas of Victoria.

DSE, through mechanisms such as the Draft Mildura Fire Protection Plan, has formalised fire mitigation practices and activities for the mallee. Relatively new practices such as 'chaining plus burning' need to be monitored and evaluated. The practice could replace that used to create 'link burns' between patches caused by recent unplanned fires.

Recommendations

9.30 That if 'link' burns continue to be used, then on-site weather sequences and fuel conditions marking successful ('within explicit prescription') and unsuccessful burns be documented.

9.31 That the success of current buffers in terms of assisting suppression operations be continually reviewed, evaluated and documented.

9.32 That the creation of buffers by chaining and then burning swaths of mallee be explicitly monitored for:

- The risk of fire escapes during their establishment;
- Their effectiveness as a barrier to unplanned fire under various weather and fuel conditions; and
- Any adverse environmental effects such as soil mobilisation and loss of biodiversity.

9.33 That, as a result of this monitoring, weather conditions for the safe conduct of burning in such operations should be defined.

Chapter 10
Constraints On Prescribed Burning in Forests

The number of days that meet the weather prescriptions for fuel reduction burning are few; around 10 on average per year. Therefore everything should be done to maximise the opportunities that those days present including burning on weekends, and investigation of the plausibility of burning in Spring.

A range of variables, apart from weather, can be used to advantage to extend the number of days on which fuel reduction burning can safely take place. Such variables include; terrain, fuel load and condition, time of day and ignition pattern.

DSE gives priority to regeneration or slash burns (following timber harvesting) over burning for fuel reduction or ecological purposes. In Gippsland and the North East around 63% of the 4295 planned fires are regeneration burns, while 33% are for fuel reduction and the remainder are ecological burns. However, prescribed burns account for more than 90% of the area burnt.

In recent years, areas that have been prescribed burned in the North East and Gippsland (regardless of fuel management zone) are below rates likely to be satisfactory either for fuel reduction for purposes of asset protection, or for the ecological needs of plant communities.

Recommendations

10.65 That a review of the fuel management zones be implemented with a view to reducing the number of zones so as to focus clearly on (i) asset protection (especially at the Public/Private land interface), and (ii) ecological burns.

10.66 That an explicit formulation of the interactions between terrain, fuel, ignition pattern, time of day and weather be created to better define those days suited to prescribed burning.

10.67 That evidence of the rekindling or otherwise of spring prescribed burns in forests be assembled and a model constructed and tested to see whether or not some days in spring could be used for prescribed burning in certain circumstances and places, especially in Zone 1.

Chapter 11
Measuring the Effectiveness of Prescribed Burning

There is no current body of opinion that allows unequivocal or immediate choice of an appropriate measure for the effectiveness of prescribed burning. As the influencing factors of climates, landscapes, technology and social conditions change, so do the most appropriate levels and types of fuel modification in different environments.

Prescribed burning reduces fuel quantities and changes the status of fuels, which by definition reduces potential fire intensity. This mitigates the effects of unplanned fires, improves the chance of control and therefore reduces the risks to life, property and other values.

Prescribed fires may reduce the potential risk from unplanned fires but they may escape and become unplanned fires themselves. Prescribed fires generate smoke and other offsite impacts. The community and agencies will have to work together to minimise undesirable impacts.

Setting an annual optimum area for prescribed burning is a difficult yet primary task for fire managers. To improve decision-making and establish appropriate burn areas, greater collection and use of targeted data is required. Getting this right is pivotal to effective public land management in Victoria.

Recommendations

11.71 That DSE:

- Provide further training and/or field staff for the routine acquisition and reporting of geographic data (maps of fire extent for prescribed and unplanned fires) and fuel-array data (quantity, type, condition and arrangement before and after fire as in the Overall Fuel Hazard Guide).
- Routinely and explicitly report on measures of the effectiveness of the prescribed burning program.
- Measure the total area subject to prescribed burning treatment in each Fire Management Zone each year along with the average proportion of that area successfully burned.
- Develop an explicit, routine system of evaluation, analysis and reporting of the effects of prescribed burning in relation to environmental outcomes such as conservation of flora and fauna and water quality.
- Train more crews, use Project Firefighters more extensively (and CFA members or MFESB firefighters where appropriate), to undertake prescribed burning.

11.72 That DSE undertake a formal study of the level of prescribed burning in south western Australia for its possible application in Victoria by comparing respective fuel arrays, terrain, weather, ground access, staff, prescribed burning days, areas conducive to prescribed burning and fire response systems.

11.73 That DSE and CFA map all unplanned fires greater than four hectares on public and private land in order to further develop an understanding of the risk to rural Victoria from unplanned fires.

Chapter 12
Traditional Burning Practices of Aboriginal People and the Prescribed Burning Debate in Victoria

A particular line of reasoning suggests that if we burned the landscape in the same way as the Aboriginal people did in the pre-European period then we would not have the problems we have today with unplanned fires and with conservation of native flora and fauna. To many, this is a highly attractive philosophy. However, to apply this philosophy we would need to know the details of past 'Aboriginal' fire regimes so we could attempt to recreate them.

Historical accounts from southern Australia, and direct evidence from central and northern Australia, support the argument that Aborigines used fire as a land management tool. Evidence also suggests that some areas of Australia may not have been subjected to this managed fire because of low human population density and resource availability. Other areas were not burned due to their cultural significance or because they were difficult to burn.

After reviewing the evidence, the Inquiry concludes that we do not know enough about traditional burning in southern Australia to be able to re-create an Aboriginal burning regime. Knowledge has been lost, or is fragmentary, and any use of a 'traditional Aboriginal burning regime' in southern Australia would be an experiment in land management and should be recognised as such.

There are no recommendations in this Chapter.

Part C
Term of Reference One: Community and Agency Preparedness

Overview

In Part C, we determine whether Victoria and Victorians were prepared for the fire season of 2002-2003 and the events that followed. We conclude that they were but more could have been done in a number of areas, particularly holistic fire prevention planning.

We investigate, comment on, and make recommendations in respect to community knowledge and engagement, the preplanning by the emergency management agencies and the fire agencies in particular, and the public and private land based fire prevention planning models.

We conclude that within the parameters of current legislation, policy and procedures what could be done prior to the event was done. If the rules were changed could we have done better - yes. Would the fires still have occurred - yes. Would they have been as extensive - we do not know and are unlikely to ever know.

If our recommendations are accepted and implemented, the Victorian community would share an appropriate level of responsibility for fire risk and be partners in the decisions that are taken on their behalf to protect their communities, rather than simply the recipient of those decisions. Community agreement on personal and community assets and values will be planned, as will fire suppression strategies and the tactics to be employed.

Chapter 13
Public Awareness And Preparedness

Since the Ash Wednesday fires of 1983 there has been significant and continuing effort by the Government and the fire agencies in preparing the Victorian population for unplanned fires and empowering them to make informed decisions. The outcomes of the 2002-2003 fires show the success of this endeavour. There were no deaths in Victoria as a direct result of the fires.

Victorian fire agencies cannot suppress fires without the assistance and commitment of the public; as a volunteer or as an informed and active landowner and/or community member. Also, as was evident last summer, in extreme fires, the fire services are not resourced to be at every property threatened by fire on every occasion. Fire prevention, mitigation and suppression is a partnership and this partnership, in general, worked well last summer.

However, in some cases the public were not prepared for the self-help role required of them and alternative fire suppression models must be developed to assist small, isolated communities. Overall, there needs to be a more flexible approach to providing a broader suite of fire readiness and management strategies for Victorians.

There are lessons to be learnt from the 2002-2003 fires and they include greater clarity in terminology and language used when engaging the public.

Recommendations

Understanding Bushfire Options: The Decision to Stay or Go?

13.23 That CFA further develops the information supporting the decision to stay or go, to incorporate a better understanding of both the likely consequences of leaving home at inappropriate times, and the conditions and emotional impacts likely to be experienced during the passage of the fire front.

Community Education and Information Program

13.53 That the three fire agencies (CFA, DSE and MFESB) develop and implement a joint Statewide fire awareness education and information program aimed at encouraging a higher degree of personal and household self-reliance.

13.54 That CFA should remain the lead agency in delivering the community education and information program to rural Victoria.

13.55 That CFA and MFESB:

- Conduct an annual survey of households to test the level of awareness and acceptance of fire knowledge amongst Victorians; and
- Regularly measure whether access to information leads to safe behaviours.

13.56 That the Co-ordinator-in-Chief of Emergency Management directs that all emergency management agencies review, by June 2004, terminology and language in current communication and public education material to ensure it is clear, easily understood and consistent, particularly with regard to fire.

13.57 That CFA and MFESB encourage householders to review their fire safety plan annually.

Community Fireguard

13.75 That CFA, in conjunction with isolated small communities, develop and promote a suite of appropriate fire readiness and fire management strategies to meet their needs.

13.76 That CFA reports to the Minister for Police and Emergency Services on recommended solutions and implementation strategies for isolated small communities by June 2004.

13.77 That CFA clarifies and restates the roles and function of existing Community Fireguard Groups (including their relationship to the Municipal Fire Prevention Plan) to members, co-ordinators, Incident Controllers and Municipal Emergency Resource Officers, prior to the 2003-2004 fire season.

13.78 That Community Fireguard Group co-ordinators' names are supplied to their local municipality for the 2003-2004 fire season, and are updated annually for use in information exchange should a Municipal Emergency Co-ordination Centre or Incident Control Centre be established.

13.79 That CFA provides technical advice to Community Fireguard Groups in the selection and purchase of appropriate equipment and protective clothing for use on their own land.

13.80 That CFA, recognising the value of the Community Fireguard Group program, undertake a review by June 2004 to identify opportunities to further develop the program to ensure its continuing appropriateness in preparing communities for fire into the future.

Public Awareness Communication Systems

13.93 That the Co-ordinator-in-Chief of Emergency Management directs the Media sub-committee of the State Emergency Response Committee to review the use of the Standard Emergency Warning Signal and its accompanying message.

13.97 That Victoria include an agenda item for both the National Emergency Management Committee and the National Meeting of Emergency Services Ministers recommending that the Australian Communications Authority review both the Commercial Radio Codes of Practice and Guidelines, and Community Broadcasting Codes of Practice, to ensure they provide necessary guidance and obligations on radio stations during emergencies and in relation to emergency warnings.

Insurance as a Preparedness Measure

13.103 That CFA, in their education and information packages, encourage appropriate insurance cover, and ensure that insurance becomes a part of the householder's annual checklist.

13.104 That Government work with the insurance industry to explore options for incentives such as a reduction in premiums for those who take appropriate self-protection measures on their properties, similar to incentives for anti-theft home security.

Chapter 14
Planning for Fire – An Holistic Approach

This Chapter builds on the review of legislation in Chapter 3 and explores in detail the role of all parties: public and private landowners and managers, utility providers and Municipal Councils in fire prevention planning and mitigation and determines that there is a better way, and recommends the establishment of a Municipal Fire Management Plan.

Good faith participation is the key to the development of an effective Municipal Fire Management Plan and we talk about the parties who should be involved and their role in its development. Fire does not respect boundaries; we must therefore move forward from the traditional model of fire prevention planning based on land type.

We found that utilities and plantation companies are generally well prepared to protect their own assets, however, their broader role in regional preparedness needs to be strengthened. They have a range of disparate reporting arrangements that do not 'mesh' or nest these planning functions regionally. This may require legislation to ensure appropriate 'community safety provisions'.

Fully audited Municipal Fire Management Plans should replace the current arrangements, and capture all public and private land, and all regional assets whether 'built' or natural.

Recommendations

Municipal Fire Prevention Plan

14.46 That, following the review of Forest Industry Brigades, the *Country Fire Authority Act 1958* be amended to ensure that the Forest Industry Brigades, which are acting in an approved manner, have the same powers and rights as other Brigades when attending fires on public land or interstate.

14.47 That CFA should not be given the power to direct Forest Industry Brigades to engage in fire prevention and suppression activities off their land and that decision should remain the responsibility of the plantation company.

14.57 That CFA and the Plantation Industry jointly develop and agree on Fire Prevention Guidelines for Plantations by June 2004, to be then promoted and distributed by the Industry.

14.58 That Municipal Councils:

- Ensure consistent approaches to planning for fire prevention and protection; and
- Consider existing rights of neighbours in planning development applications.

A New Approach to Municipal Planning

14.91 That Government review legislation for utilities operating within the State to ensure their involvement in regional fire preparedness and mitigation planning.

14.92 That the *Country Fire Authority Act 1958* be amended to:

- Replace the current Municipal Fire Prevention Plan and the requirement for a Fire Prevention Committee with a Municipal Fire Management Plan, and Municipal Fire Management Committee; and
- Bring together all stakeholders with an involvement in fire management for both private and public land within the municipality.

14.93 That the Victoria Emergency Management Council establish a sub-committee by June 2004 to ensure an all-agency and appropriate industries' policy framework is developed and agreed in respect to the planning for fire prevention, mitigation and suppression.

14.94 That the new Municipal Fire Management Plan is informed by the policy directions of the subcommittee of the Victoria Emergency Management Council.

14.95 That the Municipal Fire Management Plan amendment includes appropriate provisions for the audit of the plans including:

- Content;
- Process of development and implementation; and
- Compliance reporting to the Victoria Emergency Management Council.

14.96 That the Government identifies an appropriate body, or bodies, to undertake the audit of the Municipal Fire Management Plans.

Chapter 15
Agency Preparedness

The Inquiry assessed that CFA and DSE were appropriately prepared for the 2002-2003 fire season. They are recognised as leading firefighting agencies throughout Australia and overseas, however, there were many issues which had a significant impact on CFA and DSE prior to the fire season. All emergency services in Victoria, including CFA were assessing their capability to deal with the consequences of a terrorist attack. CFA and DSE had already provided firefighters to fires interstate and internationally and both were still involved in implementing the out workings of the Linton Coronal Inquest.

Despite changes in government organisational arrangements, an array of co-operative agreements between agencies, levels of government and interstate fire agencies, goodwill and personalities promoted sound co-operation between the various fire agencies.

The appropriate preparation of public land to mitigate fire was canvassed in Part B. Here we note that the costs associated with fuel reduction burning need to be more objectively analysed, and more flexible arrangements put in place to meet regional fuel management schedules on public land on an ongoing basis.

Finally, we note that there has been a high level of acceptance of AIIMS-ICS as the Incident Management System for the management of unplanned fires and other incidents requiring emergency response and we recommend concerted effort by CFA for full implementation across all its regions and groups. Chapter 19 recommends modifications to the application of AIIMS-ICS.

Recommendations

External Influences on Fire Agencies Prior to the 2002-2003 Fire Season

15.11 That DSE and the Department of Primary Industries formalise an agreement by the 2003-2004 fire season documenting the policies, procedures and financial arrangements relating to the availability of Department of Primary Industries staff to be trained and released for fire prevention and suppression activities on public land.

15.12 That DSE investigates whether such agreements should exist with other government Departments and agencies, particularly those with officers located in rural Victoria who may be involved in fire response and support operations in the future, based on their expertise and experience.

15.13 That DSE commences discussion with the Victorian WorkCover Authority in respect to employer liability for those staff being released to, and directed, by another agency in fire prevention and suppression activities.

Impact of the Drought on Water Availability for Firefighting

15.23 That Government in the development of its statewide water policy includes appropriate consideration of access to water for firefighting.

15.24 That communities, public land managers, Water Authorities and Catchment Management Authorities jointly identify and implement local and environmentally sound solutions to improve the availability of water for firefighting through the Municipal Fire Management Planning process.

15.25 That the fire agencies develop contingency plans in relation to access to water for firefighting, including where appropriate, the use of static, large volume water tanks.

Agency Resources

15.40 That DSE and CFA review selection and training programs for Incident Controllers and Incident Management Team members to ensure that they include all necessary competencies in recognition that technical skills are only one component of the required attributes.

Agreements and Memoranda of Understanding

15.54 That the Statewide Fire Control Priorities:

- Be developed annually by CFA and DSE;
- Be endorsed by the Victoria Emergency Management Council;
- Be incorporated into the co-operative agreement between DSE and CFA; and
- Inform the Fire Control Priorities in the Municipal Fire Management Plans.

15.67 That CFA continues to work with its Brigades to complete the integration of AIIMS-ICS with the Group Structure for full implementation by the 2004-2005 fire season.

15.76 That the Victorian fire agencies negotiate with their counterparts in New South Wales and South Australia to put in place agreements for mutual aid and the development of cross border strategy for the management of fires burning in the vicinity of, or across, State borders, and these agreements are reviewed annually.

15.77 That any local level agreements developed to address geographically specific risks or issues must be consistent with State-level arrangements.

Information Management

15.87 That Government supports the immediate development of financial models to analyse and determine the appropriate level of investment in fire management planning, preparedness and suppression on public land.

15.88 That the financial models incorporate changes in public land use, particularly 'Our Forests Our Future', and the subsequent changes in fire management priorities.

15.89 That the financial arrangements incorporate full cost recovery for prescribed burning to be undertaken over a number of weekends utilising Project Firefighters, CFA volunteers and MFESB members.

15.90 That Government reviews the funding for DSE for the 2004-2005 fire season to ensure that appropriate resources are available for fire prevention planning and preparedness.

Roads and Access Tracks

15.105 That DSE assesses the environmental and monetary cost of establishment and rehabilitation of temporary tracks, per 100 km, constructed during firefighting operations, and compare this with the recurrent costs of a program of maintaining existing tracks.

15.106 That DSE includes the cost of tracks, as above, in the development of financial models to analyse and determine the appropriate level of investment in fire management planning, preparedness and suppression on public land.

15.107 That DSE undertake community consultation on policies relating to roads and access tracks on public land, particularly in respect to fire management.

Chapter 16
Emergency Services Preparedness

Victoria's emergency management arrangements are constantly monitored and tested, both operationally and in redefining relationships.

The Co-ordinator-in-Chief, Emergency Services and the Victorian Government were fully informed of the level of preparation put in place by the fire agencies for the 2002-2003 fire season. A comprehensive risk assessment was carried out and detailed and appropriate pre season planning completed.

We note there has been very significant improvement in the integrated operation of the three fire agencies: CFA, DSE and MFESB. Opportunities for even closer collaboration are explored in Part E.

However, no emergency management arrangements are ever perfect, and living in a fire-prone environment in Victoria will always bring with it a degree of risk, and reviews following emergency events will always identify opportunities to strengthen the system or arrangements.

There are no recommendations in this Chapter.

Part D
Term of Reference Two: Response and Recovery

Overview

The Inquiry spent considerable time investigating the effectiveness of the response by the fire agencies to the fires. This was a pivotal issue for many in our community and elicited emotional, but considered, submissions and recommendations.

We fully explore the initial response to the fire outbreaks, the use of aircraft, the control and management of resources and the strategies and tactics employed over the 6 week campaign. We found no evidence of substantial organisational or systemic failure. We did however find room for improvement in the areas of application of AIIMS-ICS, integration of local knowledge into the development of strategies and tactics, and clarity in the emergency management arrangements as they relate to regional operations and partnership with the Municipal Emergency Co-ordination Centres.

We explored recovery processes and concluded that more certainty and flexibility is required in policies and processes.

Finally, we commissioned an independent assessment of the management of aircraft and the State Aircraft Unit, policies and procedures and present the findings in Chapter 22 with the full report at Appendix VII.

Chapter 17
Initial Response to the Fires

The Inquiry concluded that given the number, location and accessibility of fires caused by lightning strikes, the fuel load available to support fire, the prevailing weather conditions and the suppression resources available, all reasonable efforts were made by DSE and CFA to contain the fires as quickly as possible.

Aerial resources can play a crucial role in direct attack on small fires in remote and difficult terrain, and in holding fires in the early stages until firefighters are available for direct, ground attack. The National Aerial Fire Fighting Strategy proposed by the Federal Government in 2001-2002, had not been approved by the 2002-2003 fire season. The Inquiry believes this Strategy is urgently required.

While there have been suggestions that alternative strategies or priorities should have been established including more aircraft deployed to firebombing rather than reconnaissance in the initial stages, it is not possible to conclusively quantify what difference additional aircraft, or any other changed strategic response, would have made once the fires started.

There are opportunities for improvement in the way in which DSE and CFA fight fires and these are addressed in recommendations in this and the remaining Chapters of Part C.

Recommendation

17.51 **That an appropriately resourced, national aerial firefighting strategy is urgently required, and that the Victorian Government make representations to the Commonwealth to support the Australasian Fire Authorities Council recommendations.**

Chapter 18
The State's Emergency Management Arrangements In Action

The principles underpinning the Victorian emergency management arrangements are sound, and have been assessed as comparable with international best practice. They provide the appropriate guidance to those agencies involved in the planning for, response to and recovery from, emergencies in Victoria.

There is a need for some agencies to improve their understanding of, integration with, and application of these arrangements to ensure that their response to emergencies is effectively co-ordinated and meets the needs of all communities affected.

The level of co-operation between all agencies, particularly DSE and CFA during response to the 2002-2003 fires is acknowledged as being a significant improvement on that displayed in the past.

Recommendations

Municipal Emergency Co-ordination

18.12 That Incident Control Centres and Municipal Emergency Co-ordination Centres be collocated, wherever practicable.

18.13 That DSE and CFA ensure that:

- When a Municipal Emergency Co-ordination Centre is established in response to a fire, an appropriately experienced, trained and briefed officer of the control agency is appointed as liaison between the Municipal Emergency Co-ordination Centre and the Incident Control Centre; and
- There are appropriate training regimes in place to provide officers with the skills necessary to perform the role of Emergency Services Liaison Officer in the Municipal Emergency Co-ordination Centre.

18.14 That DSE and CFA work in co-operation with the Municipal Emergency Response Co-ordinators to develop and conduct joint exercises that practise the skills and test procedures for operations of the Municipal Emergency Co-ordination Centre, Municipal Recovery Centre and Incident Control Centres.

Evacuation

18.21 That Victoria Police ensure all police members understand the Victorian legislation in relation to evacuation, and that any decision to recommend evacuation remains with the Incident Controller.

Divisional Emergency Co-ordination

18.30 That existing DSE and CFA regional co-ordination arrangements be reviewed and any changes, such as the continued use of Integrated Multi-Agency Co-ordination Centres, be reflected in the Victorian emergency management arrangements.

18.31 That Victoria Police, CFA and DSE review the relationship between fire service regional co-ordination arrangements and Divisional Emergency Response Plans and that any changes be formalised in the emergency management arrangements.

State Level Co-ordination of Emergency Response

18.42 That a single state-of-the-art all hazards State Emergency Operations Centre be established for Victoria. This could, if necessary, be implemented in stages, initially incorporating DSE, CFA, MFESB and the State Aircraft Unit.

18.43 That the options of collocating the State Emergency Response Co-ordination Centre with the new State Emergency Operations Centre be explored.

18.44 That the State Emergency Operations Centre develop and maintain strong and close links with the State Emergency Response Co-ordination Centre, if collocation is not possible.

Co-operation Between Agencies

18.52 That the *Emergency Management Act 1986* be amended to require the development of agreements that describe joint operational arrangements between emergency response agencies.

18.53 That, wherever possible, Incident Management Team members from DSE, CFA and MFESB who are likely to be deployed together to manage fire, should train and exercise together.

Deployment of Metropolitan Fire and Emergency Service Board Personnel

18.57 That the MFESB continue to give priority to appropriate bushfire training for its firefighters.

Deployment of Victoria State Emergency Service Personnel

18.61 That VICSES, with the support of the CFA, includes basic fire safety training as one of the competencies for the VICSES Volunteers.

Chapter 19
Did the Incident Control System Work?

The Inquiry supports the continued use of AIIMS-ICS by emergency response agencies in Victoria. However, we note that the way in which DSE and CFA applied AIIMS-ICS during the 2002-2003 fires, and the process and procedures supporting the system were, at times, inflexible and restrictive.

The principal criticism - failure to effectively incorporate the knowledge of local personnel may have resulted in missed opportunities to undertake a more aggressive attack on the fires in some locations.

The Inquiry believes that DSE and CFA officers appointed as Incident Controllers must have a deeper understanding of the Victorian emergency management arrangements and the Municipal Fire Management Plan in addition to formal qualifications in Incident Management.

Recommendations

Regional Emergency Co-ordination

19.6 That the emergency management arrangements be amended to require Police Divisional Emergency Response Co-ordinators, in consultation with other response agencies, to establish and document procedures and structures at regional level in order to ensure there is:

- Effective monitoring of Incident Management Teams;
- Effective strategic management of resources;
- Efficient management of information flow within and between agencies, and between the agencies and the community; and
- Liaison between the control agency and divisional and municipal emergency response co-ordinators.

Structure of Incident Management Teams

19.13 That the practice of appointing Deputy Planning Officer, Deputy Operations Officer and Deputy Logistics Officer in an Incident Management Team be abandoned. This recommendation acknowledges the benefits of retaining a Deputy Incident Controller from the support agency (in accordance with section 4.2.6 of the Emergency Management Manual Victoria), to ensure that the command structure of that agency is preserved.

Qualifications for Incident Management Team Members

19.17 That the person appointed by DSE or CFA as Incident Controller for any incident should have formal qualifications and accreditation in the Incident Control System, be fully aware of the Victorian emergency management arrangements and have access to local fire prevention and response planning, including the Municipal Fire Management Plan.

19.18 That CFA and DSE provide media training to all Level 2 and Level 3 Incident Controllers.

Incident Control Centres

19.23 That in the review of Incident Control Centre locations, DSE and CFA give due consideration to:

- Existing public infrastructure that may provide suitable facilities; and
- Opportunities for collocation with Municipal Emergency Co-ordination Centres.

19.24 That DSE and CFA review their joint planning for Incident Control Centres to ensure that, wherever safe and practicable, those Centres are located close to the fire area.

Transferring Control from One Incident Control Centre to Another

19.29 That DSE and CFA develop an agreed process for the effective transfer of control from one Incident Control Centre to another, including processes for communicating this change to fire ground supervisors and local communities.

Chapter 20
Development And Implementation of Fire Control Strategies

The Inquiry has formed the view that, overall, the strategies and tactics applied by the agencies responding to the fires were appropriate. They achieved the objective of containing the fire as effectively and safely as possible, with no loss of life directly related to the fire, no significant injuries and limited loss of private assets and damage to property when compared to the scale of the fires.

The Inquiry is less convinced that the tactics developed to implement the strategies were flexible and responsive enough to the changing conditions on the fire ground and, as such, opportunities were missed to more aggressively, and safely attack the fire.

DSE and CFA must ensure that when determining strategies for firefighting they take into account the input of local fire officers and fire ground commanders. They must also ensure that when they are communicating these strategies to firefighters and fire ground commanders they ensure that the reasons for adopting a strategy are clearly explained.

Recommendations

Application of the Fire Control Priorities to Incident Action Planning

20.12 That CFA and DSE include agreed Fire Control Priorities in community awareness and education material provided to the community before each fire season.

20.13 That the fire agencies ensure that Incident Action Plans developed by Incident Management Teams are consistent with, and built on, the agreed Fire Control Priorities.

Aggressiveness of Firefighting

20.26 That DSE and CFA continue to stress firefighter safety as their highest priority for incident managers and fire ground supervisors.

20.27 That DSE and CFA ensure that agreed strategy and tactics, and the rationale, be communicated to personnel involved in the fire fight and be included in briefings for fire line personnel.

20.28 That personnel assigned the roles of Division Commander, Sector Commander and Strike Team Leader on the fire ground are actively encouraged to provide input into the selection of strategies and tactics.

20.29 That personnel assigned the roles of Division Commander, Sector Commander and Strike Team Leader be given flexibility to alter tactics to take advantage of changed conditions on the fire ground.

Consistency of Strategy

20.38 That when Incident Management Teams implement significant changes to objectives and strategies, these are effectively communicated to firefighters, fire ground supervisors and affected communities, and are incorporated into the broader organisational planning.

20.39 That the 'Incident Objectives' established for any response should reflect the endorsed Statewide 'Fire Control Priorities', and the relevant Municipal Fire Management Plan.

20.40 That CFA and DSE jointly develop procedures to ensure that a more consistent strategic approach can be maintained at shift and tour of duty changes.

Use of Local Knowledge

Recommendation 2 from Interim Report

That in preparation for the coming fire season, the CFA:

- *Modifies its operational procedures to ensure that local knowledge is flexibly and appropriately incorporated into tactical and strategic fire management.*
- *Modifies its operational procedures to allow for more flexible management of strike teams.*
- *Continues to work with its Brigades to complete the integration of AIIMS-ICS with the group structure.*

Recommendation 3 from Interim Report

That DSE reviews procedures to ensure that all Incident Controllers and Incident Management Teams have full access to those Departmental, Parks Victoria or appropriately experienced and qualified community members who can provide local knowledge and expertise in the development of fire suppression strategies and that advice from the fire ground is incorporated into decision making.

Information Gathering

20.54 That DSE and CFA review methods of gathering and processing fire information to ensure all methods are pursued to greatest effect.

Briefings

20.61 That DSE and CFA review the standards and protocols for documentation, including mapping, provided to fire line managers as part of their briefing notes, to ensure these are concise and appropriate.

20.62 That operational briefings in multi-agency fires should, wherever possible, be joint briefings of all agencies involved.

'No Go Zones'

20.67 That DSE and CFA ensure that:

- A clear process is established for determining whether a specific location is, or is no longer, a 'no go zone' or an area into which it is too dangerous to deploy resources, and that affected communities are advised as soon as possible of the determination, the reasons for such determination and what actions they should take as a result; and
- Where the Incident Management Team, Division Commander, Sector Commander and/or Strike Team Leader identify an area as a 'no go zone' or an area into which it is too dangerous to deploy resources, the reasons for that designation are recorded by the Incident Management Team in the incident log.

Use of Bulldozers

20.71 That DSE and CFA work co-operatively to review the management and application of bulldozers in fire suppression operations to ensure that they are used effectively, appropriately and are adequately supervised.

20.72 That quality control or performance assessments are routinely completed post fire season, to ensure that contractors who have not performed to an agreed standard are not re-engaged for the consequential rehabilitation works.

Chapter 21
Other Response Issues

DSE and CFA have made significant progress over recent years in resolving many of the problems experienced in the past, particularly with fire ground communications and the performance of firefighting equipment and vehicles. Therefore many of the major concerns raised with previous Inquiries in relation to firefighting operations were not seen as significant issues or problems during the 2002-2003 fires.

There is however, scope for improvement in a number of systems and processes used by DSE and CFA, such as protocols for managing firefighting resources. Opportunities for development and refinement of these systems and processes to ensure more effective management of the fire ground are addressed within this Chapter.

Recommendations

Keeping Track of Firefighting Resources

21.8 That DSE, CFA, MFESB and VICSES work co-operatively to establish a common system for resource tracking during major fires and incidents.

Management of Firefighting Resources in the Field

21.14 That DSE and CFA review the management of personnel deployed ensuring that:

- Shift changeovers of fire line personnel and fire line supervisors are conducted in such a way that the fire line is not left inappropriately unattended;
- Management protocols for Strike Teams are made more flexible; and
- Strike Team Leaders and Task Force Leaders undertake refresher training in the management of resources under their control

Management of Privately-Owned Firefighting Resources

21.19 That, as a matter of urgency and in consultation with stakeholders, CFA and DSE develop and communicate clear guidelines on how and when privately owned firefighting equipment should be integrated into the fire response.

Firefighting Vehicles

21.21 That CFA, having regard to terrain, continue to review the mix of firefighting appliances currently in service. In particular, consideration should be given to the number and distribution of smaller 'slip-on' type equipment.

Communications Facilities

21.31 That DSE and CFA work with the Bureau of Emergency Services Telecommunications to ensure that rural communication issues are appropriately addressed in the Statewide Integrated Public Safety and Communications Strategy, and that priorities and business cases are agreed for critical issues.

21.32 That CFA develop protocols to integrate Ultra High Frequency and Citizen Band radios into their communication structures.

Chapter 22
Aircraft Operations And The State Aircraft Unit

Aircraft are an important element of the mix of resources used to suppress unplanned fires. They do not replace on-ground firefighters, but rather, complement ground attack. However limitations affect their operation including weather conditions, visibility and the terrain in which the fire is burning.

The conduct of aerial firefighting in Victoria is generally well structured – and has no peer in Australia. The State Aircraft Unit business protocols are generally soundly based, especially the contractual arrangements with aircraft operators.

The numbers and mix of aircraft engaged by DSE and the CFA for the 2002-2003 fire season was reasonable given the assessed threat, budget constraints and contractual obligations to aircraft operators.

Recommendations

22.60 That the joint agencies introduce a system of performance measures for reporting the effectiveness of aircraft in firefighting operations.

22.61 That instances where demand for air support outstrips the supply of State Fleet Aircraft available are recorded.

22.62 That after each fire season, measures of the effectiveness of aerial firefighting be collated, analysed and used for the assessment of the State Aircraft Fleet composition and the adequacy of Training and Accreditation programs.

22.63 That a systematic performance audit of State Aircraft Fleet contractors be conducted jointly by agency and SAU personnel.

22.64 That aviation contractors be required to submit a copy of their annual independent regulatory compliance audit prepared for Civil Aviation Safety Authority to the State Aircraft Unit.

22.65 That training and competency programs for Incident Controllers should include aircraft firefighting capability training.

22.66 That more emphasis should be given to communication and discussion in regard to State Aircraft Unit's roles, responsibilities, practices and procedures.

Chapter 23
Communication With The Community

The efforts of DSE and CFA to keep the community informed of the progress of the fires and actions to be taken to prepare themselves for the passage of fire established a new standard in emergency response in Victoria.

Despite a generally very positive assessment, comments included in some submissions to the Inquiry and during public meetings from community members were critical of the lack of information provided and the timeliness and accuracy of information. This suggests there is scope for further improvement in the way in which the fire services communicate with the community before, during and after fires.

ABC Local Radio was particularly effective in keeping affected communities informed of the progress of the fires and the actions that they need to take to prepare themselves for the passage of the fire. ABC should be complimented for the role it played.

Recommendations

The Challenge: Maintaining Communication with *All* Fire-Affected Communities

23.21 That in relation to the provision of information to communities affected by fires and other emergencies, DSE and CFA ensure that:

- Incident Management Teams understand that one of their primary responsibilities, in co-operation with the Municipal Emergency Response Co-ordinator, is to keep the community informed as to where the fire is and its likely path, what is being done to combat the fire and any preparations the community should undertake;
- Community Information Units are effectively integrated into the Incident Management Teams; and
- They continue to develop a joint Internet-based communications tool to provide information and advice to both affected and broader communities during fires.

23.22 That the model of community engagement developed by DSE and CFA and applied during the 2002-2003 fires is further developed and refined, particularly in regard to short-duration, rapidly escalating incidents.

23.23 That relevant Government agencies including Emergency Communications Victoria, the Bureau of Emergency Services Telecommunications and the Victoria Police Media Unit, evaluate the proposals put forward by the Australian Communications Authority with respect to the hearing impaired.

Radio Coverage in Rural Victoria

23.30 That consideration be given to formalising Australian Broadcasting Corporation Local Radio as the official emergency radio station for Victoria, given it is the only radio station that can cover the whole of the State.

23.31 That Victoria Police Media Unit co-ordinate work with the Australian Broadcasting Corporation and the emergency service agencies to implement this arrangement.

23.32 That CFA and DSE work with Australian Broadcasting Corporation Local Radio to identify black spots, and explore opportunities to further improve coverage for broadcasting emergency information.

23.33 That opportunities be explored to use community radio to complement other methods of communication with isolated communities.

23.34 That Interstate Agreements prepared by the fire agencies be reviewed to include protocols for the joint release of consistent and appropriate information relating to fires burning across State borders.

Chapter 24
Social, Business And Environmental Recovery

Recovery must commence when response to an emergency commences. They are not sequential events but should operate in parallel, or preferably in an integrated way. We note that infrastructure, such as telecommunications, was enhanced during response but quickly dismantled after the fire threat had passed. Such enhanced infrastructure is also needed for recovery.

Government policy in relation to support for communities and individuals recovering from an emergency must reflect the principles of predictability, equity and consistency. Rules and entitlements must be known prior to an emergency event so individuals and businesses can effectively plan. Such support is not a replacement for prudent risk management.

We recommend a case management approach to assisting those requiring support. Those requiring support should not have to 'tell their story' more than once. Finally, front line community development officers and Municipal Councils must be provided with flexible support options to assist the community.

Recommendations

Overview of the Recovery Process

24.29 That Municipal Emergency Resource Officers develop registers of volunteers willing and available to provide assistance and support during the response to, and recovery from, emergency incidents.

24.30 That DPI actively promote as widely as possible within the community, the agricultural recovery service available during emergencies to ensure that all farmers are aware of the services provided.

24.31 That VicRoads and Municipal Councils review procedures and processes to ensure that the identification and delivery of remedial works on State and Council roads following emergency events are as efficient as possible.

24.32 That the Victorian Government recommend to the Commonwealth Government that it reviews eligibility for those without employment who may or may not be engaged in an emergency response, and are unable to access the appropriate infrastructure to register for financial assistance.

24.33 That Government funding for Community Development Officers engaged in community support and rebuilding incorporates flexible resources to enable the purchase of services from a range of providers to ensure choice for those requiring support.

24.34 That the *Emergency Management Act 1986* be amended to include a provision that, on the recommendation of the Minister for Police and Emergency Services as Co-ordinator-in-Chief of Emergency Management, or of another Minister, the Premier establish a Ministerial Task Force to oversee recovery in situations of extreme natural disaster or other emergency events.

Response and Recovery: Two Sides of the Same Coin

24.47 That recovery is recognised as commencing at the same time as response and that recovery planning and delivery is an integral part of the operations of the Municipal Emergency Co-ordination Centres.

24.48 That all Departments, statutory authorities, utility providers and Local Governments be made aware of the need to develop contingency plans for recovery activities, and that such plans, and the associated public education and information strategies, are included in the Municipal Emergency Management Plans.

24.49 That all agencies engaged in recovery participate in community briefings prior to and during emergency events, to ensure recovery issues are reinforced and communities are informed of the processes established to assist individuals – including matters that are not the responsibility of Victoria, such as Centrelink payments.

Relief and Recovery - Predictable, Equitable, Consistent

24.67 That Government review the emergency relief and financial assistance policy, and develop and communicate a predictable, consistent and equitable policy designed to assist the community to recover from emergencies, including natural disasters.

A Case Management Approach To Recovery

24.76 That DHS, in conjunction with Local Government, Government departments and the non-government sector, modify recovery planning at all levels to include a case management approach supported by an appropriate information system to be activated at the time of an emergency.

24.77 That the Privacy Commissioner be asked for advice in the development of this model.

24.78 That the State Emergency Recovery Committee explore opportunities to establish a 'one-stop-shop' approach wherever practicable following emergencies, including a single telephone number to connect a person to all agencies involved in the recovery process.

Fencing And Rehabilitation Private Land Damage Following Fire Suppression Works

Recommendation 4 from Interim Report

That Government initiates a review of the fencing policy for boundary and internal fences damaged as a result of a fire.

Recommendation 5 from Interim Report

That Government develops a consistent policy for the rehabilitation/restoration of private assets damaged or consumed in authorised fire suppression activity.

Part E
The Way forward

Overview

The Stretton Royal Commissions of 1939 and 1944 and the Miller Inquiry into the 1983 Ash Wednesday fires were pivotal in shaping the way Victoria prepares for and suppresses unplanned fires. These Inquiries followed failure. This Inquiry did not follow a failure. Rather, the effectiveness of the preparation and response is a result of a continuous improvement approach to emergency management in which the involved agencies review performance after all emergencies to learn for future events.

Part E discusses the next development in the State's emergency services capability, applying modern organisational thought to individual services.

We recommend an 'all hazards – all agencies' capability within the State to eliminate duplication and streamline decision-making and reporting.

Chapter 25
The Way Forward: Planning

Effective delivery requires quality information management systems and certainty in resources. Here we recommend improvements in both certainty of resourcing for DSE in public land management and enhanced analytical tools to support fire agency decision-making.

We note the complexity in the legislation in respect to public land, flora, fauna and native vegetation, and support any initiatives that will assist those charged with fire prevention planning to work within its boundaries and principles.

Finally, we express our concern in relation to the long-term viability of the current model of paid, volunteer and seasonal firefighting capability given organisational changes within government and agencies and the changing demographics of Victoria. We make recommendations in relation to the need to develop more creative approaches to human resource management.

Recommendations

The Balance Between Prevention/Mitigation and Response for Public Land

25.23 That DSE, with adequate resourcing, moves to a 12-month cycle of fire management to establish and maintain a more appropriate and balanced work program of prevention/mitigation and suppression.

25.24 When the research into prescribed burning and optimum fire protection described in Chapter 11, and the financial analysis of appropriate funding levels for prevention and suppression recommended in Chapter 15, are completed, DSE should develop a business case with Department of Treasury and Finance for assured funding to an agreed level over a three-year rolling cycle.

Managing Information

25.37 That all emergency service agencies, CFA and DSE in particular, give greater priority to information management – especially the collection, maintenance and quality control of base data sets necessary for planning, operations and program evaluation.

25.38 That Government acknowledge the importance of spatial information as a key element of planning, operations and program evaluation, and support the Geospatial Emergency Information Network as a means of ensuring integrated and co-ordinated information management on a whole-of-Government basis.

Model of Fire Cover - 'Fire Safety Victoria' Strategy

25.55 That Government confirms that the Model of Fire Cover/Fire Safety Victoria strategy should be a seamless model for the whole of the State and include both private and public land.

25.56 That DSE commits appropriate resources to work with OESC in developing the bushfire component of the model.

Planning For Emergencies at the Local Level

25.88 That CFA, DSE, MFESB, VICSES, Victoria Police and OESC, in consultation with the Municipal Association of Victoria, consult on the proposal to combine Municipal Councils' current responsibilities for the development of an emergency management plan/committee, as required by the *Emergency Management Act 1986* and a fire prevention plan/committee as required by the *Country Fire Authority Act 1958*.

25.89 That this group reports to the Minister for Police and Emergency Services on proposed legislative amendments to the *Emergency Management Act 1986*, the *Country Fire Authority Act 1958* and any associated legislation by June 2004.

25.90 That CFA, DSE and MFESB continue to develop the partnership approach for fire safety with Local Government, industry and communities.

Human Resources

25.114 That, as a matter of urgency, CFA and DSE:

- Develop strategies to provide adequate and sustainable firefighting resources, suitably-trained and experienced; and
- Advise Government of these strategies.

25.115 That all fire agencies include a formal mentoring scheme as part of their workforce development programs; and that consideration be given to the use of suitably competent and experienced individuals (such as retired staff), to act as coaches or mentors with inexperienced Incident Controllers.

25.116 That CFA, VICSES and other volunteer-based emergency service organisations develop proposals in support of the strategies for sustainable volunteerism, and that the State Government advocate these initiatives to the Federal Government.

Chapter 26
The Way Forward: Unified Command and Control

The Inquiry does not support the model proposed by the CFA to integrate the Fire Management Branch, DSE - and related regional operations - into the CFA. Rather we support a more integrated, or unified, command and control model of fire service agencies.

We recommend that DSE be made a 'prescribed agency' under the *Emergency Management Act 1986* joining the other two fire agencies.

We note that the State can no longer support different resource management systems and different Operations Centres for all three fire agencies and argue for one 'all hazards – all agencies' combined State Operations Centre.

Recommendations

Response to the CFA Proposal

26.52 That CFA, DSE, MFESB and Victoria Police jointly develop a unified command and control system that better integrates with the State's emergency management arrangements, and that this be endorsed by the Victoria Emergency Management Council by July 2004.

26.53 That this unified system include recommendations for the appointment of one person or agency to be responsible for overall control of fire suppression activity in country Victoria, including for any legislative reform considered necessary.

26.54 That a State Emergency Operations Centre be established to replace the existing separate fire agency centres. This could, if necessary, be initially confined to being a State Fire Operations Centre as recommended in Chapter 18, Part D.

26.55 That the Review of emergency operations centres by the Departments of Premier and Cabinet and Treasury and Finance and the Office of the Emergency Services Commissioner:

- Explore opportunities to significantly reduce the number of regional emergency operations centres; and
- Evaluate opportunities to pre plan and establish 'all hazards–all agencies' emergency operations centres at the regional or district level.

26.56 That in doing so, this Review must consult with the agencies mentioned above, and others such as VICSES and the Departments of Human Services and Primary Industries.

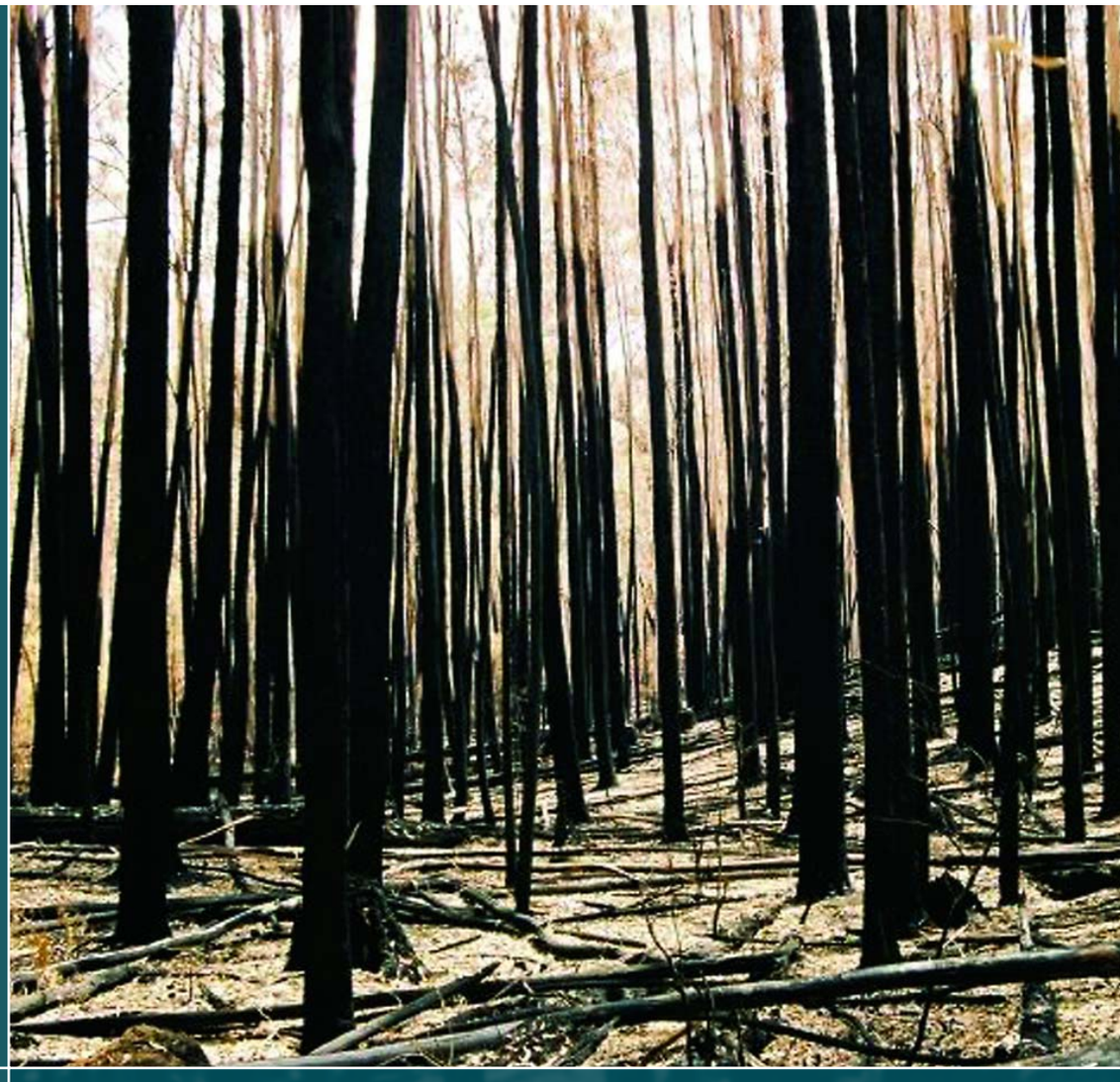
26.57 That the Fire Management Branch of DSE be prescribed as an 'emergency service agency' for the purposes of s21C (1)(a) of the *Emergency Management Act 1986*.

26.58 That the fire agencies develop a program to significantly increase the amount of joint training and exercises undertaken.

Conclusion

26.64 That OESC work with the fire agencies in developing implementation strategies for recommendations agreed by Government.

Part A
Setting the Scene



Burnt Alpine Ash Forest - North East Victoria – DSE

Overview of Part A

Lightning North East Victoria 8 January 2003 - DSE

Part A contains six diverse chapters that set the scene for our later investigations, analyses and recommendations. In the main, these chapters are explanatory and descriptive in focus; they help us to frame relevant questions about the 2002–2003 fires, to be in charge of relevant facts, and allow us to more critically assess responses to the fires.

Chapter 1 provides an introduction to the Inquiry and to this report. As well as describing how the Inquiry was conducted, it explains why the Inquiry was commissioned and what it hopes to achieve.

Chapter 2 turns to geography and history and we consider changes in land use and occupation in Victoria over the past 170 years. We pay particular attention to changing patterns of population distribution and shifts in the interface between public and private land, since these changes have increased the exposure of many Victorians to bushfire risk. The Inquiry notes that Victorians have engaged on a continuous improvement strategy to better cope with our fire-prone environment but there is further scope to advance in our preparedness and response.

One way we can do this is by putting systems in place to adjust progressively to climatic factors like global warming and El Niño that impact on the likelihood of bushfire. We make a recommendation to this effect in Chapter 2.

In Chapter 3 we outline the legislative framework within which firefighters do their work. This is important factual context for our analysis of preparedness and response in Parts C and D. We note that current arrangements are complex, involving a large number of agencies and organisations. Such arrangements can only succeed if there is a high level of co-operation and communication between agencies and the community.

In Chapter 4, we tell the 'story' of the fire and summarise its impacts. We offer a broad-brush picture of what happened, where and when. Later in this Report we give more detailed and critical accounts of particular fire situations and offer a critical analysis of the emergency response (Part D). Here, we present a balanced view of the achievements and losses, as well as the impacts of the fires on firefighters and communities.

The Inquiry received 273 submissions from groups and individuals. In Chapter 5 we summarise those submissions and document the key themes that came out of the community consultations. Interestingly, those themes – land management preparedness, agency preparedness, response issues, management of resources, and recovery were common across the State. As this Chapter is part of 'setting the scene', we make no judgements or assessments about the accuracy of claims.

Chapter 6 clarifies the contradictory views put to the Inquiry about the severity of weather during the 2002–2003 fire season and the implications for firefighting response. Our investigations support the Bureau of Meteorology's findings that conditions were not more benign than in previous, extreme fire seasons such as those of 1983 and 1939.

This Chapter also considers a second point relating to climate – the unusually low number of large fires in Victoria from the mid-1980s to 2001 and we conclude that improved fire suppression by the Department of Sustainability and Environment and the Country Fire Authority is the most likely explanation as to why so few fires in these years grew to large size. We make a further two recommendations here regarding improved data storage and analysis for climate records.

Chapter 1
Introduction

Overview

1.1 This Chapter briefly describes the significance of the 2002-2003 fires and their aftermath. It explains the reasons behind the establishment of the Victorian Bushfire Inquiry and what it hopes to achieve. We provide the three Terms of Reference, describe how the Inquiry was conducted and initial impressions. We then discuss the aims of this Report and explain the broad focus of each of its Parts.

The 2002-2003 Bushfires at a Glance

1.2 Over the summer of 2002-2003, bushfires burnt across the greatest expanse of land in Victoria since 1939.

1.3 The 2002-2003 bushfire season occurred during an ongoing drought – one of the most severe in recorded history – with the first bushfires occurring early in the season in September 2002. By the start of December 2002, the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) had already attended more than 375 fires in Victoria, almost three times the twenty-year average. The 2002 calendar year closed with Victoria experiencing its largest bushfire in 20 years, a fire in the Big Desert Wilderness Park in North West Victoria affecting 181,400 hectares of both public and private land.

1.4 On 7 and 8 January 2003, a dry storm swept across the predominantly forested and alpine areas of North East Victoria and Gippsland, and lightning strikes started over 80 fires. While the majority of these were controlled within a few days (17 remained by 11 January), a small number were unable to be controlled and ultimately joined to form the fire complexes in the North East and Gippsland areas. In terms of area burnt, these fires were of a scale approaching that of the devastating Black Friday fires of 1939. They eventually burnt approximately 1.1 million hectares of land in Victoria, including more than 108,000 hectares of private land.

1.5 Public and private assets were destroyed and environmental amenity compromised. Coming on top of the unbroken drought, the length and severity of the fire season tested the capacity of fire agencies and community resources. Victorians witnessed the personal toll on communities and firefighters. The fires also captured unprecedented attention from the media and Victorians generally.

1.6 When we compare outcomes of the 2002-2003 fires to extreme fire events from Victoria's past – taking into account six consecutive years of drought – they are not as severe as they might have been. Given the eventual scale of the fires, loss of property and assets were significantly below what might have been expected. No lives were lost as a direct result of the fires and injuries were minimal.

1.7 However, some communities were severely affected by fire and felt let down by the fire services. Others lived with the threat of fire for days and even weeks. Many individuals and communities were engaged in the firefighting effort for a protracted period requiring them to put aside their normal businesses or employment. Many businesses in the affected regions suffered losses.

After the Fires: Questions

1.8 It is not surprising then that fires of this scale generated a wide range of views, including considerable criticism of the management of our forests. For many of those most affected, the fire season was seen as avoidable – the result of perceived negative changes in Victoria's public land management regime over many years.

1.9 For others, the recent fires were a repeat of 1939 where fires also followed a severe drought; they were a harsh reminder that the Victorian environment is subject to periodic, extreme bushfires.

1.10 The fire experience in Victoria, the repeated fire events in New South Wales and the devastation caused by bushfires in the Australian Capital Territory, caused many Victorians to ask: Could Victoria have prevented these fires? Were there problems with how the fires were suppressed?

1.11 A range of significant issues has been raised about these fires, in particular the management of public land to reduce fire risk and the way in which the fires were fought.

1.12 It was in this context that the Emergency Services Commissioner was invited to chair an Inquiry into the 2002-2003 Victorian Bushfires. Under section 21c of the *Emergency Management Act 1986*, the Commissioner is required to monitor the performance of emergency service agencies and to advise, make recommendations and report to Government on any issue in relation to emergency management (prevention, response and recovery).

Victoria is not alone in experiencing fire events such as that of last fire season. Parts of Europe and Canada have also experienced extreme fire weather over the summer of 2003.

- More than 800 forest fires in Canada have burned more than 345,000 acres and resulted in the deaths of two firefighters by the 18th August 2003.
- On 26 August a fire in British Columbia, Canada approached a heavily populated area, destroyed 200 homes and forced 30,000 to leave their homes. This fire was the eighth fire to threaten a populated area this summer, unprecedented for British Columbia.
- Portugal has had the worst fire season on record with 19 people killed, and 362,000 hectares burned.
- In France and southern Italy large areas have been burned. Five people died in France and tens of thousands of hectares of woodland burned.

The summer of 2003 has clearly been an extreme fire year in the northern hemisphere with threat to urban areas in Canada and more than five times the average area burned across France, Italy and Portugal.

1.13 The Government requested that the Inquiry report at the end of September 2003 to allow maximum opportunity to implement recommendations prior to the 2003-2004 fire season.

Terms of Reference

1.14 The Terms of Reference for the Inquiry were to:

1. Examine the effectiveness of preparedness for the 2002/03 bushfire season, including hazard reduction and mobilisation of resources;
2. Assess the effectiveness of the response to the 2002/03 bushfires, including emergency management procedures, cross agency response and co–ordination and resource deployment; and
3. Provide recommendations for future bushfire management strategies, including any required improvements to existing emergency management arrangements including public communications, community advice systems, infrastructure, training and overall resourcing.

Expert Input to the Inquiry

1.15 Two independent experts were appointed to the Inquiry. They are:

- Dr Malcolm Gill, Honorary Research Fellow, retired from CSIRO Plant Industry, Canberra. Dr Gill has published widely on wildfire and its role in forest ecosystems in Australia and was awarded an Order of Australia Medal in 1999 for his contribution to research on bushfires and the environment; and
- Professor Neal Enright, School of Anthropology, Geography and Environmental Studies, and Executive Director, Office for Environmental Programs at the University of Melbourne. Professor Enright specialises in the fire ecology of plants, re–vegetation and rehabilitation, has been published widely and has conducted extensive research and consultation.

1.16 Their appointment brought a breadth of knowledge in bushfire behaviour and environmental science to the Inquiry to complement the expert knowledge of the Emergency Services Commissioner in the planning for, and management of, emergency situations. The Inquiry members were supported by a Secretariat located in the Department of Premier and Cabinet.

How the Inquiry was Conducted

1.17 The Inquiry members approached the task with no predetermined views about the eventual findings. Considerable time was spent building an understanding of the fire events themselves, their impacts on communities and the environment, the quality and efficacy of planning and what was done to prevent and suppress the fires. A wide range of issues requiring consideration were identified. A phased process was developed to explore and evaluate these issues.

1.18 The Inquiry called for public submissions by 30 May 2003 as a way of framing the key issues for consideration. Inquiry members then toured Victoria, following the path of the fires in North West and North East Victoria, East Gippsland and Gippsland, talking in situ to firefighters, incident controllers, regional and local staff of DSE, the Department of Primary Industries, Parks Victoria and the CFA.

1.19 The Inquiry received 273 submissions from a range of individuals and organisations. These are listed at Appendix I. These submissions, combined with a substantial volume of information gathered during and after the tour of fire-affected areas (from public land managers, and staff and volunteers of the fire agencies), allowed us to understand the community's principal issues of concern.

1.20 This was followed by a series of meetings with community members, Local and State Government Departments and agencies, and other organisations. These discussions were held at most of the fire-affected areas on farms and plantations; at the site of fires; at CFA sheds and fire stations; at DSE, CFA and PV offices; at shire offices and community halls – as well as in Melbourne.

1.21 In all, Inquiry members met over 400 people, both individually and in small groups and these are listed in Appendix II. This process ensured a broad cross section of the community had the opportunity to put their views to the Inquiry.

1.22 While submissions were not protected by parliamentary privilege, Inquiry members are unanimous in their view that information was provided in an open way by volunteers and agency staff involved in land management or fire suppression, and by community members.

1.23 The public consultations allowed Inquiry members to hear and discuss community and individual concerns, ensure everyone had a say, and draw out community views on the Terms of Reference – specifically, how fire prevention and suppression and community recovery could be improved or strengthened. Comments and criticisms were surprisingly uniform around the State, and issues raised with the Inquiry fell into a series of themes repeated from the far North West to the far South East of the State. These are outlined in Chapter 5.

1.24 The Inquiry's public consultations also provided an opportunity for expression of rural anger. Most affected communities were in drought prior to the fires and, following the fires, remained in drought – but with less feed and water available for their remaining stock, a need to rebuild fencing and make good other fire suppression works combined with, in some cases, significant loss of tourism in their community.

1.25 Communities were asked what they wanted to see in the Inquiry recommendations to prepare and respond better for future bushfires. Solutions covered the full spectrum of views but were consistent in seeking greater effort by all parties to fire prevention planning, more community involvement in decision making and better use of local knowledge in fire suppression.

1.26 The Inquiry made it clear that its recommendations would be developed independent of Government and of the public land management agencies and fire services. However, we also stressed that the success or failure of the final recommendations would rely to a large extent on all parties implementing and owning the outcomes. Communities need to move forward in partnership with Local Government, Departments, agencies and the CFA.

1.27 Inquiry members informed communities and government agencies that, to the extent possible, recommendations would be tested or 'ground truthed' with selected communities. Accordingly, a number of return visits were made and this process commenced as the consultations continued over the six weeks of rural visits. Emerging themes were discussed with individuals and groups.

1.28 In addition to considering submissions and participating in public meetings, the two expert Inquiry members, Dr Malcolm Gill and Professor Neal Enright, undertook scientific research into some of the issues associated with prescribed burning and its value in suppressing and reducing bushfire intensity. They also examined the climatic conditions that existed over the fire season and how these compared to previous years, especially those years when significant bushfires occurred.

1.29 Additionally, an external review of the effectiveness of the management of aerial firefighting resources over the fire season was undertaken and the outcomes of this review form part of the final report (Chapter 22).

1.30 The Inquiry also examined the *Emergency Management Act 1986* and arrangements in place, the findings and implementation of previous bushfire inquiries and reviews and the adequacy of co-ordination between DSE and the CFA in fire planning/prevention and response for rural Victoria.

Aims of this Report

1.31 The purpose of the Inquiry has been to learn from the recent bushfire experiences in order to further improve Victoria's preparedness and response to future fire and other emergencies.

1.32 Reviews following any large-scale emergency identify both successes and mistakes. They also identify lessons to be learnt and improvements to be made. In saying that, the Inquiry's purpose has not been to attribute blame nor to engage in the public humiliation of individuals working on behalf of their community or organisation, paid or unpaid.

1.33 Rather, the Inquiry has identified areas for improvement in fire prevention planning, preparedness and response and developed realistic recommendations to ensure a longer-term continuous improvement strategy is implemented for Victorians. Systemic problems and issues requiring policy change by Government, or changes to the State's emergency management arrangements, were of critical interest.

1.34 Our report aims, first and foremost, to be a constructive document that provides recommendations for enhanced bushfire safety in Victoria. The report acknowledges positives such as progress made in Victoria's Emergency Management arrangements since 1983 and the significant improvement in co-operation and co-ordination across the many agencies involved during and after the fires. To some extent, it also aims to be educative, providing the context for a discussion of fire in the Victorian environment, a framework for rational debate and a way forward based on objective data and evidence.

1.35 The report has five Parts. Part A sets the scene for our later analysis. Parts B and C respond to the first Term of Reference and look at fire on public land and community and agency preparedness. Part D tackles the complex questions of response and recovery and addresses the second Term of Reference. Part E looks forward and makes recommendations for the future in line with the third Term of Reference.

1.36 Among other things, the report deals with many of the criticisms made in submissions and in consultations. It cannot, however, engage in point by point forensic analysis of every incident raised with the Inquiry. Instead, we note distinct themes and commonality of purpose and provide recommendations based on evidence and research. In saying this however, five case studies and the lessons learnt are discussed in Parts C and D.

1.37 The report also discusses in detail the efforts of the two principal fire suppression agencies, DSE and the CFA, during the North East and Gippsland fires and their relationship with the other agencies engaged in fire and emergency management. We comment on the effectiveness of arrangements now in place and recommend changes for the future.

Interim Report: August 2003

1.38 The Inquiry was invited to present an Interim Report to Government if issues were identified that needed immediate attention. The Inquiry took this opportunity and an Interim Report was forwarded to Government in August 2003. The report contained six recommendations concerning prescribed burning, use of local knowledge, fencing policy, rehabilitation and protection of water catchments. The Premier released the report on August 26, accepting all recommendations. The Interim Report of the Inquiry into the 2002-2003 Victorian Bushfires is at Appendix III.

Chapter 2
The Changing Victorian Environment

Overview

2.1 Victoria has one of the most fire-prone environments in the world due to the combination of its landscape and vegetation with climate and weather conditions. Add to this mix Victoria's high population density relative to other States, and the dispersed nature of rural and regional assets, and we have a high-risk fire environment for many Victorians.

2.2 The Victorian landscape has always been subject to fire, with much of the flora and fauna necessarily adapted to particular fire regimes.[1] It has been estimated that prior to the 1840s, around 88 per cent of Victoria was covered by forests or woodland. Extensive clearing, mostly for agriculture, led to considerable change in the vegetative cover. Combined with the ever-increasing population, this influenced the pattern of fires and fire risk to which the land and people were (and are) exposed.

2.3 Despite advances in our approach to the prevention and management of fire, the recent fire season demonstrates that the State remains at high risk of fires including major fire events. Given that higher temperatures, changes in rainfall, and consequent altered ecosystem dynamics may lead to an increased fire risk for Victorians, we argue it is important to have systems in place to meet wider changing circumstances.

The Victorian Landscape

2.4 This section looks at Victoria's diverse geography and landscape and notes areas of particular concern in relation to fire risk.

2.5 Victoria is traversed by the Great Dividing Range – a series of low hills in the west that increases in height across to the New South Wales border in the North East of the State. However, in western Victoria, the term 'range' is not a good description for the plateaux and ridges which are generally relatively low and undulating, with only a few peaks reaching more than 1,000 metres. There are areas of woodland and shrubland across parts of these uplands, as well as in the Grampians. The Grampians National Park contains the main area of fire-prone, rugged forested ranges in the west. Lightning has ignited a significant number of fires there over the years, posing a fire risk to surrounding properties.

2.6 To the north is the area called the Wimmera – the riverine plain and the Mallee dunefields which are largely flat and increasingly arid, with large areas of broadacre cropping and some grazing. The natural vegetation of the Mallee is mainly sparsely vegetated shrubland, most of which remains in the park areas of the Little Desert, Big Desert, Wyperfeld and the Sunset Country.

2.7 Fire has shaped this landscape, and the management of these park boundaries with private land is therefore given priority from the point of view of fire mitigation and impact on local communities.

2.8 South of the ranges is mainly farmed coastal plain, with the exception of the forested Otway Ranges which have experienced significant fires and adjoin major coastal resort areas that rely predominantly on tourism. The region's wool industry has contributed significantly to Victoria's wealth in the past. However, over recent years it has lessened with the rise of other land use. A large proportion of the growth in private plantations (i.e.100,000 hectares) across Victoria during the past five years has been mainly in the South West, largely replacing areas previously used for sheep grazing.

2.9 Grass fires are a risk to pasture, cropland areas and plantations across the plains and undulating hills of the western district and North West. Significant grass fires occurred in 1944 (burning more than 1 million hectares of grassland) and 1977 (103,000 hectares were burnt), as illustrated in Table 2.1.

2.10 In central Victoria the ranges begin to rise, with the urban areas of Melbourne on the plains to the south. North of the central ranges is the riverine plain which extends to the Murray River, supporting a large proportion of Victoria's high-value agriculture. The ranges north west of Melbourne are characterised mostly by relatively low elevations with scattered areas of forest in small National and State Parks such as Macedon Ranges, Wombat State Forest and Lerderderg Gorge. Despite the fragmented nature of forests across this region, the growing population in these areas makes them of concern for fire safety and asset protection. To the near east of Melbourne, the eucalypt forests across the Dandenong and Yarra Ranges provide high environmental amenity for the encroaching suburban population, but also pose a significant fire risk.

1 Plants and animals are adapted to sequences of fire rather than one single event; these sequences are called 'fire regimes'. Effects of individual fires on the environment can be observed at the time but the state of the environment at the time of each fire is likely to have been influenced by the effects of the previous fire event.

North East Alpine Areas

2.11 It is in the North East of the State that the ranges become rugged, mountainous alpine areas. The region is covered by extensive areas of normally cool, moist temperate forest such as Mountain Ash, as well as drier sclerophyll forest at lower altitude and on drier slopes. Moist gullies are filled with tree ferns. These worn, rounded mountains are high by Australian standards, reaching over 1,900 metres. There are many steep slopes making access very difficult across much of the region.

2.12 On the high plains, low alpine vegetation and Snow Gums predominate across the middle of the highest ranges providing the environment for winter snow-based recreation and, in summer, tourism and some cattle grazing. But the chief characteristic of their terrain is forested mountain ridges interspersed with long river valleys to the north and south, many of which contain scattered, isolated farming communities that are frequently exposed to high levels of fire risk. These valleys to the south gradually widen to become coastal plains across much of Gippsland, although at the easternmost end, the forested ranges extend almost to the sea.

Gippsland

2.13 The population of East Gippsland is relatively low and mostly confined to coastal villages and towns around a predominantly public estate of forested land. Small pockets of agriculture are interspersed within the steeper terrain. Farmland in central and west Gippsland provides an important source of agricultural income and supports a higher population in towns such as Warragul, Traralgon, Moe and Morwell. The mountain ranges in the east of the State provide much of the water for Melbourne via the Thomson Dam and water from the northern slopes feed Eildon and Dartmouth (to name but two water storages), and the Murray River.

Fire in the Victorian Environment

2.14 Fire has been a natural phenomenon within the Australian and Victorian landscape since time immemorial. However, the extent of fire appears to have increased with European settlement. (Chapter 12 discusses this in more detail.)

2.15 The recent history of bushfires demonstrates the nature of disastrous fire in the Victorian environment. A study in 1986 estimated that in the past 100 years,[2] more than two thirds of Australian bushfire-related deaths and more than half of the significant bushfire-related property losses occurred in Victoria.

2.16 Particular fire seasons such as 1939 and 1983 tend to be remembered for their severe impacts. Figures 2.1, 2.2 and 2.3 illustrate the areas burnt during the 1939, 1983 and 2002-2003 fires.

2.17 The number of fires and the size of area burnt give one perspective on the history of bushfires in Victoria but the impacts on life and assets provide another. Loss of life, property and other assets cannot be solely predicted by the number and severity of fires. Some relatively small fires have had a significant impact. These fires, as well as large-scale fires, have contributed significantly to fire-management arrangements.

2.18 Table 2.1 is a summary of significant fire events on all land across Victoria from 1851 through to 2003.[3] It lists impacts on life and assets.

2.19 Additional historical information is provided at Appendix IV (Fires on Public Land - Historical Data) and details the annual number of wildfires attended by public land managers between 1921 and 2003 and the area burnt.

2 J. Hickman & M. Tarrant (1986) '*Australian Bushfires and their Real Cost*', Fire Science, 4th Australian National Biennial Conference, 21–24 October, Perth, Institution of Fire Engineers, Perth.

3 While there is a lack of accurate information, particularly regarding fires during the nineteenth century, a significant fire event in 1851 reportedly affected about a quarter of the State. The information has become more reliable during the twentieth century with better record keeping, especially for fires since 1939.

Table 2.1: Significant Fire Events in Victoria[4]

Date	Location	Losses and area affected
Black Thursday 6 February 1851	Wimmera, Portland, Gippsland, Plenty Ranges, Westernport, Dandenong districts, Heidelberg	Approx. 12 people One million sheep Thousands of cattle Approx. five million hectares (a quarter of Victoria)
Red Tuesday 1 February 1898	South Gippsland	12 people 2,000 buildings 260,000 hectares
Early 1900s (esp. 1905, 1906, 1912, 1914)	Gippsland, Grampians, Otway Ranges	Varied (100,000 hectares in 1914)
1926	Noojee, Kinglake, Warburton, Erica, Dandenong Ranges	60 people Many farms and houses
1932	Many districts across Victoria, particularly Gippsland	9 people
Black Friday 13 January 1939 (December 1938–January 1939)	Large areas of the North East and Gippsland, the Otway and Grampian ranges and the towns of Rubicon, Woods Point, Warrandyte, Noojee, Omeo, Mansfield, Dromana, Yarra Glen, Warburton, Erica	71 people More than 650 homes/shops 69 timber mills 1.5–2 million hectares
3–4 March 1942	Hamilton, South Gippsland – Yarram (burning on a 60 mile front)	1 person 100 sheep 2 farms More than 20 homes
22 December 1943	Wangaratta	10 people Thousands of acres of grass country
14 January 1944	Central & western districts	49 people 500 homes Huge stock losses More than one million hectares of grassland and 160,000 hectares of forest
14 February 1944	Morwell, Yallourn	Plant, works, open cut mine and buildings
5 February 1952	Benalla area	Several people 100,000 hectares
14 January 1962	The Basin, Christmas Hills, Kinglake, St Andrews, Hurstbridge, Warrandyte, Mitcham	More than 8 people 454 homes
17 January 1965	Longwood	7 people (all from one family) 6 houses
21 February–13 March 1965	Gippsland	More than 60 homes/shops More than 4,000 stock 300,000 hectares of forest 15,000 acres of grassland
19 February 1968	Dandenong Ranges, The Basin, Upwey	64 homes and other buildings 1,920 hectares

4 This list is not definitive but gives an idea of the major fire events, particularly after 1939 when the reliability of information increases.

Date	Location	Losses and area affected
8 January 1969	280 fires broke out affecting Lara, Daylesford, Bulgana, Yea, Darraweit, Kangaroo Flat, Korongvale	22 people 230 homes 21 schools/church/halls More than 12,000 stock 250,000 hectares
December 1972	Mt Buffalo	12,140 hectares
12 February 1977	Penshurst, Tatyoon, Streatham, Creswick, Pura Pura, Werneth, Cressy, Rokewood, Beeac, Mingay, Lismore, Little River	4 people more than 100 houses/shops Approx. 200,000 stock 103,000 hectares
15 January 1978	Bairnsdale	2 people 1 house 6,500 stock
28 December 1980–6 January 1981	Sunset country and the Big Desert	119,000 hectares
31 January 1983	Cann River	250,000 hectares
1 February 1983	Mt Macedon	50 houses 1,864 hectares
Ash Wednesday 16 February 1983	Monivae, Branxholme, Cockatoo, East Trentham, Mt Macedon, Otway Ranges, Belgrave Heights, Warburton, Cudgee, Upper Beaconsfield, Framlingham	47 people More than 27,000 stock Over 2,000 homes/shops 210,000 hectares
14 January 1985	Avoca/Maryborough, Little River, Springfield, Melton	3 people 182 homes 400 farms 46,000 stock 50,800 hectares
27 December 1990	Strathbogie	1 person 17 homes More than 12,000 stock
23 Feb 1995	Berringa	10,000 hectares (mostly forest)
21 January 1997	Dandenong Ranges, Creswick, Heathcote, Teddywaddy, Gough's Bay	3 people 41 houses 400 hectares
December 31 1997–9 January 1998	Caledonia River area of the Alpine National Park, Carey River State Forest	32,000 hectares
2 December 1998	Linton	5 CFA firefighters, 1 CFA tanker 780 hectares
17–19 December 2000	Dadswells Bridge	29,000 hectares of grassland
17–31 December 2002	Big Desert	1 abandoned house 181,800 hectares
8 January–8 March 2003	Over 80 fires started by lightning, North East Victoria, Gippsland	1 person (indirectly) 41 houses 9,000 livestock 1.1 million hectares

Sources: CFA website; DPI/DSE website; R.H. Luke and A.G. McArthur, *Bushfires in Australia*, AGPS, 1978; Reports of the 1939 and 1944 Royal Commissions; A.G. McArthur, N.P. Cheney and J. Barber, *The fires of 12 February 1977 in the Western District of Victoria*, CSIRO and CFA, 1982; R. Murray and K. White, *State of Fire: A History of Volunteer Firefighting and the Country Fire Authority in Victoria, CFA, 1995*.

Figure 2.1: The 1939 Fires

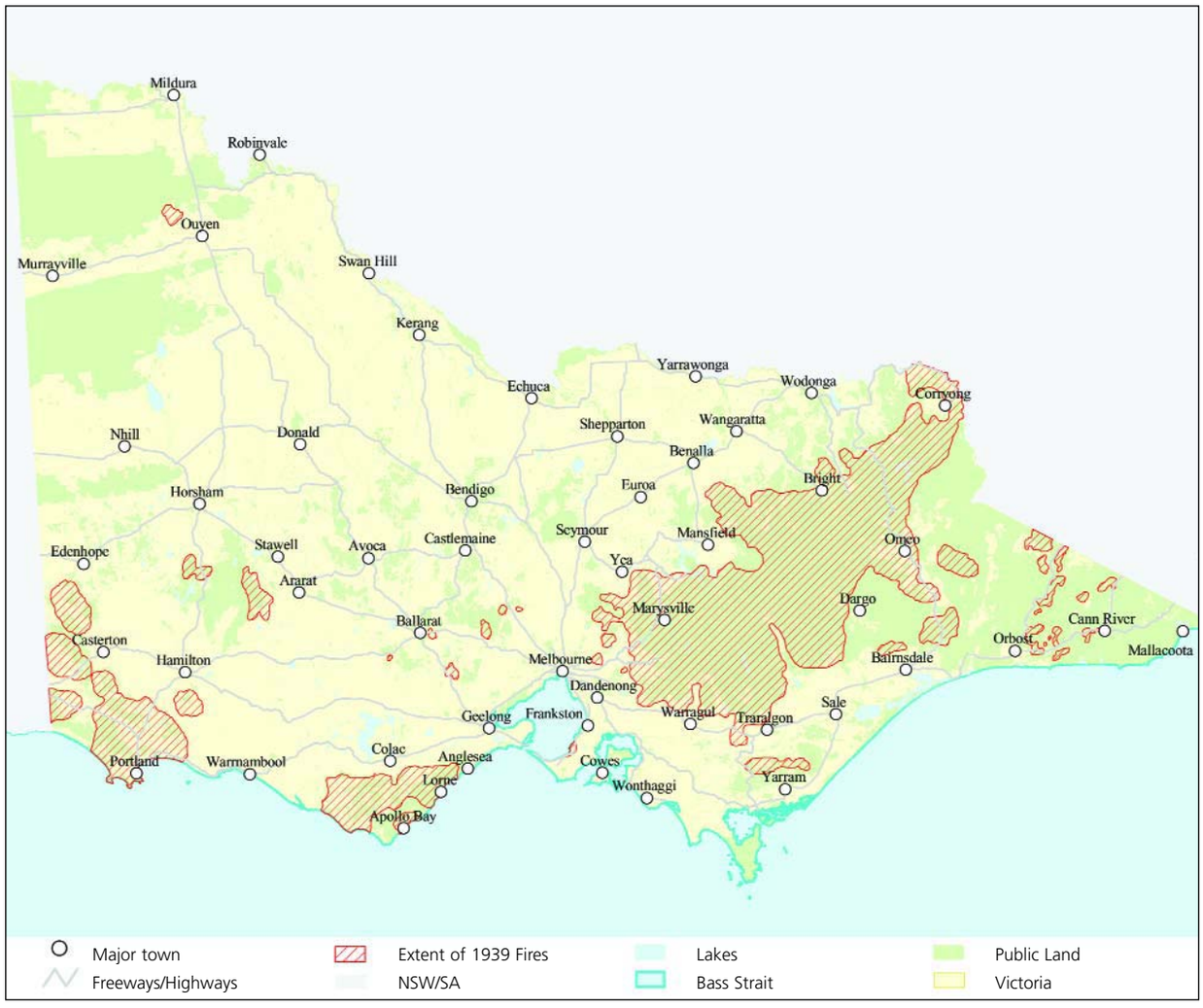


Figure 2.2: The 1983 Fires

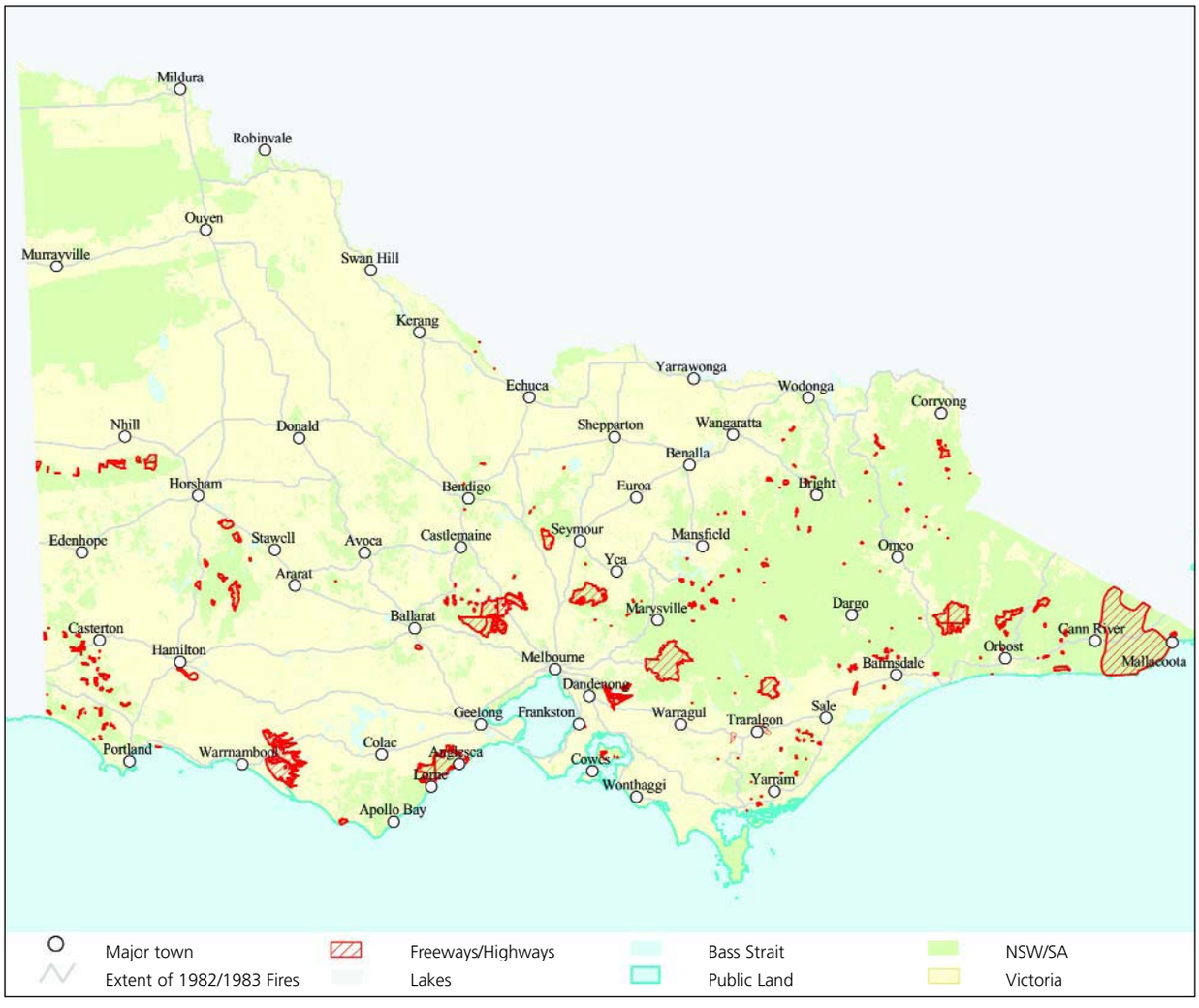
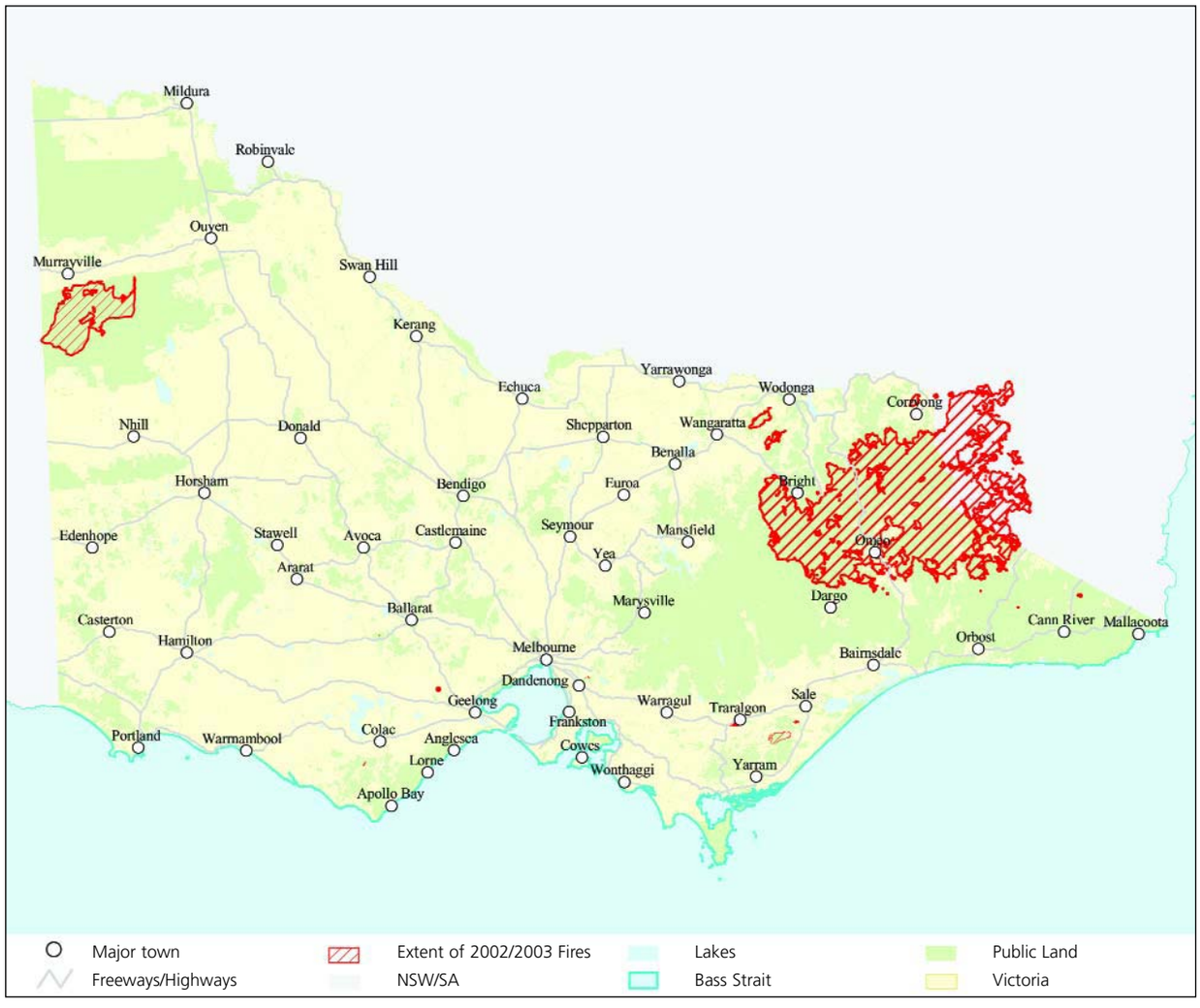


Figure 2.3: The 2002-2003 Fires



Exposure of People and Assets to Bushfire Risk

Population Density

2.20 Victoria has the highest density of population in Australia with one quarter of the nation's population occupying just three per cent of Australia's total land area.[5] The population of Victoria at 30 June 2001 was 4.83 million, with approximately 1.30 million people living in rural and regional areas outside the Melbourne Statistical Division (broadly the greater Melbourne area).[6]

2.21 Most of the people living in rural and regional Victoria are exposed to bushfires since, apart from regional town centres, bushfires occur across all parts of the rural landscape putting lives, houses, farms, businesses and a range of other public assets at risk. People living and working on the fringes of metropolitan Melbourne and regional towns are also at significant risk as demonstrated by the Ash Wednesday fires in 1983, which resulted in 47 deaths. Table 2.1 includes major fires that have occurred on the Mornington Peninsula, the Western grasslands and across the Macedon, Dandenong and Yarra Ranges.

Agricultural Assets

2.22 Agricultural production currently occupies around 56 per cent of the State's land base. Of this, the major land use is broadacre dryland pasture and broadacre cropping, approximately 95 per cent of agricultural land.[7] The remainder consists of irrigated pasture, horticulture and plantations.

2.23 A range of high-value agricultural assets is therefore exposed to fire risk, including stock, pasture, plantations and other crops. Some farmers made the value of these assets clear to the Inquiry when they stated that protection of these agricultural assets was a higher priority than their houses. Similarly, plantations represent valuable assets that are very vulnerable to fire. While there have been changes in agricultural land use across Victoria over the years, particularly the change from grazing to private forestry, the impact of these changes on total fire risk is not clear.

2.24 The area of farmland and number of farms has declined, especially since the early 1970s. At the same time, tourism has become a key growth industry in regional Victoria, particularly in areas of scenic quality. Visits to National Parks have increased between one and six per cent per annum for the past 10 years.[8] Increased tourism has contributed to greater value being placed on the natural environment in many rural areas.

Public Land

2.25 Approximately two thirds of the State's land area is privately owned and the remaining third, some 7.7 million hectares is public land, principally parks and forests. Heightened community awareness of conservation issues has led to an increase in the area of National Parks at the expense of State Forests. The area of protected parks in Victoria (National Parks and other protected parks and reserves) has progressively expanded from some four per cent of the State in the early 1970s to approximately 16 per cent or 3.6 million hectares today.[9]

Timber Production

2.26 The area of State Forest is 3.5 million hectares, of which just over one million is managed sustainably for timber production under the co-ordination of DSE. The remainder is in reserves for ecological and recreational use.

2.27 Commercial State Forests supply timber that in 2001–2002 totalled 2,216,000 cubic metres (gross).[10] From this, 741,000 cubic metres (or approx 33 per cent of total volume) of sawlogs was produced. Through recent policy developments (*Our Forests Our Future* released in February 2002), a proposal to reduce licensed sawlog volumes by approximately 30 per cent Statewide has been agreed and implementation strategies are being developed.

5 Government of Victoria, *Atlas of Victoria* 1982, J. S. Duncan (ed), p82.
6 Australian Bureau of Statistics, 2002 Victorian Year Book, pp 7-8.
7 Australian Bureau of Statistics, Agricultural Census 2001.
8 Source: Victoria Research, Parks Victoria.
9 Department of Natural Resources and Environment – Submission to Linton Coronial Inquiry, Sept 2000 and Park Victoria – State of the Parks 2000.
10 This represents $39,38m and $25.566m respectively product charge invoiced, which is made up of the royalty, roading and silviculture charges. Source: Forests Service.

Public Land and Private Property

2.28 There are approximately 60,000 kilometres of boundaries between public land and private property.[11] Issues associated with the interface between public and private land, such as the spread of fires, weeds and feral animals, has been the source of community debate for many years. There are concerns about the cross-boundary impacts of native animals on private pastures and crops, of livestock on forest understories, and of pest plant and animal problems. The interface also provides a source of concern in terms of fire risk.

2.29 The recent fire season saw fires originating on public land, typically from lightning strikes, and burning across the boundary into private property. By clearing valleys and plains, European settlement has created steeper, more inaccessible and marginal farming country that generally has remained as public land. This type of country is not only more prone to lightning strikes, it is more likely to be heavily vegetated, providing ready fuel for bushfires.

2.30 The boundary with private land is sometimes the point where access is easier and fuel loads change, providing a point at which the fire is likely to be fought and controlled more easily. While public land may pose a risk to private land it should also be noted that fires do originate on private property, presenting a threat to public land.

Population and Cultural Change

Population Decrease in Some Fire Risk Areas

2.31 Since European settlement, fundamental population changes have occurred across rural Victoria. While the population increased significantly during the nineteenth century, this trend has reversed in the second half of the twentieth century. The modernisation of agriculture from the 1950s saw changes that resulted in fewer jobs in the primary industry sector, precipitating population loss across many rural areas, particularly in the west of the State.[12] A cycle of decline became cumulative in these areas, contributing to a concentration of settlement around large metropolitan and regional centres, declining small towns, and an ageing rural population.

2.32 An important implication of the decreased population in these rural areas has been the reduced capacity of communities to participate in CFA and DSE summer crews and the State Emergency Service. For example, the number of CFA volunteers, particularly rural volunteers, has declined around 4.2 per cent per year during the last decade.[13]

Population Increase in Some Fire Risk Areas

2.33 There has been significant population increase in areas within commuting distance of Melbourne – in both regional towns and areas of high landscape amenity. For example, the extended Melbourne commuting region, and the Melbourne weekend and rural retreat region, both experienced population increases of around 38 per cent between 1976 and 1991.[14] Second homes are generally found in some of the major urban centres and coastal, historic, hobby farm and recreation zones. This means that population increases have occurred in areas at high risk of bushfires, particularly those located in and near forest and coastal heathland.

2.34 There has also been a significant increase in tourism throughout regional Victoria with employment in tourism-related services representing more than 25 per cent of the workforce in some areas.[15] Some newer residents in these areas may have no experience with fire and be unaware of how to protect themselves and their property from fire.

2.35 An even greater population increase between 1976 and 1991, of 122.5 per cent, was experienced on the Melbourne urban-rural fringe where many properties are exposed to high bushfire risk.[16] These population trends continue despite fires such as Ash Wednesday in 1983, the 1997 Dandenong Ranges fires and the Sydney fires in 1994 and 2001-2002.

11 Auditor-General Victoria, *Fire Prevention and Preparedness*, May 2003.
12 Department of Infrastructure, *Regional Matters – Atlas of Regional Victoria 2002*, pp 10-13.
13 Submission to the Inquiry by the Country Fire Authority, *From the Foothills to the Alpine Heights 2003*, p. 211.
14 T. Budge, 'Population decline in Victoria and Tasmania' in P.W.Newton and M.Bell (eds) *Population Shift – Mobility and Change in Australia* published by AGPS, 1996 pp 193–4.
15 Department of Infrastructure, *Regional Matters – Atlas of Regional Victoria 2002*, p. 27.
16 T. Budge, 'Population decline in Victoria and Tasmania' in P.W. Newton and M. Bell (eds) *Population Shift – Mobility and Change in Australia* published by AGPS, 1996 pp 193–4.

Cultural Change: Changing Attitudes to Fire

2.36 The search for landscape amenity has been paralleled by an increased interest in environmental issues and conservation. This is shown by the increased membership of conservation and similar groups, including membership in rural areas. For example, the State Government's Land for Wildlife program, in which landholders are supported to provide habitat for native wildlife, has grown to over 5,800 properties in Victoria since 1981. The Victorian National Parks Association now has some 16,000 members and supporters, around half located outside of Melbourne.[17]

2.37 A major change has also taken place in attitudes about the place of fire in the Victorian landscape. In the early days of European settlement in Australia, fire was an important tool for farmers and many others to assist with clearing and stimulating pasture growth. The widespread use of fire, as well as carelessness in its use, is clear from the Report of the Royal Commission into the 1939 bushfires. Since then, however, attitudes to fire have slowly changed so that where fire is used it is controlled and recognises safety issues.

2.38 Nevertheless, reports following the 1939 and 1977 major fires identified apathetic attitudes towards fire except where danger was immediate.[18] Increasing concern about the impacts and risks of prescribed burning – impacts on ecological values and health; risks to property and businesses such as tourism – has also led to apathy around bushfire prevention. In recent years, considerable effort has been put into community education to increase awareness and preparedness for bushfires. This issue of public awareness and preparedness is discussed further in Chapter 13.

Changes in Victorian Response to the Threat of Unplanned Fire

Changes to Legislative and Organisational Structures

2.39 The response of early Victorians to the threat of fires was initially reactive and ad hoc. During the second half of the nineteenth century, fire brigades and volunteer town and bush brigades slowly evolved to help protect lives and assets. In 1890, the *Fire Brigades Act*[19] established the separate responsibilities of the Metropolitan Fire Brigades Board and Country Fire Brigades Boards and ensured some consistency in their funding. However, the country brigades remained relatively small, scattered and inadequately organised to meet the threat of any major bushfires as their primary focus was townships and the (then) outer metropolitan area.

2.40 By 1914, a second fire brigade movement was gaining momentum – the bush fire brigades, centred on rural landowners. These brigades, the forerunner to the Rural Brigades,[20] were informal and had no formal source of funding. In 1928, the Bush Fire Brigades Association was formed to provide a voice.

2.41 In 1926, bushfires led to significant loss of life and property in Victoria and subsequent efforts were made to improve legislation and systems for fire management. However, in 1939 the largest bushfires in living memory occurred, resulting in 71 lives lost in one day and considerable loss of assets.

2.42 The subsequent Stretton Royal Commission[21] eloquently highlighted the need for Government to address wildfire prevention and suppression needs on all rural land in Victoria. The Government of the day did not immediately act on the findings.

17 Source: Victorian National Parks Association.

18 Stretton, L.E.B, *Report of the Royal Commission to Inquire into the Bushfires of January*, 1939 and *Report of the Board of Inquiry into the Occurrence of Bush and Grass Fires in Victoria*, 1977.

19 *The Fire Brigades Act 1890* established the Country Fire Brigades Board (CFBB) and the Metropolitan Fire Brigades Board. The CFBB had extensive powers and responsibilities over volunteer fire brigades that were based more than 10 miles from Melbourne. Funding was provided in equal parts from the state of Victoria, from municipalities and from companies insuring against fire.

20 Bush Fire Brigades were the forerunner to the CFA Rural Brigades and were groups of landowners who banded together to replace the old informal arrangements. A formal organisation to support Bush Fire Brigades did not exist until 1928 when the Bush Fire Brigade Association was formed. Bush brigades relied chiefly on levies placed on landowners and donations from volunteers and the community.

21 Stretton, L.E.B, *Report of the Royal Commission to Inquire into the Bushfires of January*, 1939.

2.43 Following further extensive fires in 1944 and a second Stretton Royal Commission[22] the Government legislated for clarity in the organisational arrangements. Responsibility for wildfire prevention and suppression on public land went to the Forests Commission (a responsibility now assumed by the Secretary of the Department of Sustainability and Environment [DSE]) and the remainder of rural Victoria to the Country Fire Authority (CFA), which replaced and subsumed the Country Fire Brigades Board and the Bush Fire Brigades. In the area of fire prevention and planning, the CFA was to work with Local Authorities and their designated 'Proper Officer' (now the Municipal Fire Prevention Officer). This model continues today. The CFA commenced operation on 1 January 1945.

2.44 In managing fires on public land, DSE and previous government agencies have always relied primarily on paid employees, permanent and casual, as has the Metropolitan Fire and Emergency Services Board. However, on private land, the tradition of volunteer firefighting continues to this day in the CFA, with 1,129 career (including support and administrative) staff and 57,985 volunteers involved in fire management on private land and other support roles.

Changes to Science, Technology and Administration

2.45 Not only did the legislative and organisational structure for fire prevention and suppression change over the last century, so did the science, technology and administration. These changes have broadly been in the areas of:

- Increased emphasis on research and development into the science and ecology of bushfires in order to develop a greater understanding of fire behaviour and the factors influencing this;
- Increased use and understanding of fuel reduction and other fire mitigation strategies to reduce fire intensity and assist in fire suppression (discussed in detail in Part B of this report);
- Increased investment in research and development into firefighting equipment, clothing, the effect of fire on a range of materials, buildings and products and building design;
- Increased consideration of wildfire in the planning schemes and the Building Codes;
- Increased emphasis on training and development of all firefighters, supervisors and strategists; and
- Gradual improvements in information and communication technology, the use of satellite technology, firefighting and communications equipment; and the increased use of aircraft – all of which have significantly improved suppression efforts over the years.

Changes following Ash Wednesday and Linton Fires

2.46 In more recent years, two fire events have led to important changes in fire management arrangements: the Ash Wednesday fires in 1983 and the deaths of five volunteer firefighters at Linton, Victoria in 1998.

2.47 Following the Ash Wednesday fires of 1983 and the report of the Inquiry conducted by Police Commissioner Millar in 1984,[23] the State introduced the *Emergency Management Act 1986*. This Act recognised that emergency response is not confined to one agency and that all agencies must work in concert to deliver effective outcomes for Victoria.

2.48 The Ash Wednesday fires also prompted considerable progress in community education programs to improve community awareness and preparedness for bushfires, particularly during the 1980s.

2.49 In 1998, a relatively small fire near Linton, resulted in the deaths of five CFA firefighters. The response to this tragedy was to ensure firefighter safety was paramount in the priorities and procedures of fire suppression agencies.

Climate Change and Increased Bushfire Risk

2.50 As we have seen, unplanned fires will always be with us. But can we expect an increase in the number of bushfires over coming years?

2.51 Climate and weather provide the context within which fires such as those of 2002-2003, occur. Weather at the time of unplanned fires can be critical in determining how successful fire suppression efforts are likely to be, and the extent to which fires might impact on people and property.

22 Stretton, L.E.B, Report of the 1944 Royal Commission.

23 Report of the Bushfire Review Committee on Bushfire Disaster Preparedness and Response in Victoria, Australia, Following the Ash Wednesday Fires 16 February 1983, April 1984.

2.52 Victoria experiences a climate conducive to the occurrence and spread of unplanned fires in nearly every summer somewhere in the State. During periods of drought, such as those associated with El Niño events, evidence indicates there is an increased risk of large fires. Additionally, climate change throughout the present century is predicted to lead to increased temperatures and, with them, a heightened risk of unplanned fire.

2.53 As part of our Inquiry, we investigated whether Victoria must plan for an increased frequency of extreme fire weather days as the climate becomes hotter. Specifically, we investigated whether there is an increase in extreme fire weather during strong El Niño–Southern Oscillation events in eastern Australia.

2.54 The Commonwealth Bureau of Meteorology has compiled summary statistics on Australia's weather and climate and maintains an up-to-date analysis of short and long-term trends in key climate parameters, especially temperature and rainfall. To assist analysis, the Bureau provided more detailed climate data, based on individual climate station records Melbourne and other selected locations in Victoria.

2.55 Long-term records for a number of climate stations in Victoria were used to estimate the daily 3 pm Forest Fire Danger Index and the Keetch-Byram Drought Index, two measures of environmental conditions widely accepted to be related to the probability of fire ignition and spread. These parameters were then analysed in relation to time and to the Southern Oscillation Index to investigate the strength of evidence for trends and cycles in the occurrence of extreme fire danger weather in Victoria.

2.56 We also examined the results of relevant investigations into extreme fire weather conditions described in reports and working papers written by Bureau of Meteorology staff.

2.57 Specific findings of our investigation are outlined in detail in the paper 'Climate, Weather and Unplanned Fires in Victoria', attached as Appendix V to this report.

2.58 To summarise here: Our exploratory investigations of the ways that global climate warming and cyclical phenomena such as El Niño drought contribute to fire risk in Victoria reveal possible increases in fire risk as climate warms, and a higher likelihood of fire in El Niño drought periods.

2.59 It is therefore possible that a higher fire risk future for Australians will result from higher temperatures, changes in rainfall, and consequent altered ecosystem dynamics (i.e. changed growing conditions for plants, including altered competitive interactions, possible increased biomass production and changed fuel types).

2.60 This points to the importance of having systems in place to adjust progressively to changing circumstances.

Recommendation

2.61 **That DSE and CFA as part of their long term planning, and in conjunction with the Commonwealth Bureau of Meteorology, consider ways in which evidence for climate change and El Niño–Southern Oscillation cycle impacts on the likelihood of unplanned fire, can be better incorporated into preparedness and response planning.**

Conclusion

2.62 Land use has changed significantly over the last 170 years of European settlement in Victoria and, to a large degree, changing patterns of population destination has mirrored this. The interface between public and private land was once an issue for the farmer only; this is no longer the case with increasing growth in both permanent and weekend communities now at the direct interface with public land.

2.63 Last century, Victorians realised that unplanned fire would always be with us and they introduced a range of legislative and organisation responses to prevent and suppress fires. There is no doubt that Victorians are significantly more skilled in both these areas and have engaged on a continuous improvement strategy to better cope with our fire prone environment. Much of this report details the significant advances that have been made and opportunities for Victorian to advance further.

Chapter 3
Current Legislation and Co-operative Arrangements

Overview

3.1 This Chapter describes the Victorian legislation relating to the management of emergencies – in particular, fire. It also describes co-operative arrangements in place to minimise the impact of those emergencies on the community.

3.2 Current arrangements are complex; they involve a large number of agencies and organisations and can only succeed if there is a high level of co-operation and communication between agencies and the community.

3.3 This Chapter gives the legislative context for Victoria's multi-agency preparation and response to bushfire events. Later Chapters assess the effectiveness of agencies in preparing for and suppressing the 2002–2003 fires.

Victorian Legislation

3.4 Key legislation includes:

- *Emergency Management Act 1986*;
- *Metropolitan Fire Brigades Act 1958*;
- *Country Fire Authority Act 1958*;
- *Forests Act 1958*;
- *Planning and Environment Act 1987*; and
- *Local Government Act 1989*.

3.5 A number of other Acts impact on agencies charged with protecting Victoria from fire. These include:

- *Electricity Act 1998*;
- *Flora and Fauna Guarantee Act 1988*;
- *Alpine Resorts (Management) Act 1997*;
- *National Parks Act 1975*;
- *Transport Act 1983*;
- *Environment Protection Act 1970*; and
- *Catchment and Land Protection Act 1994*.

3.6 In addition, a number of agreements and Memoranda of Understanding provide detail for organisations and agencies on how these agencies implement their responsibilities. The Agreement of most interest to the Inquiry is the Co-operative Agreement between the Country Fire Authority (CFA) and the then Department of Natural Resources and Environment, September 2002.

Emergency Management Act 1986

3.7 The *Emergency Management Act 1986* gives the Office of the Emergency Services Commissioner (OESC) a broad role in emergency prevention planning, including the fire services. The OESC can set and monitor performance standards for the Metropolitan Fire and Emergency Services Board (MFESB) and CFA and encourage and facilitate co-operation between the agencies to effectively utilise fire and emergency services.

3.8 The *Emergency Management Act* also addresses:

- Recovery planning and management;
- 'State of Disaster' arrangements; and
- Compensation arrangements of registered emergency workers.

3.9 Part 3A of the Act outlines the State Emergency Recovery Plan. This includes the appointment of a co-ordinating agency for recovery, a State Recovery Co-ordinator and the establishment of state and regional recovery committees. Part 5 of the Act outlines the declaration, powers and duties of the Co-ordinator-in-Chief and Part 6 covers compensation arrangements for registered emergency workers.

3.10 Further to these arrangements, the Act outlines specific responsibilities for the development of response planning and co-ordination for emergencies, including fire. Of particular note are the obligations and responsibilities placed on Municipal Councils, including Alpine Resort Management Boards, to plan for emergencies that may occur within their jurisdiction. This task is carried out under the sponsorship of Police Municipal Emergency Response Co-ordinators (usually an Inspector or Senior Sergeant), located within each municipality.

The Fire Agencies

3.11 Three agencies respond directly to fires in Victoria:

- Metropolitan Fire and Emergency Services Board;
- Country Fire Authority; and
- Department of Sustainability and Environment (DSE).

Of these, it is the latter two agencies that deal predominantly with bushfires.

Metropolitan Fire and Emergency Services Board

3.12 Under section 7 of the *Metropolitan Fire Brigades Act 1958*, MFESB has the function of suppressing and preventing fire in the Metropolitan Fire District. This covers the Melbourne Central Business District through to Laverton in the west, Tullamarine and Somerton in the north, Croydon in the east and Clayton and Mentone in the south. This is an area of approximately 1,100 square kilometres with a population of approximately 2.2 million.[1]

3.13 In the Metropolitan Fire District there are few opportunities to engage in fighting bushfires. However, there are some areas of protected public land – for example, along the Merri Creek and the Yarra – which DSE would normally have control of in respect of fire suppression. Following agreement between the Chief Officers of the MFESB and DSE, MFESB have assumed control for fire suppression in these areas. DSE and CFA assist MFESB as required if specific bushfire expertise or equipment is needed.

3.14 While some small pockets of the Melbourne Metropolitan Fire District contain public land and/or abut CFA areas (and could therefore be viewed as potential bushfire areas), CFA and DSE are the agencies that deal mainly with bushfire.

Country Fire Authority

3.15 The CFA is established under section 6(1) of the *Country Fire Authority Act 1958* (CFA Act) and is mandated to provide for the 'more effective' control and prevention and suppression of fires in the country area of Victoria.

3.16 The country area of Victoria is defined in the CFA Act to mean that part of Victoria outside the Metropolitan Fire District, not including forest, National Park, or protected public land. CFA is therefore responsible for fire protection to all other parts of Victoria including outer metropolitan Melbourne and regional centres, rural areas and plantation forests. This equates to approximately 15 million hectares of land, approximately one million homes and 2.6 million people.

3.17 Section 20 of the *CFA Act* states that the general duty of the CFA is 'superintending and enforcing all necessary steps for the prevention and suppression of fires and for the protection of life and property in case of fires…'.[2] However, CFA does not have sole responsibility for fire prevention in the country area of Victoria. It must work with the Municipal Councils and public authorities to fulfil its fire prevention role.[3] Both CFA and Local Government have a duty to prevent fire.

3.18 CFA fulfils its fire prevention role through a number of means. These include the Declaration of Fire Danger Periods[4] within a municipality or part of a municipality, and Declarations of Total Fire Bans.[5] CFA also provides leadership within the fire prevention planning process and provides training, advice and support to Municipal Fire Prevention Officers. CFA undertakes community education programs to deliver appropriate fire safety and prevention messages to the community. These include intensive face-to-face activities.

Department of Sustainability and Environment

3.19 DSE is responsible for fire prevention and suppression for Victoria's 7.7 million hectares of public land including forests, National Parks, and protected public lands. Section 62(1) of the *Forests Act 1958* states that the Secretary's duty is 'to carry out proper and sufficient work for the prevention and suppression of fire in every State forest and national park and on all protected public land…'.[6]

3.20 Protected public land is defined in section 3 of the *Forests Act 1958* and includes State Forests, National and State Parks, wilderness areas and Crown Reserves. This includes areas managed by an Alpine Resort Management Board.

3.21 DSE fire management planning operates at three distinct levels:

- Strategic fire plans;
- Fire operations plans; and
- Individual burn plans.

1 Based on 2001 ABS data.
2 The powers given to the CFA to achieve its suppression and prevention roles are set out at ss20AA, s23, s28, s29, s30, s33 and a variety of ancillary provisions of the *Country Fire Authority Act, 1958*.
3 s43, *Country Fire Authority Act, 1958*; S8 and Schedule 1 of the *Local Government Act 1989*.
4 s4, *Country Fire Authority Act, 1958*.
5 s40, *Country Fire Authority Act, 1958*.
6 DSE's powers to carry out its fire suppression and prevention roles are contained generally in ss63–69 of the *Forests Act 1958*.

3.22 Strategic fire plans identify five fuel management zones that provide a guide to appropriate treatments and priority for fuel management works. These plans, which are developed for each DSE district, guide the development of fire operations plans and individual burn plans for specific locations. These plans are developed through a consultation process with relevant stakeholders including Parks Victoria and the wider community. They are discussed in more detail in Chapter 14.

3.23 Communication about respective fire prevention strategies for public and private land is through relevant CFA Group meetings and the Municipal Fire Prevention Committee. Where the municipal district is adjacent to or adjoins any part of a forest or National Park, DSE has a representative on this Committee. DSE also undertakes further consultation with the broader community.

3.24 DSE has the discretionary power to direct the removal of fire hazards on private land within 1.5 kilometres of any National Park or State Forest.[7] This relates to both control and lighting of fires. However there are some locations around the State where that power has been transferred to the CFA, making delineation unclear.

3.25 DSE undertakes its fire responsibilities by running education programs, declaring prohibited periods, applying and promoting the *Code of Practice for Fire Management on Public Land*[8] and through its systematic planning approach to the implementation of the strategies set out in its Fire Protection Plans.

CFA and DSE Suppressing Fire Together

3.26 Depending on whether the fire is located on private or public land, either CFA or DSE respectively will have responsibility over suppression (see Figure 3.1). When the fire traverses public and private land, one agency is deemed the control agency for the fire. This arrangement is outlined in the *Emergency Management Act 1986* which provides that any of the Chief Officers in respect of fire (including the MFESB) may appoint an officer of one of the agencies to have overall control of response activities. This ensures there is a clear line of authority in respect of each fire and ensures the agencies work together in the suppression of fire.

3.27 In addition to the *Emergency Management Act 1986*, further co-operative arrangements between DSE and CFA were put in place following the Linton tragedy with the aim of achieving seamless co-ordination between the two agencies. This arrangement – most recently agreed to in September 2002 and detailed in the Auditor-General's May 2003 report *Fire Prevention and Preparedness* – sets out the extensive incident control and co-operative arrangements in place.

3.28 Most importantly for fire response, a jointly-staffed incident control centre is established to:

- Determine and co-ordinate strategy;
- Co-ordinate communication;
- Co-ordinate the requests for and management of resources;
- Oversee implementation of tactics;
- Provide information to affected communities and the wider community; and
- Liaise with media.

Other Agencies and Organisations in Fire Management

3.29 Fire preparedness and prevention involves a myriad of agencies or bodies:

- MFESB, CFA and DSE;
- Office of the Emergency Services Commissioner;
- Other parts of DSE's portfolio through the Office of Planning, the Building Commission and Parks Victoria;
- The 79 Municipal Councils;
- Alpine Resort Management Boards; and
- The electricity industry, the Office of the Chief Electrical Inspector, the forest industry, Water Authorities, VicRoads, and VicTrack – to name some of the many agencies involved.

3.30 Current Victorian legislation does not provide specific requirements for the participation of many of these agencies.

Municipal Councils

3.31 In conjunction with the CFA, Municipal Councils[9] (and public authorities), have a significant primary fire prevention role in the country area of Victoria.

7 *Forests Act 1958*; s65.
8 Department of Natural Resources and Environment, *Code of Practice for Fire Management on Public Land, 1995*
9 *Local Government Act 1989* S8 and Schedule 1 confer the function of "fire prevention and protection" on Municipal Councils.

Figure 3.1: Public and Private Land in Victoria

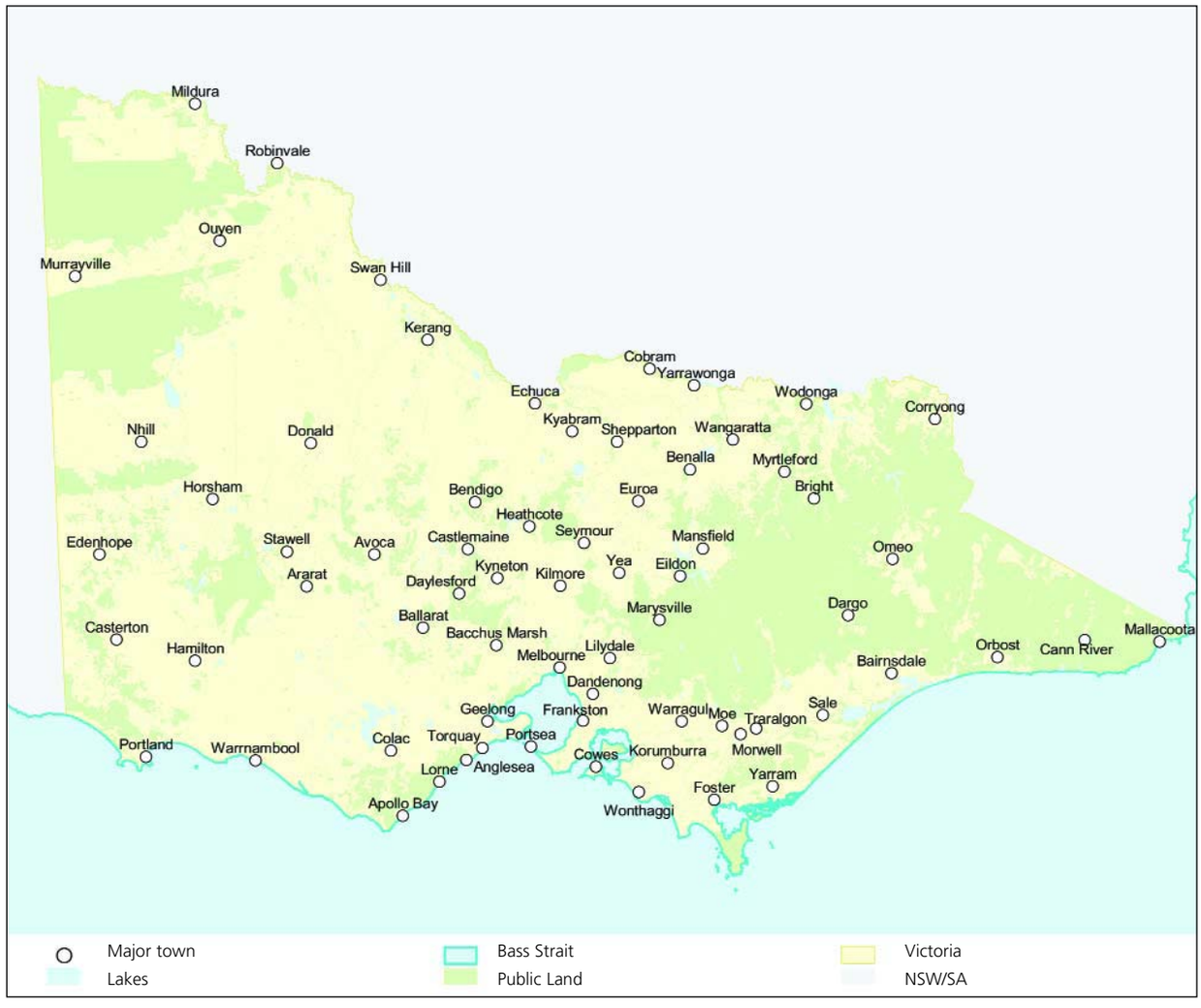


Table 3.1: Public Land Types for which DSE has Fire Management Responsibilities

Category	Approximate area (ha)
Public land	7.70 million
Parks & other Conservation Reserves	4.23 million
State forest	3.50 million
State forest for timber production	(1.05 million)

Source: DSE. Note 1: Total land base for Victoria is 22.83 million hectares. Note 2: 1.05 million hectares of State forest is available and currently used for timber production.

3.32 Section 43 of the CFA Act states 'it is the duty of every municipal council and public authority to take all practicable steps (including burning) to prevent the occurrence of fires on, and minimise the danger of the spread of fires on and from – any land vested in it or under its control or management; and any road under its care and management'.

3.33 Further, section 55A of the CFA Act states all Municipal Councils must have a Fire Prevention Plan. The Municipal Fire Prevention Committee (which must be established according to section 54 of the CFA Act) oversees the development of this plan. In addition, all Councils must appoint a Municipal Fire Prevention Officer (s96A of the CFA Act). To enforce Council's duties in respect of fire prevention, a council may also issue a fire prevention notice or a fire prevention infringement notice.

3.34 Municipal Councils cannot be sanctioned if they fail to fulfil their obligations under the CFA Act. However, the CFA can ask the Governor-in-Council to transfer a Municipal Council's fire responsibilities to the CFA if it is satisfied that a Municipal Council or Public Authority is failing to carry out its fire prevention responsibilities (ss45–46 CFA Act). To date, this procedure has not been invoked.

3.35 Under Section 14 of the *Planning and Environment Act 1987*, Municipal Councils are required to develop, administer and enforce a planning scheme to set out the use, development and protection of land for an area. This planning scheme sits within the Statewide Planning Policy Framework, administered by the Office of Planning within DSE. There is an overarching guideline (the wildfire planning guide) that requires councils to identify priority hazards in planning schemes, consider fire hazards in planning decisions affecting identified areas, have regard to specific fire protection guidelines and seek the advice of relevant fire authorities.

3.36 Clause 15 of the *Planning and Environment Act 1987*, allows Municipal Councils to apply a Wildfire Management Overlay (WMO) to the planning scheme. The WMO identifies land where the potential fire intensity is high enough to warrant special treatments to mitigate the effects of fire. Twenty-six councils have WMOs and this classification is noted on their planning scheme maps. Municipal councils may also need to deal with other environmental measures that impact on fire prevention and preparedness such as the Native Vegetation Framework and the implementation of the Flora and Fauna Guarantee.

10 s62(2) *Forests Act 1958*.
11 s33(1) *Country Fire Authority Act 1958*.

Parks Victoria

3.37 Parks Victoria is a Statutory Authority within the DSE portfolio. It is the largest land manager in Victoria with responsibility for National Parks, Wilderness, State and regional parks, Melbourne's metropolitan parks and open space network. Parks Victoria also has responsibilities for the recreational management of the Lower Yarra, Maribyrnong and Patterson Rivers, and Port Phillip and Westernport Bays.

3.38 DSE has statutory responsibility for fire prevention and suppression on all National Parks and also has a statutory obligation to seek agreement with Parks Victoria prior to fire prevention works being undertaken.[10] Parks Victoria is a major stakeholder in the development of Fire Protection Plans and Fire Operations Plans for each DSE Fire District and is consulted when DSE audits its annual fire operations plans and its strategic Fire Protection Plans.

3.39 Before Fire Protection Plans are finalised, Parks Victoria and the Executive Director, Fire Management Branch, DSE, review them and resolve differences. Finally, any aggrieved party can ask the Secretary, DSE to review the Plans.

3.40 Land managed by Parks Victoria includes substantial assets such as:

- Infrastructure (e.g. management buildings, accommodation, information and interpretive centres, walking trails);
- Cultural sites relating to Aborigines, early settlers (e.g. mountain cattleman huts) and industry (e.g. mine sites, logging tram tracks and trails); and
- Ecological sites (for rare and threatened species).

Alpine Resorts

3.41 Although Alpine Resorts are located on public land and are therefore a DSE responsibility, all resorts except Mount Baw Baw are under CFA's fire prevention responsibilities following an agreement between DSE and CFA.[11] DSE still retains responsibility for managing fuel on public land up to the boundary of the Alpine Board of Management Area.

3.42 Alpine areas are managed by Alpine Resort Management Boards. These Board are deemed to be a Municipal Councils for the purposes of the *Emergency Management Act 1986*.[12] As such, Boards must prepare and maintain a Municipal Emergency Management Plan (under section 20 of the *Emergency Management Act 1986*). Such plans are primarily for emergency prevention, response and recovery. While they encompass fire prevention and suppression, the plans are cast at a management rather than operational level.

3.43 Despite this classification, Alpine areas do not have to participate in Municipal Fire Prevention Committees and are not required to prepare and maintain Municipal Fire Prevention Plans and have those plans audited by CFA every three years. They do not need to appoint a Municipal Fire Prevention Officer.

Water Authorities and Catchment Management Authorities

3.44 Providing water is the province of five water authorities (wholesalers), three metropolitan retailers (licensees), 15 regional urban authorities, and one irrigation trust. In the Melbourne metropolitan area there is one wholesaler (Melbourne Water) and three retailers. In the rest of Victoria there are four rural water authorities, one water trust and 14 regional urban water authorities.

3.45 Despite this number of entities, DSE and Parks Victoria are primarily responsible for fire prevention and suppression in Victoria's water catchment areas. This is because, for the most part, Victoria's significant reservoirs and catchment areas are located in National Parks or State Forests.

3.46 Some water authorities (for example, Melbourne Water Corporation [MWC] and Goulburn Murray Water) also own freehold land on which balancing storages are located. Because these are located in the country area of Victoria, CFA has fire prevention and suppression responsibility. The authorities work with the CFA and the Municipal Fire Prevention Committees to manage the fire risk on these properties.

3.47 MWC and DSE entered into an agreement in December 1995 (shortly after the Melbourne Metropolitan Board of Works was dismantled and became MWC) that recognises that DSE has the primary legal responsibility for fire prevention and suppression (under the *Forests Act 1958*) but acknowledges MWC's role in this respect (under section 321 of the *National Parks Act 1975*). That agreement states MWC must be consulted about, and agree with, the preparation of Fire Protection Plans for its water catchment areas. MWC has its own standing fire suppression force of approximately 50 full time staff, which is trained up to DSE standards and which, like DSE's own force, is supplemented during each fire season.

3.48 Interfacing with the Water Authorities and DSE are ten Catchment Management Authorities. Their general responsibilities (outlined in section 4 of the *Catchment and Land Protection Act 1994*) are to maintain and enhance long-term land productivity while also conserving the environment. Catchment Management Authorities aim to maintain and enhance the quality of the State's land and water resources (and associated plant and animal life). They have no explicit statutory responsibility for fire prevention. The Fire Protection Plans and Fire Operations Plans developed by DSE are required to take into account the special characteristics of the catchment areas.

Electricity Industry and Office of the Chief Electrical Inspector

3.49 The Office of the Chief Electrical Inspector (OCEI) has the statutory authority for ensuring that electrical companies minimise the risk of fire to the community. This authority is derived from Part 8 of the *Electricity Safety Act 1998*, which sets out the regime for electric line clearance in Victoria, and is backed by the Electric Line Clearance Regulations 1999, the Electricity Safety (Bushfire Mitigation) Regulations 2003 and the Code of Practice for Electric Line Clearance. The regime contained in the Act, Regulations and Code requires all electricity suppliers to prepare a bushfire mitigation plan for the area their supply covers.

12 s5 *Alpine Resorts (Management) Act 1997*.

3.50 There are seven main companies who, in conjunction with OCEI, must prepare an annual bushfire mitigation plan. These are the main transmission company SPI PowerNet and the six supply companies: TXU, Powercor, AGL Energy, Country Energy, Citipower and United Energy. Bushfire mitigation plans for the companies with areas designated as a hazardous fire risk area are audited annually by OCEI. Of the main electricity suppliers only Citipower do not have any areas designated as a hazardous fire risk area and are not required to prepare a bushfire mitigation plan.

3.51 As of 1 July 2003 following introduction of the new Electricity Safety (Bushfire Mitigation) Regulations, OCEI prescribes the content and minimum standards for bushfire mitigation plans.

3.52 OCEI also oversees the Electric Line Clearance Consultative Committee. Representatives from all relevant stakeholders provide advice and recommendations on the preparation of the Code of Practice for Electric Line Clearance. OCEI are not required to consult with the CFA, OESC or the Victoria State Emergency Service (VICSES) to ensure that the Code or the Bushfire Mitigation Plans are in accordance with wider fire prevention plans, nor are those plans audited by any of those bodies.[13]

The Forest Industry

3.53 Under amendments to the CFA Act, where a plantation owner has more than 500 hectares of plantation within a 25 kilometre radius, they may be required to establish, equip and staff a forest industry brigade.[14] This requirement is open to interpretation, as it does not cater for owners who might have significant holdings over a more dispersed area.

3.54 The forest brigades came into being when Victoria's State-owned plantations were privatised. They were set up to ensure CFA local brigades did not carry a disproportionate burden for fire suppression in plantations.

3.55 There are now over 25 such brigades in operation, controlled by 15 different plantation owners.

Roads: VicRoads and Councils

3.56 VicRoads are responsible for maintaining all declared roads (such as major arterials, forest roads and tourist roads). Municipal Councils are responsible for all other local rural roads. VicRoads and Municipal Councils are responsible for keeping roads clear and safe from a fire prevention and risk management perspective. Private roads are the responsibility of the private owner.

3.57 VicRoads' duties in respect of roads are contained in the *Transport Act 1983*.[15] Councils' roles in respect of roads are derived from their general responsibilities for roads in the *Local Government Act 1989* coupled with their general responsibility for fire prevention under the CFA Act. Neither agency is required to co-ordinate its road maintenance program with the main fire prevention agencies, however, Municipal Councils co-ordinate any road clearance work within their broader Municipal Fire Prevention Plan.

VicTrack

3.58 VicTrack is the trading name of Victorian Rail Track, a body corporate established by the *Rail Corporations Act 1996*. VicTrack has the responsibility to establish, manage and maintain railways and rail infrastructure.[16]

3.59 VicTrack also has the power to serve a notice on owners and land occupiers, requiring them to fell or remove any tree or wood that could be an obstruction or danger if it is within 60 metres of a railway track.[17] In other words, VicTrack has the statutory function and the means to require that land around railway tracks be kept clear and safe. Although not explicitly mentioning fire, this function includes fire mitigation and prevention work.

3.60 VicTrack has delegated these functions through a head lease to the Public Transport Division of the Department of Infrastructure. They, in turn, have sub-leased Victoria's rail track to two main lessees – who, in turn, allow other operators to use the track. These sub-lessees have the operational responsibility for carrying out VicTrack's statutory fire responsibilities. Both sub-lessees have sub-contracted rail line maintenance to another contractor.

13 See sections 6.7 to 6.15 of Auditor-General Victoria's *Fire Prevention and Preparedness* for further detail.
14 Amendments to the *Country Fire Authority Act, 1958* (s23AA).
15 Specifically, sub-sections 16(1)(a)(b) and (e).
16 Pursuant to s11(1) of the *Rail Corporations Act 1996*.
17 Pursuant to s60 of the *Rail Corporations Act 1996*.

3.61 If fire prevention works are not carried out, VicTrack cannot be compelled to carry out works by Municipal Councils or the CFA as it is a public authority and not subject to the serving of a fire prevention notice by a Municipal Council.[18] However, such a notice may be served on the lessees of railway track, because they are private companies.

3.62 The chain of command for fire prevention work on and around railway track is unclear and, as the Auditor-General's 2003 Report noted, many municipalities are themselves unclear as to who has responsibility for addressing fire prevention concerns on leased lines.

3.63 The Public Transport Division of the Department of Infrastructure has a co-ordinated Emergency/Incident Management Response Plan that includes bushfire. The Public Transport Division also holds bi-monthly co-ordination meetings with the rail bodies. The CFA, OESC, VICSES or any other body with fire management experience does not audit this plan.[19]

Building Commission

3.64 Under the *Building Act 1993* and Building Regulation 1994, Councils can identify bushfire-prone areas and apply a WMO. WMO and bushfire-prone areas are now mapped using identical requirements. The effect of building a development in a bushfire prone area is that construction must be in accordance with the Building Code of Australia requirements.

3.65 The Building Code of Australia is generally reliant on the Australian Standard AS 3959 (the Standard) to provide specific requirements relating to construction in bushfire-prone areas. The Standard generally includes requirements for burning debris and ember protection, radiant heat and flame contact protection, controls on the combustibility of external materials, and the protection of openings, such as windows and doors. It is prescriptive in specifying construction requirements. The criteria for identifying the various risk categories in bushfire-prone areas is an aspect of the Standard more open to interpretation.

Conclusion

3.66 As noted at the start of this Chapter, current legislative arrangements are complex and involve a large number of agencies and organisations. Co-operation, communication and goodwill are essential for such a complex system to work well.

3.67 Chapter 5 notes the many submissions that praised and criticised the effectiveness of co-operation and communication between agencies and the community. In Chapter 16 we assess how well our emergency management procedures work within this legislative framework.

18 s41(1) *Country Fire Authority Act 1958*.
19 For further detail, see Auditor-General Victoria, *Fire Prevention and Preparedness*, 2003, 6.16–6.31.

Chapter 4
The Story of the 2002-2003 Victorian Fires

Overview

4.1 There can be no single, definitive story that gives justice to the multiple and complex experiences, responses, successes and challenges of Victoria's 2002-2003 fire season.

4.2 This was a widespread, long-lasting, fire season involving 3,000 fires and many thousands of personnel, including agency firefighters and community members. People worked together – not just to fight the fires, but in many other support roles. Thousands of people living in fire-affected areas have their own stories of fear, loss and triumph. Victorian communities – industry, the media and the public – were also affected and they, too, contribute to the broader fire story.[1] Not surprisingly, the Department of Sustainability and Environment (DSE) described the task of piecing together a record of the 2002-2003 fires as 'formidable'.

4.3 This Chapter outlines some of the significant achievements as well as the losses, which were part of the story of the 2002-2003 fires. It serves as an important context for our later analyses and recommendations against the three Terms of Reference. First, it reminds us that the 2002–2003 fires were exceptionally severe in terms of length, multiple outbreaks and geographical spread. And second, it tells us that suppressing these extreme fires in a flexible, responsive and co-operative way – with minimal loss – was a major achievement on the part of all involved.

4.4 We start by highlighting an important context for the fires – drought. A chronological narrative of the key fire events from December 2002 to March 2003 follows, based on detailed daily records prepared by the DSE[2] and the Country Fire Authority (CFA).[3] Both records can be accessed on the Department of Premier and Cabinet website.

4.5 Onto this story of drought, dramatic weather, remote country, threatened townships and the co-ordination of human resources and equipment we overlay the stories of multi-agency co-operation and community engagement. We then tell another story – one of positive and negative impacts on firefighters and affected communities.

Drought – A Key Context for the Fires

4.6 In the period leading up to the fires, severe drought in its sixth year had a major impact on rural communities. The drought resulted in considerable water supply issues. The state of water storages was, on average, better in May 2002 than at the same time in 2000 and 2001. However, the lack of winter and spring rainfall in 2002 kept streamflows and water storages low.

4.7 By the end of 2002, water restrictions of varying severity were in place across Victoria, with the situation most severe in the North Central and North West regions. By 6 December, 235 towns across Victoria were on water restrictions; seven were on severe restrictions, 32 on moderately severe restrictions and a further 196 had low levels.[4]

4.8 For the farm sector, the drought meant a significant reduction in farm incomes and farm employment, particularly in northern Victoria. Poor pastures meant increased costs for hand feeding stock and moving stock to find feed. (This, in turn, had a potential impact on breeding stock.) The drought threatened fruit trees, vines and other horticulture. It meant lower water allocations to irrigators.

4.9 Low water levels in streams, the Hume Dam and in Lakes Eildon and Eppalock impacted on recreation and tourism and created potential for algal blooms and other water quality problems.

4.10 As the State asked communities, householders and CFA volunteers to prepare for the forthcoming fire season, rural communities faced significant social and economic stress that left them vulnerable to the impact of the bushfires.

4.11 For many in rural communities who had already been doing it hard, the bushfires provided an additional source of hardship. Communities were frequently torn between priorities, including:

- Handfeeding and watering stock;
- Earning an income from other forms of employment, sometimes in remote locations;
- Maintaining businesses; and
- Defending their own and others' property from fire over a long and difficult season.

4.12 Understandably, the recovery effort has seen the need for support of various kinds including financial and general counselling.

1 For example, industry and the public gave significant donations to firefighting agencies to help with fire suppression and recovery.
2 The 2003 Alpine Fires, DSE, July 2003.
3 Country Fire Authority, From the *Foothills to the Alpine Heights,* CFA's Submission to Victoria's 2002-2003 Bushfire Inquiry, 2003 Appendix F.
4 DSE website: Victorian Resources Online.

Figure 4.1: Big Desert Fire Area

The 2002-2003 Fire Season

4.13 The first fires of the 2002-2003 fire season were reported in September. Many fires had been attended by the time the North East and Gippsland fires started in early January. At the beginning of summer, after a warm, dry spring and the ongoing drought, the Government received notice from the Bureau of Meteorology that conditions were similar to those leading up to the 1983 Ash Wednesday fires. Fire agencies across the State – already aware of the significant risk following the Bureau's July Seasonal Outlook – went on high alert.

The Big Desert Fire – 17 to 25 December

4.14 On 17 December, a lightning storm started two fires in the Big Desert Wilderness Park in Victoria's remote North West. Several days of very high temperatures and erratic winds followed, producing high fire intensity. Atmospheric conditions in the region, generated by the fire itself, caused a localised thunderstorm. Within days, the two original fires had merged, covering large areas of the Big Desert Wilderness Park and part of Wyperfeld National Park. On the northern edge of the park, driven by uncharacteristic southerly winds, fingers of fire burned on to private land, running across drought-affected paddocks. Not just weather, but terrain posed a challenge: access was difficult in the undulating sand dune country and areas of dense mallee scrub.

4.15 The Big Desert Fire was, at the time the biggest fire in Victoria in 20 years, affecting 181,400 hectares of predominantly public land and requiring significant resources (Figure 4.1).[5]

Yambulla Fire – 6 to 11 January

4.16 Two days before the lightning strikes of 7 and 8 January, lightning ignited a fire in the Yambulla area, North West of Genoa in East Gippsland. The fire was seen as posing a major threat and required significant firefighting resources. At the time the main fires started on 8 January, a total of 180 DSE firefighters were allocated to the Yambulla fire, supported by bulldozers and firebombing aircraft. The fire was contained within a few days. The level of resourcing did, however, impact on the local resources available to fight the multiple outbreaks that followed.

4.17 The Big Desert fires and the Yambulla fire (as well as four fires burning in Kosciusko National Park near the Victorian border) provided a taste of the extreme fire season ahead.

The North East and Gippsland fires

The First Week – 7 to 14 January

4.18 Late on Tuesday January 7 and early the next day, dramatic, dry thunderstorms brought widespread lightning strikes that ignited over 80 fires in Victoria's North East and Gippsland. Many were in mountainous, forested areas of the Alpine National Park. Another eight fires were reported in other regions and a further 42 fires were ignited by lightning over the border in New South Wales. January 8 is considered day one of the North East Victoria and Gippsland fires (see Figure 4.2).

4.19 Around 280 DSE personnel were involved in the fire effort on the first day with a further 265 being moved from other areas. The CFA also responded to a large number of fires on both private and public land.

4.20 The situation was extremely complex. Accurate detection of the number and location of so many fires was difficult for the firefighting agencies. The remote country, in which the ignitions started, as well as the weather conditions, compounded this. These issues are fully discussed in Chapter 17.

4.21 There were early successes. By the second day, 40 of the initial fires were contained or under control.[6] By 14 January a small number of fires remained. These fires – mostly in steep, inaccessible forest in the North East – continued to burn.[7] These fires presented huge challenges to firefighters especially Anderson's Peak on the Mt Buffalo plateau, Mt Arthur, Razorback and Mt Feathertop. Hand crews and aircraft continued to attack the fires and construct control lines. The number and location of the fires as well as turbulence hampered aerial support. Firefighters described the progress of the fires at this stage as 'not raging but inexorable'. Despite their efforts, fires continued to break through control lines.

4.22 Figure 4.3 shows the fires burning on 11 January.

5 At the peak of the fire, over 300 firefighters, nine bombing aircraft and 75 vehicles were deployed.

6 For example, the Genoa fire, ignited prior to the main alpine fires, was classified as contained and the Sale, Erica, Heyfield and Yarram Incident Management Teams were closed over the week with most fires under control in the area.

7 Those fires in the North East were grouped into complexes managed by the Ovens and Corryong Incident Management Teams. Corryong managed the Cravensville fire and the Pinnibar fire near the NSW border. The latter was managed as a joint incident with NSW, with fires threatening to cross the border from NSW. Ovens managed the Mt Buffalo fire and five fires in the Mt Beauty, Mt Bogong, and Mt Feathertop/Harrietville area. The Razorback/Mt Cooper fire north of Omeo was managed by the Incident Management Team at Swifts Creek.

Figure 4.2: Lightning Strikes 7 and 8 January 2003

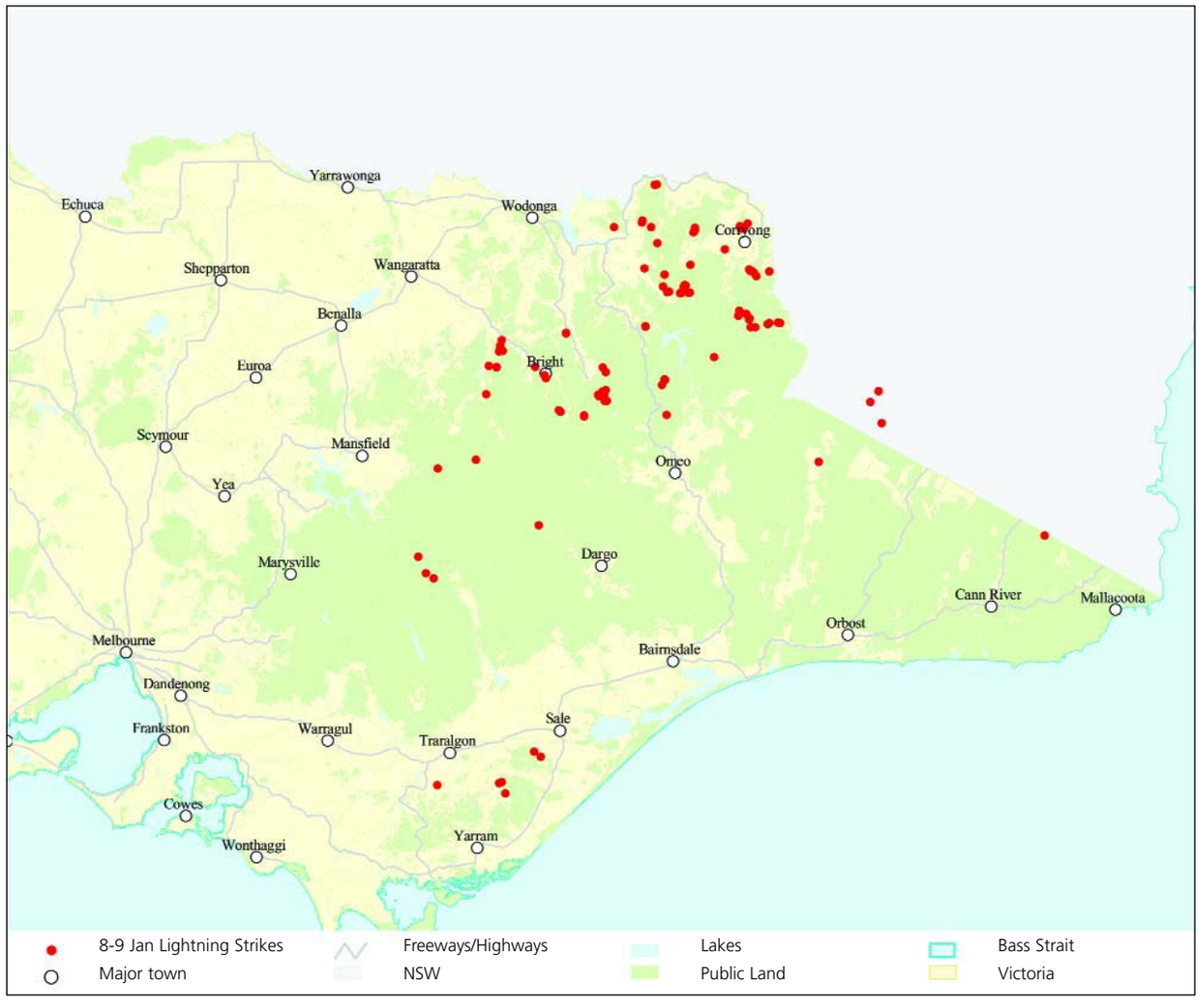
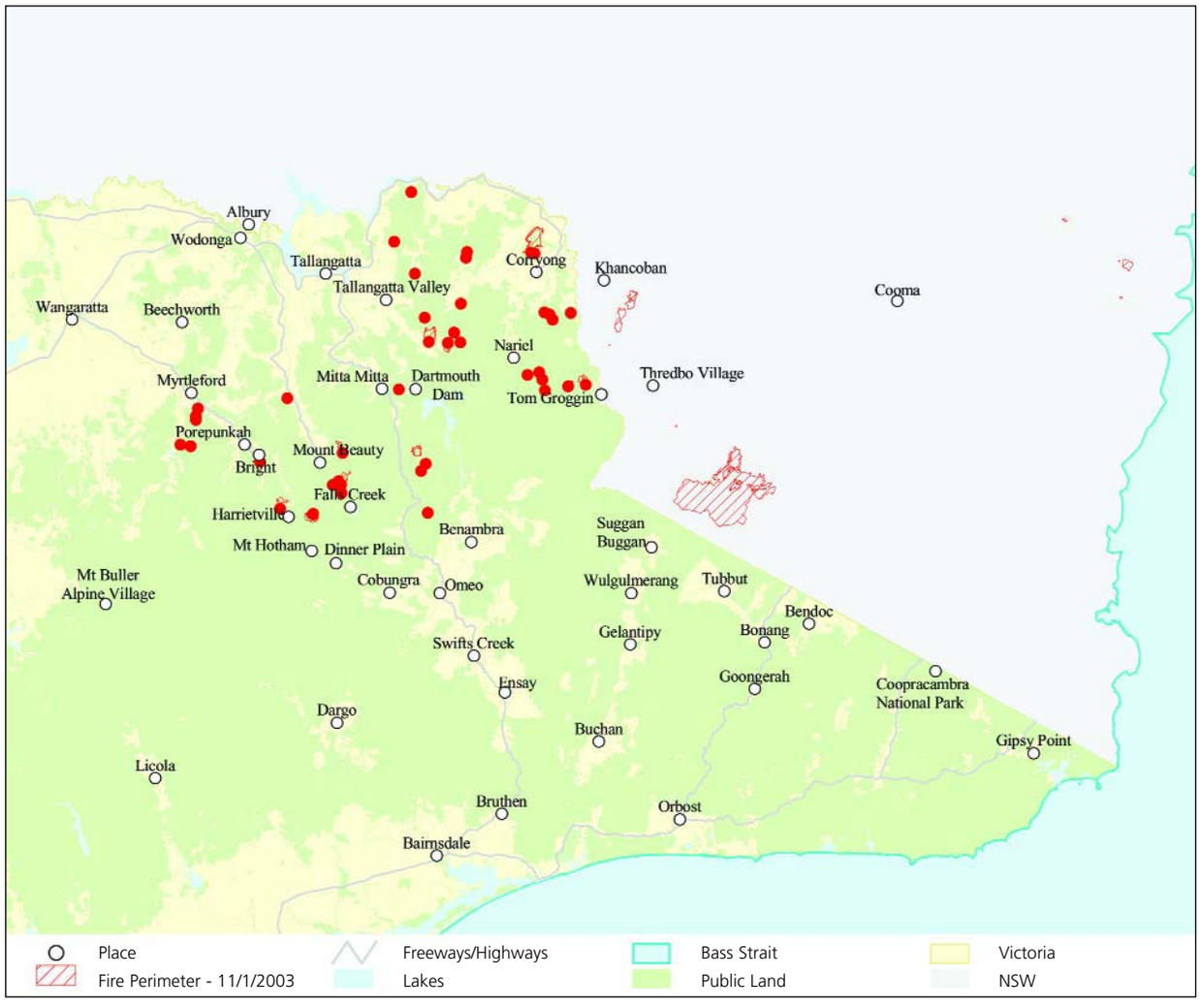


Figure 4.3: Fires Burning Day 4, 11 January 2003



The high volume Erickson aircrane, other aircraft and other resources were deployed early to Gippsland to help contain the fire there due to the threat to assets and private property. Despite this level of resourcing, two Gippsland fires – the Mullungdung fire north of Yarram and the Emu Track fire south of Sale – burnt around 8,000 hectares during the first three days, including private plantations worth four million dollars. The Mullungdung fire was the largest in the first week, requiring significant resources. However, by 11 January both these fires were contained.

The Fires Escalate – 14 January to 2 February

4.23 The weather deteriorated over the next fortnight and fire behaviour was increasingly intense and erratic. By 30 January, fire behaviour was at its most extreme.[8] The area affected by the fires increased exponentially. From more than 27,000 hectares burning on 15 January, the affected area increased to more than 230,000 hectares on the 24 January and around 700,000 hectares by 2 February.

4.24 The threat escalated dramatically as the fires impacted on private land and townships throughout the North East and Gippsland.

4.25 The fourteen fires in North East Victoria were grouped into two complexes: Upper Murray and Ovens. An Incident Management Team, staffed with DSE and CFA personnel, managed each fire.

4.26 January 14 saw a significant advance in all directions of the Mt Feathertop fire, particularly toward the Mt Hotham Alpine village. Fires from both New South Wales and Victoria crossed the border on 17 and 18 January.

4.27 On January 18, the day fires devastated Canberra,[9] there was a major expansion of the fires in Victoria. The largest fires were the Razorback (in the Mitta valley) and Pinnibar (south of Corryong) fires. On 18 and 19 of January, those fires began to join and create very large complexes as shown in Figures 4.4 and 4.5. Specifically:

- The Pinnibar complex fires joined;
- The Mystery Lane fires south of Corryong joined with the fires in the Kosciusko National Park (in New South Wales); and
- The Mt Feathertop and Bald Hill fires joined with the fires around Mt Bogong and Razorback, all of which were in remote, steep mountain country.

4.28 At this time, Harrietville and the Alpine resorts of Falls Creek, Dinner Plain and Mt Hotham were threatened and crews were deployed to help protect private assets. Among other new fires, lightning ignited a fire in the National Park near Tubbut in far-East Gippsland (near the border with New South Wales) on 17 January. This fire placed further demand on DSE and CFA at a time when resources were described as 'very stretched to whole time'.[10]

4.29 On 21 January, six fires started in the vicinity of Beechworth. Of these, four were controlled but the remaining two, known as the Stanley and Eldorado fires, spread rapidly with south-westerly winds gusting up to 50 kilometres per hour, very low humidity and temperatures over 30 degrees.[11] The Stanley fire threatened the outskirts of the Stanley township, destroying four houses and a large area of pine plantation. These fires were contained by 27 January.

4.30 On 22 January, residents of Bright, Wandiligong, Freeburgh and Porepunkah were warned that the Mt Buffalo fire was travelling in their direction. Fire was within 500 metres of Harrietville and the town of Dartmouth was under threat.

4.31 On 25 January, a Total Fire Ban was declared for the whole of the State and temperatures in the North East were in the 40s. (Melbourne's temperature that day was 44.5 degrees – the second highest on record after Black Friday, 1939.) Houses were threatened in the Buckland Valley, North West of Bright. CFA attended 237 incidents across the rest of Victoria on this day, some of which had the potential to become large outbreaks.

4.32 Another day of Total Fire Ban in the North East and Gippsland was declared on 26 January. The fire danger index was one of the highest of the fire period; fire behaviour was extreme and erratic. There was continuing threat to property at Mt Hotham and Dinner Plain; the township of Benambra was threatened, with three houses lost. A further six houses were lost near Cobungra along with sheds and stock.

8 A total fire ban was declared on nine days during this fortnight for either the North East or the State.
9 On 18 January, fires near Canberra destroyed pine plantations and generated a large, dry thunderstorm and tornadoes. The fire reached Weston Creek at the same time as a tornado. Combined, they resulted in the tragic devastation to Canberra suburbs, including Duffy, Chapman, Holder and Kambah. Overall, the fires burnt almost 70 per cent of the ACT – around 160 000 hectares.
10 DSE Submission to Inquiry; Victorian Alpine Fires, January to March 2003.
11 An Incident Management Team was established in Beechworth to manage these new fires.

Figure 4.4: Geographic Areas Affected by Fires Day 11, 18 January 2003

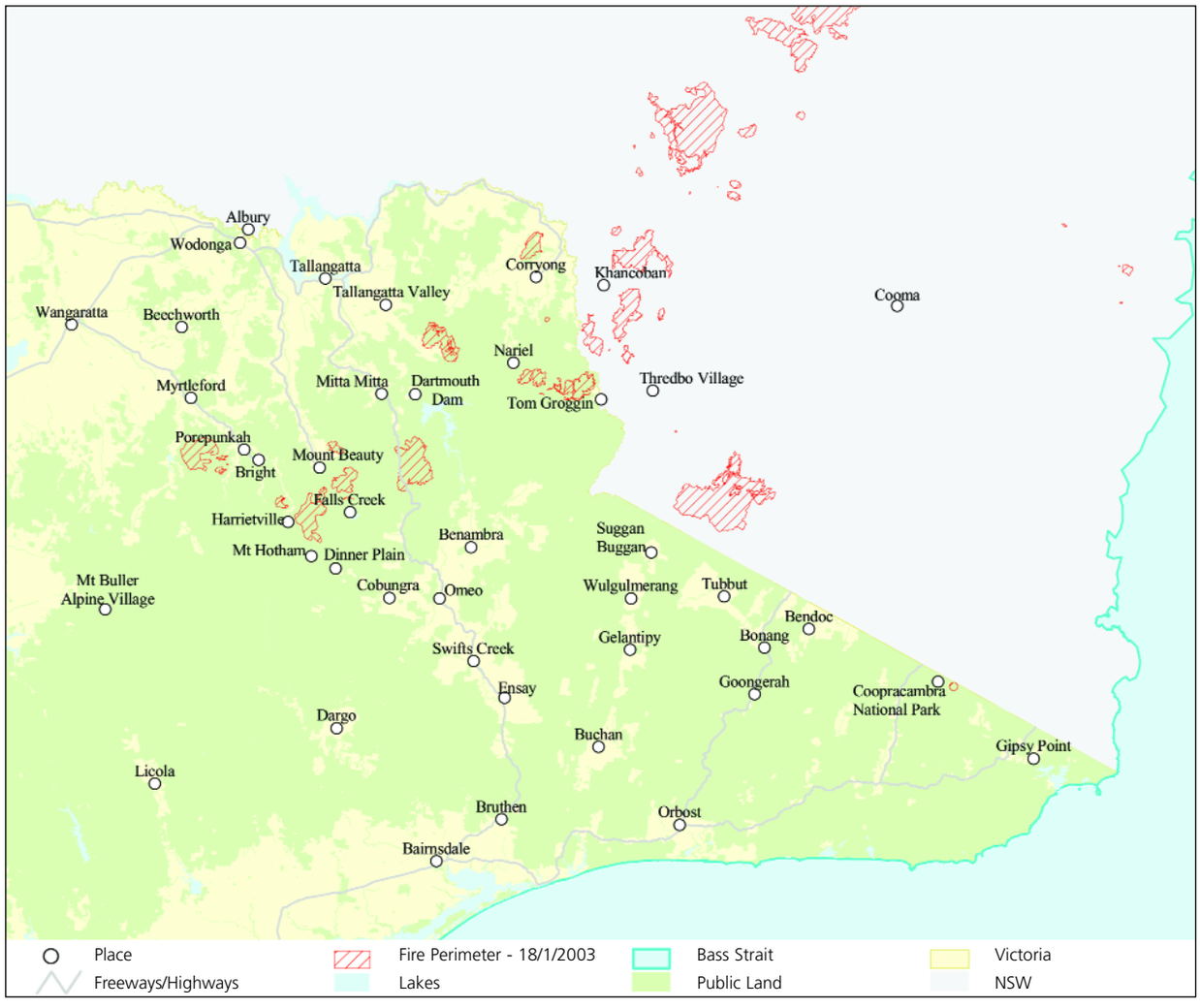
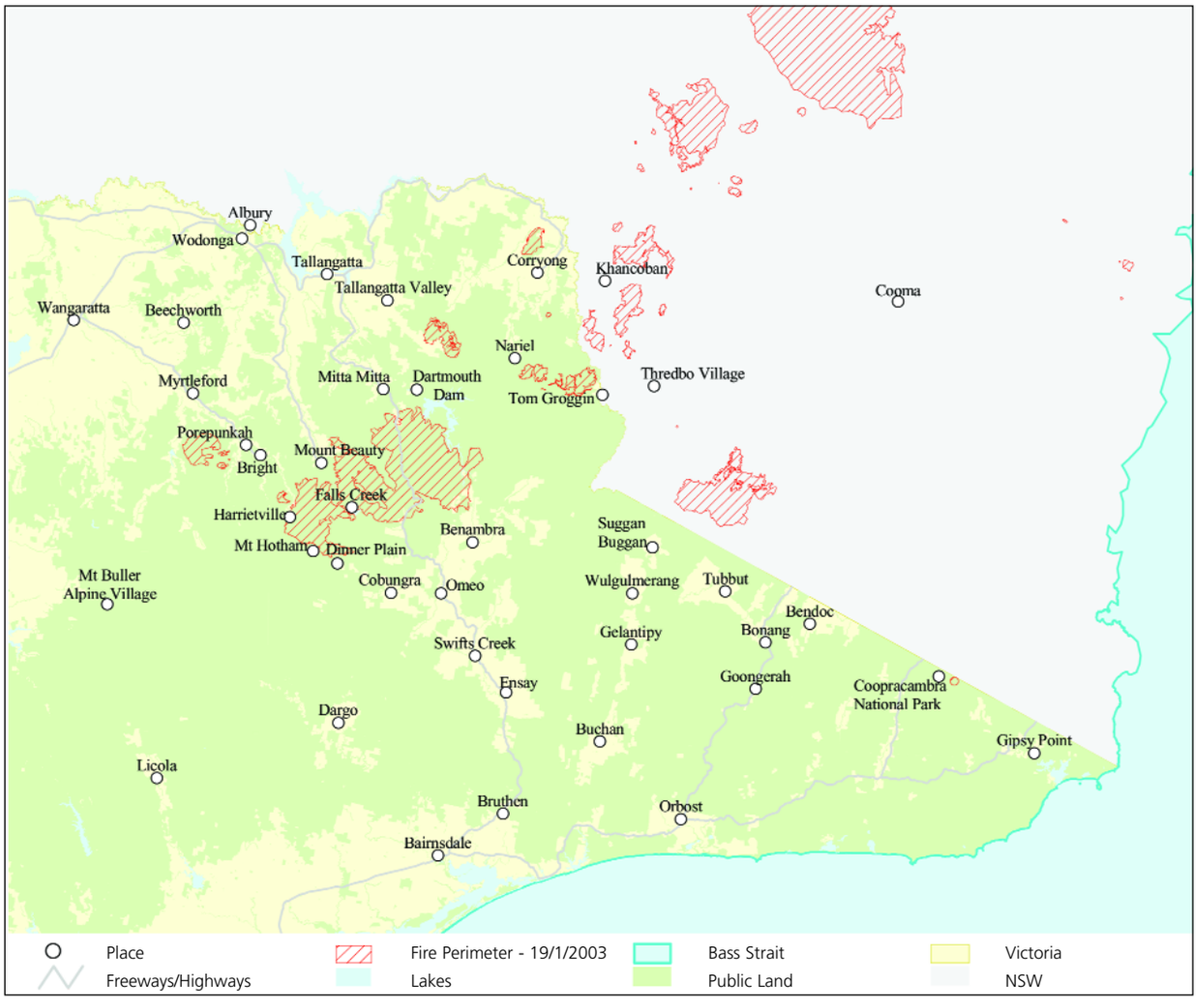


Figure 4.5: Geographic Areas Affected by Fires Day 12, 19 January 2003



Benambra is in a valley surrounded by the Alpine National Park. The town experienced significant threat from the fires for approximately 40 days, with three houses, grazing land and stock lost. Yet maps of the area burnt by the fires reveal a large section of unburnt country around the township, illustrating the community was galvanised into action to prepare and defend their land and assets under effective local CFA leadership. This included:

- Organising shifts of local people to act as lookouts at strategic locations, day and night, to report any fire or spotting activity;
- Establishing a most effective Divisional command post in the town;
- Establishing a community UHF operational network; and
- Organising support for operations.

4.33 The Pinnibar and Bogong complexes joined and this created a continuous area of fire stretching from Mt Hotham to Canberra. The Mt Buffalo fire grew rapidly in size. Extreme fire behaviour on the Bogong West complex required sustained firefighting with the fire burning to the edge of Dartmouth township and a fire run into Bogong Village that saw four houses burnt.

4.34 The fire reached within three kilometres of Omeo and Swifts Creek; Swifts Creek experienced an intense ember attack. The townships of Bright, Wandiligong, Freeburgh, Harrietville and Porepunkah were surrounded by fire for a week.

4.35 By late January, suppression efforts in these areas were focused on asset protection in and around townships and private property. As weather deteriorated, with hot to very hot conditions forecasted, a number of communities went on heightened alert.

4.36 Figure 4.6 shows the geographic area affected by fire on the 27 January 2003.

January 30: Intense and Erratic Fire Behaviour

4.37 January 30 was probably the single worst day of the fire season with intense and erratic fire behaviour:

- The Bogong and Pinnibar fires merged and stretched over 90 kilometres from the New South Wales border to Harrietville.
- The fire made a number of major runs of up to 40 to 50 kilometres in one day, speeds that were unprecedented. One of the largest extended from near Benambra in a south-easterly direction into Gelantipy and Wulgulmerang, another from south east of Mt Hope along the Victorian-New South Wales border towards the Snowy River.
- A satellite image shows a dramatic, intense area of fire approximately ten kilometres wide and two deep in the Dargo River catchment near the Great Alpine Road.
- The fires caused one or more thunderstorms in East Gippsland with lightning strikes occurring east of Gelantipy in the Snowy River National Park.
- A number of communities were under considerable threat including Benambra, Swifts Creek, Cassilis, Bindi, Mitta Mitta, Eskdale and Harrietville.
- The Mt Hotham Village was subject to a fire spotting and ember attack with the fire coming within metres of the buildings in the village.
- Four houses were lost in and around Omeo but extensive and aggressive firefighting saved further significant property damage.

4.38 Figure 4.7 shows the area affected by fire on 2 February.

Reduced Fire Activity – 1 February to 7 March

4.39 Several new fires were ignited by lightning on 31 January,[12] however, the following three weeks brought milder weather which generally reduced fire activity and reduced threat to assets.

4.40 This meant renewed effort could go to:

- Strengthening containment lines – especially around threatened communities;
- Protecting assets;
- Fighting spot fires;[13]
- Backburning;
- Patrolling and mop up in some areas; and
- Planning for rehabilitation of fire areas.

12 For example, on 31 January, new fires started near Cann River, Tubbut and Bonang.

13 These continued to be problematic – for example, on 6 February spot fires in Benambra and Bindi areas burnt 800 hectares of grazing land.

4.41 Despite this, some areas of the fire continued to create problems for Incident Controllers:

- The south-west perimeter of the fire from Abbeyard to Dargo was in very rugged, steep and rocky terrain. A long and protracted campaign was undertaken to establish control lines, with the fire continually breaking out for more than a month before the area was secured.
- The Tubbut and Deddick valleys experienced weeks of threat from fires in the surrounding National Park. A long campaign was waged to secure control lines to stop impact on private grazing land.

4.42 Figure 4.8 shows the areas affected by fires on 9 February 2003. By 10 February, fire had burnt over one million hectares of land.

21 February to 7 March

4.43 Rain in most areas across Gippsland helped to quieten fires. While lightning continued to ignite some fires in this region, they were quickly controlled. By 1 March, at least 95 per cent of the fire edge was contained. Crews and strike teams were rested or released.

4.44 On 26 February, storms and localised flash flooding washed a DSE vehicle into a stream in the upper Buckland Valley. Sadly, a DSE seasonal firefighter lost her life; the other two crew were rescued from the vehicle. During that same afternoon, a fixed-wing fire bombing aircraft crashed south of Mt Buffalo, injuring the pilot.

4.45 On March 7, the Chief Fire Officer of DSE officially declared the fire contained

Agency Response to the Fires

4.46 Firefighters attended over 3,000 fires during the December to March period. The total personnel directly engaged on the North East and Gippsland fires were 15,725.[14] Maintaining effective firefighting capacity over such a long period was an exceptional achievement on the part of Victoria's firefighting agencies.

4.47 In total, over 35 agencies – both government and non-government – were involved in the North East and Gippsland fires. In addition, DSE and CFA 'recruited' recently retired staff with specialised skills in developing containment strategies, mentoring, and managing the construction of containment lines.

Firefighting Personnel

4.48 Fires of this scale and intensity involve very large numbers of people and equipment.

4.49 In early February, at the peak of the fires, around 3,760 people were involved in the fire effort, excluding local CFA brigades. This figure includes 160 Defence Force staff, over 300 interstate firefighters, 33 alpine firefighting specialists from New Zealand and 35 personnel from the United States.

4.50 Apart from direct firefighting, staff worked in command and control operations, planning operations and logistics, aircraft-related duties, base camp support, media and community liaison, and liaison with police and other agencies.

4.51 DSE's narrative of the North East and Gippsland Fires provides a detailed, day-by-day account of staff and equipment deployed on the fire effort. In that report, DSE also describes an 'all hands to the pump' attitude in agencies and across government throughout the suppression activities. The utility companies, especially power and telecommunications, also worked co-operatively and pro-actively to maintain and restore services.

Keeping the Community Informed

4.52 The public's need for information grew exponentially during the fire event. This need for information is likely to increase during future fire events and the resourcing implications of this are discussed in Chapter 24.

4.53 In addition to traditional media such as television, press and radio, a range of flexible and localised communication strategies kept communities informed and engaged:

- Over 80 **community meetings** in the North East and Gippsland to brief residents on the fire situation and a further 172 in non-fire areas at the request of residents for information. Over time, these meetings moved to recovery issues;
- Specialist **call centres** set up in response to public demand;[15]
- **Community newsletters** updated and distributed twice daily by individual Incident Management Teams to keep people informed;
- **CFA and DSE's websites**, which were updated several times daily with fire information (the DSE website had 106,000 'visits' during the fire period);

14 Country Fire Authority, *From the Foothills to the Alpine Heights*, CFA's Submission to Victoria's 2002-03 Bushfire Inquiry, 2003.

15 For example, due to public demand, an enhanced call centre was set up at World Vision headquarters on 24 January. Nine hundred and thirty eight calls were received in the first five and a half hours. On 25 January, 3,554 calls came in over a fourteen-hour period. An additional call centre was set up in Traralgon to give specific information to east Gippsland residents.

Figure 4.6: Geographic Areas Affected by Fires Day 20, 27 January 2003

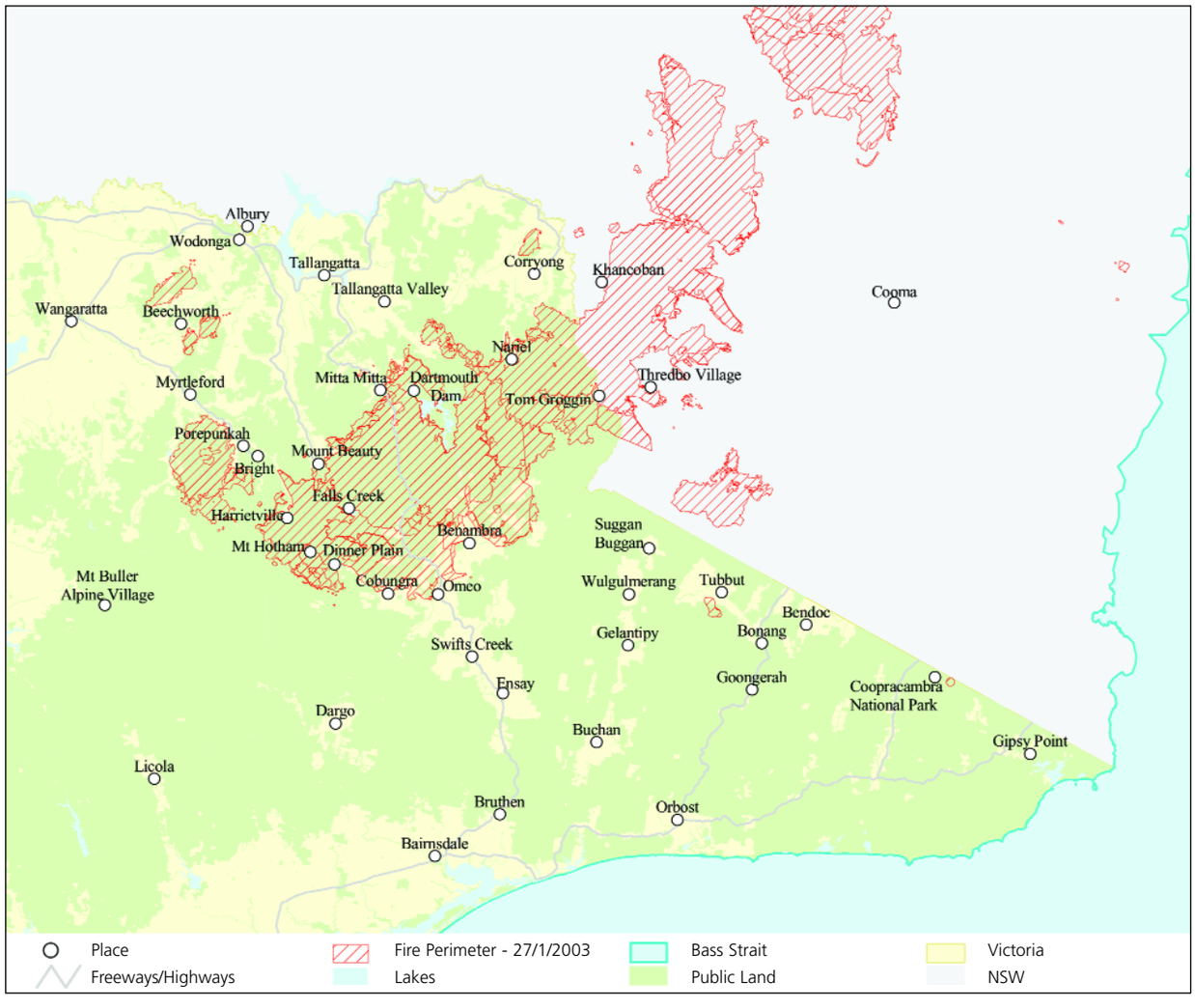


Figure 4.7: Geographic Areas Affected by Fires Day 26, 2 February 2003

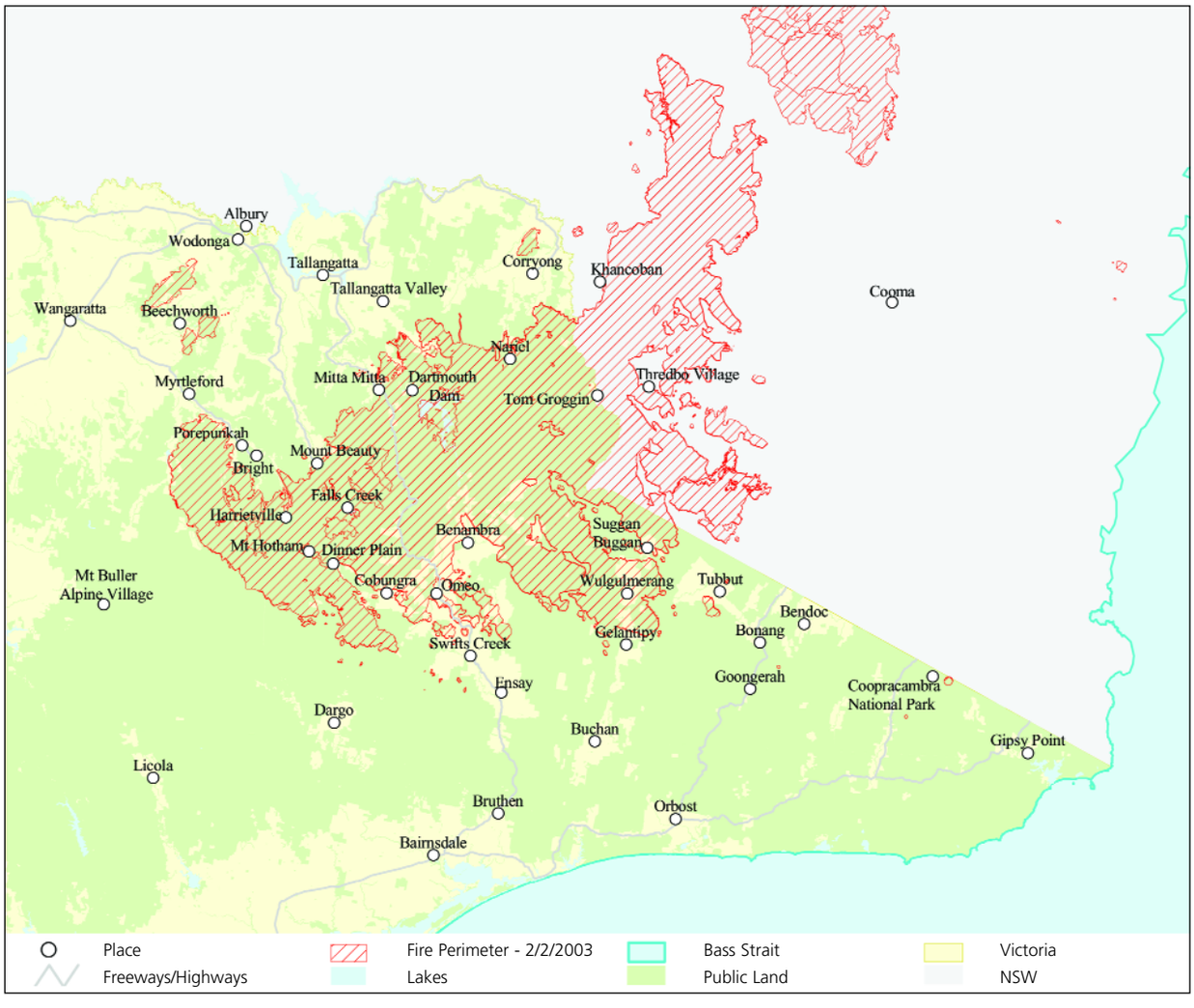
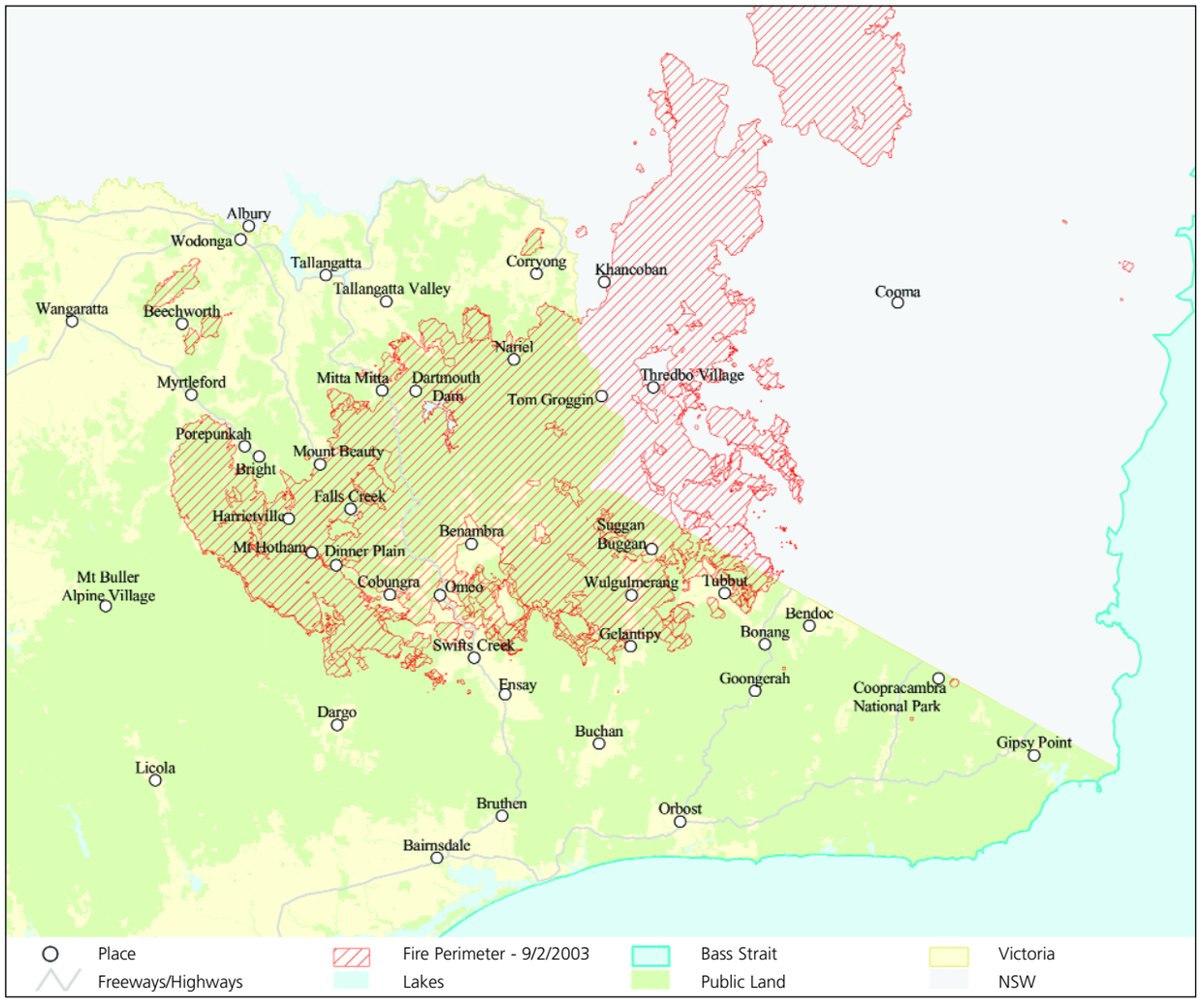


Figure 4.8: Geographic Areas Affected by Fires Day 33, 9 February 2003



More than half of the estimated 15,725 personnel engaged in the fires were CFA volunteers. 8,595 volunteers from 674 brigades fought a long, difficult campaign often giving up their normal businesses or employment.

"Many of our CFA members are dairy farmers. Some had to pay for relief milkers to replace them while they went out to the fire fronts. Others relied on family members to maintain their businesses."

Quote from Submission by John R. Cardwell, Captain, Mitta Rural Fire Brigade, Deputy Group Officer, Tallangatta Group. Submission no. 119.

- **Information phone lines** maintained by CFA, Victoria Police and specific shires;
- **Media releases** to alert residents of threat and advise on appropriate actions and where to get more information;
- **Regional radio and TV** stations used effectively to communicate fire information to rural communities; and
- CFA **'phone trees'**, a system whereby messages are communicated though the community by a series of phone calls from person to person.

The Media's Role

4.54 The media is a natural partner in emergency situations, imparting information during the event. It acts as a source of information throughout recovery and the critical community debrief phase.

4.55 The media was a valuable partner over the summer of 2002–2003 and National, State and regional radio stations, print and electronic media, played important roles throughout the fires. DSE states that the media generally, but regional radio in particular, assisted Incident Management Teams to get urgent information to communities across the fire area. This level of partnership is without precedent.

4.56 In particular, ABC regional radio should be commended for services to Victorians during the bushfires. ABC regional radio was a reliable source of information for Victorians throughout the entire summer fire season, most notably in the response effort to the North East and Gippsland fires. Submissions and consultations noted that they provided reliable information.

Impacts of the Fires

4.57 The 2002-2003 fires affected 1.12 million hectares in North East Victoria and Gippsland and 181,400 hectares in the Big Desert. Vast areas of forest were burnt, some very intensely. The drought meant that mountain gullies and southerly slopes that in most other fires would remain unburnt, were dry enough to burn. This extensive impact is second only to that caused by the 1939 fires which also had a substantial effect on both people and environment.

4.58 Throughout the fire emergency, the safety of fire crews and the wider community were afforded the highest priority. DSE is right to claim it is a significant achievement that no lives were lost as a consequence of what was, at times, extremely dangerous fire behaviour.[16]

4.59 While extensive hectares were burnt, there was minimal damage to structures compared to earlier fire events and similar events elsewhere. Some 108,393 hectares of private land (including farms and 2,500 of plantations), 41 houses, over 213 other structures, over 3,000 kilometres of fences and over 9,100 stock were confirmed lost.[17]

4.60 While this is clearly serious for those affected, the levels of loss were relatively low given the length of the fire campaign and its severity. This is testimony to both the careful preparations by individuals and communities and to the skill of fire crews once the fire front arrived.

16 For example, a CFA strike team in the Tambo/Bairnsdale area was in a near-miss situation when their truck became trapped in the fire at Cobungra in an intense ember attack.

17 Country Fire Authority, *From the Foothills to the Alpine Heights*, CFA's Submission to Victoria's 2002-03 Bushfire Inquiry, 2003. Appendix G pp 1–3.

Lost:	41 houses
Protected:	1,000 houses within the perimeter of the fires
At risk:	7,000 houses within five km of the fire perimeter and 12,000 houses within 10 km

Source: Country Fire Authority, *From the Foothills to the Alpine Heights*, CFA's Submission to Victoria's 2002-03 Bushfire Inquiry, 2003. Appendix G.

Impacts on Firefighters

4.61 DSE employed psychologists throughout the fires to support staff in what was a long campaign with many setbacks and difficulties. CFA deployed Critical Incident Stress Peer Support teams to provide emotional support to firefighters and incident managers throughout the fires. In their report to DSE, the psychologists stated that the main issue facing staff was fatigue. While, early in the fire, high morale and a spirit of co-operation countered this, morale suffered as the fire campaign progressed. For those who experienced danger, there was often a sense of bewilderment, shock and disbelief at what had transpired. Others experienced fear.[18]

4.62 The Inquiry's consultations and conversations support these observations. Keeping in mind the positives of camaraderie and co-operation, firefighters told us of fatigue, frustration, stress and distress.

Impacts on Communities

4.63 The Inquiry heard and read hundreds of stories about the impact of the fire on individuals and communities. Understandably, many found the fires an overwhelming experience. Those in fire-affected areas spent weeks under great pressure as they lived in a state of fire readiness with decreased air quality and visibility. In addition, they lived with the fear of losing their homes, property, stock, fences and land.

4.64 For others, those losses were very real, with significant financial impacts and implications for their future livelihood. The continuing impacts on communities are no less significant as they face regional economic hardship, continued water quality problems and reduced infrastructure and amenity.

4.65 However, many submissions to the Inquiry also highlighted the positive impacts of the fires. First, community bonds were forged through hardship. Second – and perhaps more importantly – there was a renewed and heightened awareness among communities of the serious and ongoing risk posed by fire. A person from Mt Hotham expressed this well:

'None of us were or are firefighters but we came away with renewed respect for what mother nature is capable of dishing out and we will ensure that we remain cognisant of the precautions we must continually take to fireproof our properties. My last bush fire experience at Hotham was during the 1985 fires but nothing then prepared me for this latest event.'[19]

4.66 Consultations showed that many communities and individuals affected by the fires were able to make informed choices because of the CFA's community education programs.

Conclusion

4.67 This Chapter has outlined the significant achievements and losses that are part of the 2002-2003 fire story.

4.68 That fire story is far from over. The impact on our land, our communities and our firefighters continues with environmental, financial and psychological costs. As our next Chapter shows, the fires strained relationships between communities, agencies and Government. Effective recovery must therefore involve working together and rebuilding productive relationships between communities, agencies and Government must be a priority.

18 DSE, Victorian Alpine Fires, January to March 2003, p. 18

19 Quote from Peter Malkin from a CD-ROM produced by the CFA: Bushfires 2003, about the experience of communities at Mt Hotham and Dinner Plain during the fires.

Health Impacts of Smoke during the 2002–2003 Bushfires

The Department of Human Services (DHS) reported the following statistics in relation to the 2002 –2003 bushfires. DHS states there is no conclusive trend in relation to possible direct health impacts of the fires – for example, through acute or chronic smoke inhalation.

- Total State Hospital Admissions for January to March 2003 (compared to same period 2002) was 265,572 admissions (down five per cent from the previous year). Of these figures there were 6,148 respiratory-related admissions in the same period (up 2 per cent).
- DHS conducted a study of potential smoke impacts in the North East during these three months. The total admissions for the first three months of 2003 were 7,847 (7,977 for the same period in 2002). Of these, respiratory disease contributed 157 admissions; in 2002 this figure was 161.

Source: Department of Human Services

The 2002-2003 Fire Season at a Glance

- Over **3,000 fires** burned from December to March.
- Firefighters worked on the ground for **over 70 days**.
- Over **1.12 million hectares** were affected in Victoria's North East and Gippsland.
- Over **181,400 hectares** were affected in the Big Desert.
- Over **35 agencies** were involved in fighting the fires and support roles, as well as interstate, New Zealand and US firefighters.
- The total personnel directly engaged on the North East and Gippsland fires was **15,725**. A peak of over **3,760 personnel** were involved at any one time.
- **8,500 people** attended over 250 community briefings.
- DSE's website had **106,000 visits** during the fire season.

Chapter 5
Submissions and Community Consultation

Overview

5.1 The Inquiry received 273 written submissions from individuals and organisations and spoke with over 400 people as individuals, or in groups. The submissions were diverse, ranging from the highly critical to notably positive. Within individual submissions comments on issues would often vary markedly. The consultations echoed the submissions, the complexity of issues raised and solutions proposed; thus presenting a challenge for the Inquiry.

5.2 This Chapter documents the five key themes raised in the submissions and consultations, relevant to the first two Terms of Reference. These are:

- Land management preparedness, particularly the issue of fuel reduction on public land;
- Agency preparedness;
- Response issues relating to how the fire was fought;
- Management of resources; and
- Recovery issues.

5.3 Our summary makes no comment or judgement on the views contained in the submissions and consultations. Instead, we aim to convey to the reader the breadth, and depth, of issues raised and to document areas of particular concern. These provide important context for our later analysis, discussion and recommendations in Parts B, C and D.

5.4 The Terms of Reference required the Inquiry to give recommendations for a way forward (the third Term of Reference) and the community responded to this. The specific comments addressing the third term of reference have not been included in this analysis as they were difficult to codify due to their wide-ranging nature but have been used to inform Part B through to Part E of the Report.

5.5 In broad terms, fire-affected Victorians asserted that the few fires that got away did so because of a complex combination of circumstances and poor decision-making. They identified three key strategies to improve future efforts:

- Better use of local knowledge;
- Better communication and planning between the agencies and local community; and
- Greater consistency from all levels of government on key policy issues such as fuel reduction burning, and private/public and urban/rural land interface.

5.6 Having said this, our community consultations showed that many Victorians were sincerely appreciative of those who fought in and supported the fire efforts.

The Submission and Community Consultation Process

5.7 The Inquiry called for 'written, signed submissions from persons or organisations who wish to provide factual information or express an opinion on the terms of reference or any aspect of them'.

5.8 The Inquiry's Terms of Reference (outlined in Chapter 1) were published in the Melbourne metropolitan papers and country papers in April and May 2003. While the deadline for submissions was 30 May 2003, the Inquiry continued to take submissions until August 2003.

5.9 Over half of the 273 submissions were from individuals or households commenting on the specific Terms of Reference; others related personal experiences or the experiences of family, friends and neighbours. A quarter of all submissions were from commercial and private organisations or groups, with the remainder from Government, authorities and individual fire brigades. Some submissions were highly specific; others were a more general response to the Terms of Reference. Some were scientifically based. Within submissions, comments on various issues varied markedly.

5.10 In addition to written submissions, the Inquiry also undertook a community consultation process, to:

- Revisit some of the recurrent issues raised in written submissions;
- Hear from those who were unable to participate in the formal, written processes; and
- Meet face to face with those who had prepared a submission so that their concerns could be more thoroughly explored.

5.11 However, some issues that arose during consultations did not feature strongly in the submissions. These issues may have gained importance as time passed and the environment calmed and again this has informed our thinking in Parts B to E.

5.12 Throughout this Chapter the reader will note that negative comments outweigh the positive statements. This is to be expected when one seeks views from the community and specialist stakeholders' on how to improve the State's planning, preparation and response to the threat of bushfires. This process was no exception.

5.13 Finally, it was not possible for the Inquiry to investigate in detail every anecdote and incident raised in submissions and consultations. Rather, the Inquiry focused on the broad themes and issues that emerged from the submissions and consultations and this informed our research, investigations and eventually our recommendations. There were however five exceptions. Five case studies relating to specific incidents and lessons that can be learnt from these events are detailed in Parts C & D.

Origin of Submissions

5.14 Figure 5.1 shows the geographic focus of the submissions. Where it was made clear in the submission, they have been grouped according to the fire area of principal interest:

- More than half of the submissions focused on, or came from residents of, the fire-affected areas of North East Victoria and Gippsland.
- Remaining submissions covered Victoria-wide issues, specific fire events and issues outside the Terms of Reference.
- Submissions from State agencies and business organisations covered a wide geographic area, as did the science and research-based submissions.
- A large number of the Statewide submissions came from the Melbourne Metropolitan area.

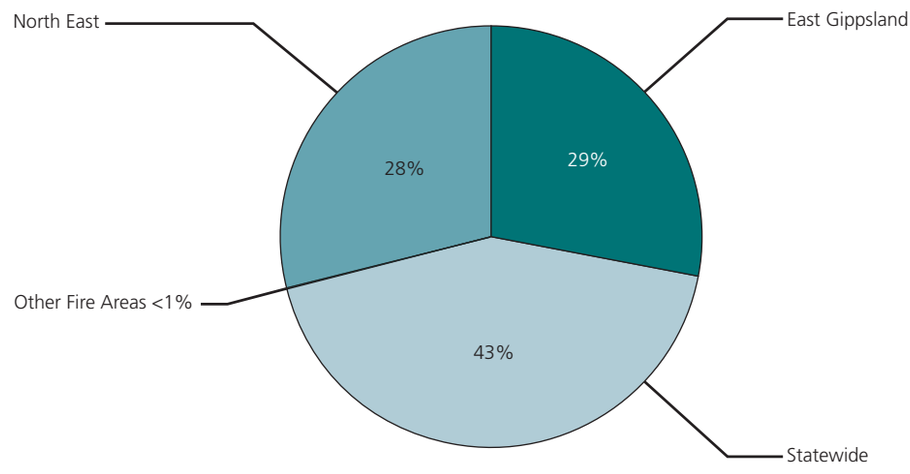
Key Themes

5.15 Figure 5.2 shows the level of comment in relation to the first two Terms of Reference.

5.16 To assist with processing and analysing the submissions, issues have been grouped under broad themes that are derived from the terms of reference. Once again, we make no comment on the validity or otherwise of the opinions and views expressed in submissions, but seek to assist the reader in understanding the breadth of issues raised. Comments were evenly dispersed across each of Terms of Reference 1 and 2, with land management preparedness and response issues receiving the most attention from respondents.

5.17 Table 5.1 summarises key thematic concerns against the first two Terms of Reference.

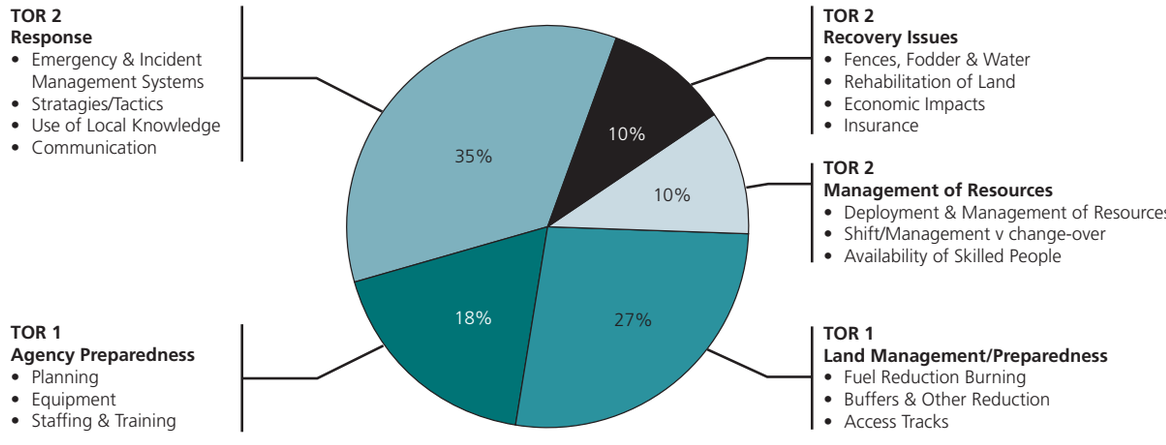
Figure 5.1: Geographic Focus of the Submissions



Source: Data compiled from 273 submissions recieved by the Inquiry into the Victorian Bushfires 2002/2003

Figure 5.2: Percentage of Comments Received by Terms of Reference 1 and 2 by Category

Chart indicating the number of comments made (positive and negative) in relation to the Terms of Reference (TOR)



Source: Data compiled from 273 submissions recieved by the Inquiry into the Victorian Bushfires 2002/2003

Table 5.1: Summary of Five Key Thematic Concerns; Terms of Reference 1 and 2.

Term of reference	Five key thematic concerns
TOR 1 Examine the effectiveness of preparedness for the 2002/2003 bushfire season, including hazard reduction and the mobilisation of resources.	1. Land management/preparedness - Fuel reduction/prescribed burning; - Access tracks; - Plantation management; - Grazing on public land; and - Land management at the interface – private/public and urban/rural. 2. Agency preparedness - Planning; - Equipment; - Training; and - Research and Development.
TOR 2 Assess the effectiveness of the response to the 2002/2003 bushfires, including emergency management procedures, multi-agency response and co-ordination and resource deployment.	3. Response issues - Strategy/tactics; - Utilising local knowledge and experience; - Emergency management arrangements; - Public information and communication; - Risk aversion; and - Asset protection. 4. Management of resources - Allocation of resources; - Availability of skilled people; - Shift changes; - Strike teams; - Use of defence force personnel; and - Firefighting at night. 5. Recovery issues - Fences; - Economic impacts; - Land rehabilitation; - Restoration of public utilities; and - Other general recovery matters.

5.18 As stated, this Chapter details the comments under the first two Terms of Reference, these group into five thematic concerns:

- Land management preparedness;
- Agency preparedness;
- Response issues;
- Management of resources; and
- Recovery issues.

5.19 For each Term of Reference, snapshots of positive and negative comments for issues identified by respondents were developed into a bar graph.

Term of Reference 1

'*Examine the effectiveness of preparedness for the 2002/2003 bushfire season, including hazard reduction and the mobilisation of resources.*'

5.20 Submissions addressing, either in part or in full, the first Term of Reference, were grouped and analysed within two broad themes; *land management preparedness* and *agency preparedness*.

Land Management/Preparedness

5.21 Land management preparedness attracted considerable comment and focused on the following issues:

- Fuel reduction/prescribed burning;
- Access tracks;
- Plantation management;
- Grazing on public land; and
- Land management at the interface – private/public and urban/rural.

5.22 Of these, fuel reduction burning and access tracks attracted the most comment.

5.23 Figure 5.3 gives a snapshot of the positive and negative comments made in respect to land management preparedness

Fuel Reduction/Prescribed Burning

5.24 The issue of fuel reduction burning to reduce the threat of fire attracted considerable comment. Comments represented a wide range of views about the role, history and process of this practice. Overall, comments were constructive and based on the experiences of individuals and organisations that have undertaken various fuel reduction activities.

5.25 Opinion was clearly divided between those who strongly advocated prescribed burning, noting its benefits and potential, and those who felt it was inappropriate or should be carefully considered and used only in particular circumstances. Submissions acknowledged that recommendations from previous Bushfire Inquiries advocated the role of fuel reduction burning to mitigate the effects of unplanned fires.

5.26 Submissions primarily focused on:

- A perception of lack of fuel reduction on public land;
- The restrictive criteria for performing fuel reduction burning;
- Resourcing constraints for fuel reduction; and
- The consequent high fuel load on public land.

5.27 Private land owners raised the possibility of undertaking fuel reduction burning in public land adjacent to their own. They also noted the restrictions in place under the Native Vegetation Framework that prevent them from clearing native vegetation.

5.28 Some comments highlighted the existence of the 1995 Code of Practice for Management of Fire on Public Land and contended that the Department of Sustainability and Environment (DSE) and Parks Victoria had not met minimum standards under this Code.

5.29 Others commented that documentation on the effectiveness or otherwise of annual fuel reduction and environmental burn programs was inadequate. Another concern was that the wider community had come to view all fires as bad and in need of immediate suppression.

Suggested Alternatives

5.30 A number of submissions suggested alternative reduction strategies. They acknowledged that the community and key fire agencies must be active partners in broader Municipal Fire Prevention Plans and that these plans should cover both public and private land.

Figure 5.3: Land Management/Preparedness

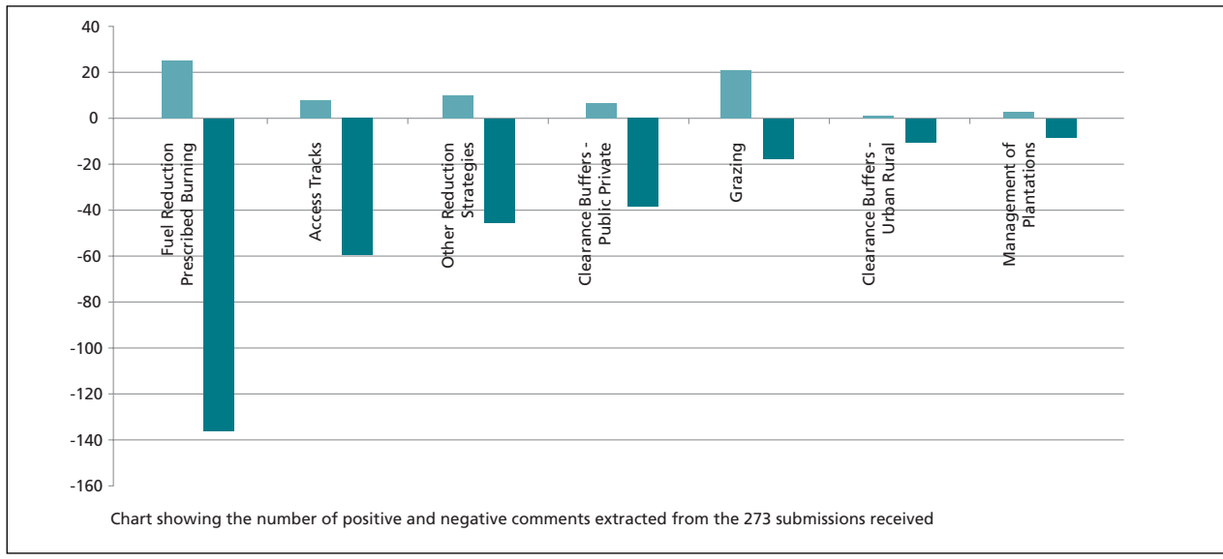


Chart showing the number of positive and negative comments extracted from the 273 submissions received

5.31 Some suggested solutions included:

- Reintroduce fire wood collection from public land;
- Increase slashing and/or controlled grazing along roadsides;
- Modify the application of the Native Vegetation Legislation;
- Include more members of the community in actual reduction operations; and
- Involve DSE 'Project Firefighters', local landowners and CFA staff and volunteers in fuel reduction activities to increase their skills and knowledge. Submissions suggested that this would provide additional opportunities for training, integrated fire management experience and succession planning.

Access Tracks

5.32 Many submissions were critical of the quality and number of access tracks on public land, in particular, in State and National Parks. Many submissions called for a review of the maintenance and closure of access tracks.

5.33 Some submissions asserted that new access tracks were created during fire suppression activities in relatively close proximity to older, established access tracks that had been allowed to fall into disrepair. Respondents preferred to see older, established tracks re-opened because:

- Older tracks were established on more appropriate gradients and in better fire control locations. This made them more stable and, therefore, safer;
- New tracks created less stable creek crossings;
- New tracks had a greater potential to introduce plant and soil disease; and
- Opening old tracks created less disruption to natural resources than creating new tracks.

5.34 Currency in access track mapping was also raised, as was the importance of up-to-date fire suppression maps, particularly in National and State Parks. Some water authorities with responsibility for water harvesting noted they already conduct an active program of access tracks maintenance for firefighting and other requirements.

5.35 Proposals in submissions included opening tracks prior to, and following, the summer fire season so that visitors could help park management keep tracks clear and report problems. Tracks could be closed off after this period.

Plantation Management

5.36 Submissions identified a number of issues regarding the planning, design and location of plantations. In particular, plantations adjacent to urban areas and isolated rural communities were identified as high risk. Most submissions on this topic suggested the pursuit of practical management solutions to minimise this risk, for example:

- Improved management of ground fuels and residue following the harvest of commercial forests; and
- The creation of appropriate buffers and access tracks between plantations and private land to ensure access to communities in the event of a fire.

5.37 Other submissions positively discussed the fire minimisation strategies undertaken by commercial forestry, including use of their own brigades and training and the development of forestry management standards.

Grazing on Public Land

5.38 The majority of submissions commenting on this issue were supportive of grazing on public land to reduce fuel loads, particularly in the Alpine and High Country.

5.39 To support this position, some submissions noted scientific findings and photographic evidence in support of grazing and suggested a 'cultural value' in alpine grazing. However, other submissions sought a reduction in grazing, also citing scientific evidence to support their case.

Land Management at the Interface

5.40 A range of issues arose regarding land management at the public/private and rural/urban interface.

5.41 The common perception was that buffers between public/private lands were inadequate and appropriate land clearance regimes were needed to inhibit the spread of fire from public to private land. Some submissions noted that fire also travelled from private land to public land and that private land management regimes should also be addressed.

5.42 Respondents said that because of inadequate buffers on public land and the perceived high fuel loads; agencies were forced to fight the fire on private land.

Proposals

5.43 Suggestions included:

- Creating buffers that could range from ten metres to two kilometres wide;
- Developing individual, co-operative planning arrangements for interfaces;
- Creating a cleared track on public land adjoining private land to allow improved access, and from which backburning or other suppression efforts could occur; and
- Developing a uniform policy on buffers between the urban and rural interface.

Agency Preparedness

5.44 When commenting on agency preparedness, four key issues were constant:

- Planning;
- Equipment;
- Training; and
- Research and Development.

5.45 The majority of comments were not detailed but did offer some suggestions for better practice. Figure 5.4 gives a snapshot of the positive and negative comments made about agency preparedness.

Planning

5.46 The issue of planning attracted considerable comment. Comments focused on the individual fire prevention planning completed by DSE and Municipal Councils, the relationship between the agencies plans and the level of community input into such plans.

5.47 There was a perception that DSE prescribed burning plans were a near-completed product by the time they were presented to the community and to the Municipal Councils for consultation. The perceived impact was that DSE planning did not adequately account for the priorities of the community, particularly those adjacent to public land.

5.48 The question of how our National and State Parks are managed was often raised. Respondents asserted that fire management planning must involve a wider cross-section of the community. Many were aggrieved that environmentalists had, in their view, exerted too great an influence in the planning processes. They believed conservation was given higher priority than fire prevention activities.

Figure 5.4: Agency Preparedness

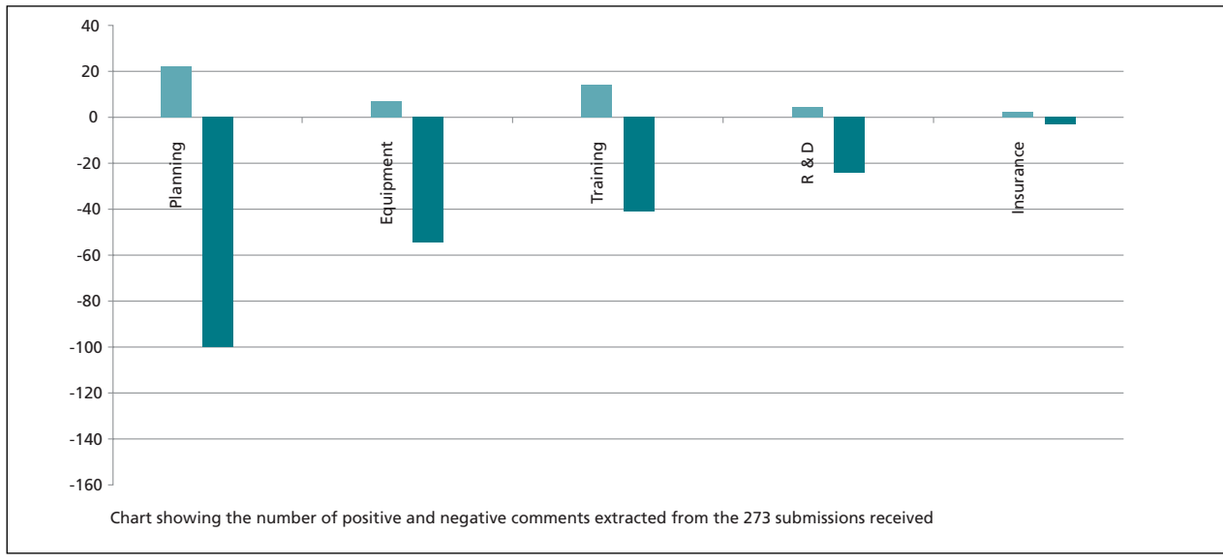


Chart showing the number of positive and negative comments extracted from the 273 submissions received

5.49 There was a perception that Local Government did not fully involve the appropriate stakeholders in developing Municipal Emergency Management Plans, Municipal Fire Prevention Plans, and local area and land management plans. This was seen to limit key firefighting agency and community input.

5.50 However, comments acknowledged that the Municipal Fire Prevention Plans were developed primarily by CFA Brigades and Local Government and contended that DSE and the community were not actively involved. This was thought to result in lack of understanding and ownership and, in some cases, failure to implement the plans. Similar comments were made regarding the input to, and ownership of, the Municipal Emergency Municipal Plans. Further to this, some comments identified the importance of using planning tools such as wildfire overlays and adopting relevant building codes in fire-prone areas.

5.51 Numerous comments identified the successes and benefits of adequate planning and involvement.

Proposals

5.52 Respondents offered specific strategies to improve the planning process:

- Adequate water storage should be planned and developed on public land, reducing reliance on private water storages when fighting fires on public land;
- Public infrastructure should be considered a resource in both response and recovery phases;
- Planning should identify the priority order of assets for protection – environmental, farming and community assets, as well as public and private assets;
- Planning should address school closures, impact on curriculum, bus services to schools and other destinations; and
- Planning should address community infrastructure concerns and their management during and following emergency events – for example, cultural heritage sites, power and roads;

5.53 Respondents also suggested that more use of photographic 'before and after' evidence would help communicate the importance of effective planning.

Equipment

5.54 Comment on the adequacy, mix and quality of equipment was a key feature of submissions, especially from those who personally fought the fires. Comments were diverse as were suggestions on how best to equip the fire services for the future.

5.55 A key issue with operational equipment was ensuring the right mix of equipment to terrain and circumstance.

5.56 Considerable comment focused on the role of aerial firefighting – in particular, the need to use aircraft earlier. Other expressed concerns were:

- Getting the mix of aircraft right;
- Ensuring adequate air strips and water supplies; and
- Having an appropriate aerial fire detection strategy.

5.57 Comment also focused on the perceived need for a better match between firefighting vehicles and terrain. The suitability of small to medium-sized tankers and slip-on units in the steep terrain of the North East and Gippsland was supported and promoted. Respondents noted that some vehicles from outside areas did not have appropriate devices such as inclinometers. Other submissions questioned whether materials used on fire trucks were appropriately fire and heat resistant.

5.58 Further comments were made about the use and selection made of earth-moving equipment. Respondents noted an inconsistency in hygiene requirements (to minimise the spread of soil and plant disease) between earth moving equipment and firefighting vehicles: earth-moving equipment was required to meet set hygiene standards; firefighting vehicles were not.

5.59 Other equipment issues raised in the submissions dealt with communication systems, the quality of maps and appropriateness of clothing for firefighters. A common suggestion was to standardise general and field communication systems. Strike teams called for better quality maps and signage for access roads and tracks – important for those deployed from outside the fire area.

5.60 Some comments highlighted the need for improved food storage and transport facilities for meals. An increase in quality and quantity of backup equipment (such as portable generators to maintain operations when power was lost) was also suggested.

5.61 The submissions also related positive experiences with equipment use, noting in particular the benefits that flow from the appropriate mix of equipment. Comments were positive regarding the use of private machinery and the versatility of slip-on units with private four-wheel drive vehicles. Telstra's assistance in providing additional telephone and mobile phones was also acknowledged.

Training

5.62 Respondents were generally supportive of the benefits of training. Various agencies and utility service providers also commented on the case for appropriate training to minimise risk. However, some comments claimed that training and accreditation for volunteer firefighting was considered too burdensome. They nominated this as a reason for not being able to participate in the fire efforts. There was also a perception across submissions that knowledge, skills and experience of firefighters was on the decline.

5.63 A large number of submissions recommended there should be more training for the broader community.

Proposals

5.64 Suggestions to improve training included:

- Increase training for CFA and DSE in regards to firefighting, strategic planning, response and training for machinery operators;
- Maintain and, in some specific cases, increase training for firefighters, plantation staff and media crews; and
- Use fuel reduction burning as a tool for increasing the training and skill level of firefighters.

Research and Development

5.65 Many submissions noted the benefits that could flow from more substantive research and development efforts. Areas identified for research and development included improved methods of fuel reduction and wildfire management and the impact of fires on flora, fauna and water quality. Suggestions also included applying research and development outcomes to provide better quality training for forest and fire management.

Term of Reference 2

'Assess the effectiveness of the response to the 2002/2003 bushfires, including emergency management procedures, cross agency response and co-ordination and resource deployment.'

5.66 Submissions addressing, either in part or in full, the second Term of Reference were grouped and analysed into three broad themes; *response, management of resources* and *recovery*. Within each of these categories, a series of issues were regularly commented on. Response concerns attracted the most comment.

Response

5.67 Land management preparedness and agency preparedness were the two key themes we identified in relation to the Inquiry's first Term of Reference. Response issues, management of resources and recovery issues are the three broad themes we identified relevant to the Inquiry's second Term of Reference.

5.68 In particular, response issues attracted considerable comment around the following:

- Strategy/tactics;
- Utilising local knowledge and experience;
- Emergency management arrangements;
- Public information and communication;
- Risk aversion; and
- Asset protection.

5.69 Figure 5.5 gives a snapshot of the positive and negative comments made about these issues.

Strategies and Tactics

5.70 Comments received were both supportive and critical of overall tactics and strategies employed by CFA and DSE but generally asserted that the agencies either collectively or individually did a good to exceptional job in relation to fire suppression.

5.71 However, five key issues were consistently raised in regards to strategies and tactics. These were (in no particular order):

- Unexplained changes in strategy by management during the campaign;
- Poor deployment decisions;
- The lack of backburning as a fire suppression strategy;
- Occupational Health and Safety issues raised by the Linton Coronial Inquest; and
- Mineral earth breaks as a firefighting tool on private rather than public land.

Unexplained Changes in Strategy by Management

5.72 A perception shared by firefighters, fire ground managers and Incident Management Team members, was that changes were made to strategy during the course of the campaign, without explanation. In some cases, this led to frustration and a lack of confidence in decisions.

Poor Development Decisions

5.73 Respondents questioned some deployment strategies and tactics, specifically the level and quality of consultation between DSE and CFA. Some submissions also asserted that decisions were not being made at the fire front, limiting the input of local knowledge. This was seen to result in poor tactical and deployment decisions.

Weather Conditions

5.74 A number of comments were made regarding weather conditions as weather plays a significant part in determining fire suppression strategies. Comments focused on two aspects; the weather conditions during the 2002-2003 fire season and a comparison of the 2002-2003 fire season weather patterns with past extreme fire events.

5.75 Some submissions asserted that benign weather conditions were not taken advantage of to aggressively suppress the fires. Other submissions noted that weather conditions were extreme, in part from the unusual lack of rainfall over the period of the fire.

5.76 Opinion was divided when weather conditions were compared to other extreme fire events. Submissions supported the need to more effectively monitor and analyse weather conditions and factor this analysis into planning strategies and tactics.

Figure 5.5: Response

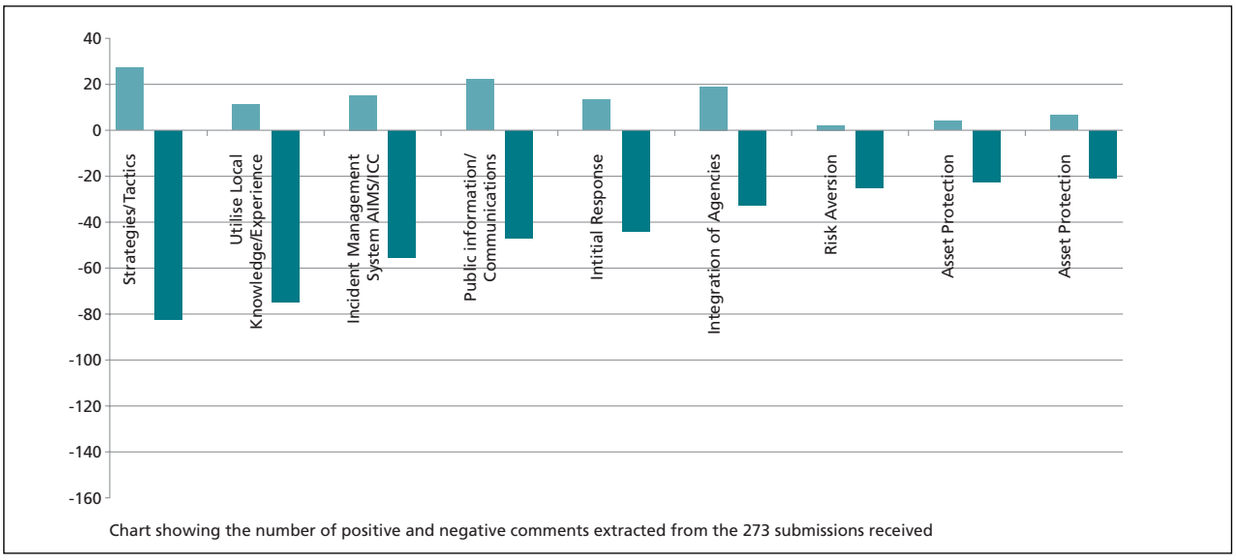


Chart showing the number of positive and negative comments extracted from the 273 submissions received

Lack of Backburning as a Fire Suppression Strategy

5.77 Dissatisfaction was expressed at the perceived lack of backburning as a fire suppression strategy. This was particularly so when Incident Controllers did not support tactics proposed by fire ground commanders when they believed weather conditions were benign and backburning was achievable. Some respondents commented that this cautious approach might be a reaction to findings from the Linton Coronial Inquiry.

Occupational Health and Safety Issues

5.78 A number of comments addressed the impact of the Linton Coronial Inquest. The common perception was that agencies had over-reacted to the Coroner's recommendations and placed too strong an emphasis on firefighter occupational health and safety, resulting in a more conservative approach to fire suppression and reduced levels of backburning.

Mineral Earth Breaks as a Tool

5.79 Submissions also commented on mineral earth breaks as a tool in firefighting on public/private land. Perceptions were that mineral earth breaks were; located wrongly, of an inappropriate size and/or constructed on private land in preference to public land.

Other Issues

5.80 Further issues and concerns relating to strategies and tactics included:

- Greater community and other key stakeholder involvement in identifying priority assets to be protected;
- Better management of fire lines at shift changeovers;
- More timely decision making;
- Better management of aircraft deployment – in particular, using aircraft when local conditions are viewed as favourable; and
- A perception that DSE prioritised conservation over private property protection.

Utilising Local Knowledge and Experience

5.81 A considerable number of respondents were critical of what they perceived as the poor use of local knowledge and a lack of confidence in information provided by local residents to Incident Management Teams. Particularly, some felt that Incident Management Teams did not use local knowledge and field observations effectively at critical times.

5.82 A large number of respondents identified times where they believed local knowledge and experience were not adequately applied:

- Instances were described where an Incident Management Team did not integrate local knowledge and experience when developing firefighting strategy/tactics.
- There was a perception that information was treated differently, in some cases, when it was provided by an individual or group in the community rather than sourced from local DSE or CFA staff.
- Some argued that local knowledge was not incorporated into strike teams from out of the area.
- There was a perception that the experience and knowledge of retired personnel was not consistently incorporated – in particular, their knowledge of terrain and fire behaviour.

Emergency Management Arrangements

5.83 Many comments on Emergency Management noted room for improvement.

5.84 Some submissions noted confused messages between key agencies on issues such as road closures and subsequent access, evacuation procedures and evacuation centres. Respondents claimed that, in some cases, established emergency management arrangements and other co-operative agreements were not followed.

5.85 However, approximately twenty five per cent of all comments in this category were positive about emergency management arrangements and related issues. These submissions noted the effective co-ordination between agencies, systems and plans.

5.86 A general feeling was that co-operation at the local level was successful, and respondents commended the use of resources such as Red Cross, State Emergency Service, Rural Ambulance Victoria and the Armed Forces.

Incident Control Centres

5.87 Concerns were noted about the operation of the Incident Management Teams at Incident Control Centres, in particular lack of consistency in strategic directions and tactics between shifts and between changes of incident controllers. Comments suggested some Incident Control Centres were too distant from the fire front and did not value or use local information and knowledge to full benefit.

5.88 During the North East and Gippsland fires, DSE and CFA established Integrated Multi-agency Co-ordination Centres to co-ordinate the work of Incident Management Teams at Incident Control Centres and the deployment of resources across them. Some submissions raised concerns that these facilities were developed with minimal planning and consultation. There was also a perception that the Integrated Multi-agency Co-ordination Centres exerted influence over the Incident Management Teams operating in the ICCs' choice of strategy and tactics.

Municipal Emergency Co-ordination Centres (MECCs)

5.89 Municipal Emergency Co-ordination Centres were activated in all affected Municipalities. While some submissions noted that MECCs should have been in operation earlier, they generally felt the MECCs worked well, once established.

5.90 Others commented that the roles and responsibilities of MECCs and Emergency Service Liaison Officers (located in MECCs) were unclear to key personnel, including those in Incident Control Centres. Many suggested more training and practice in MECCs would be beneficial.

Integration of Agencies

5.91 Respondents both praised and criticised the integration of agencies. Specific suggestions were made to:

- Improve the working relationship between responsible organisations;
- Identify areas for improvement such as arrangements around road closures; and
- Improve communication with the media.

Initial Response

5.92 Many respondents noted the importance of a quick and appropriate first response. A common criticism in relation to initial response was that resources were not used early enough, particularly the use of aerial attack. Given the total resources available and a perception of benign weather, some felt the fires could have been put out much earlier. (We consider the scientific evidence for this claim of benign weather in Chapter 6.) It was also claimed that, in some cases, there was a lack of skill and experience in directing early response activities.

5.93 Some submissions noted that the fire agencies responded well in particular circumstances – for example, at Stanley where fires were quickly contained.

Public Information and Communication

5.94 Responses were mixed on the issue of public information and communication. Submissions noted some poor information processes, including poor radio signal in some areas, and a delay in receiving information on the progress and management of the fires – in some cases, more than a day late.

5.95 Some respondents questioned the approach of commercial news services that were not seen as providing an accurate, timely and responsible alternative to the ABC. (The ABC did not have full radio coverage in far East Gippsland due to black spots.)

5.96 However, some submissions identified positive aspects of the public communication process, particularly the role played by the ABC, particularly regional radio and the support received from Telstra.

Risk Aversion

5.97 Many comments about risk aversion referred back to the Linton Coronial Inquiry.

5.98 A general sense was that the Linton Inquest had a negative impact on effective suppression techniques. As we noted earlier, some submissions asserted an increased fear of litigation and unnecessary focus on occupational, health and safety considerations as a result of the Linton Coronial recommendations. Some submissions suggested a prior mapping of areas considered 'unsafe' to improve firefighting safety and reduce the likelihood of a conservative interpretation of firefighting efforts.

Asset Protection

5.99 A number of respondents suggested that priorities for the protection of public and private assets should be developed and agreed upon before the fire season. This point was noted earlier. For example, some landowners felt firefighters did not share or even understand their view of protection priorities, especially around pasture, livestock, plantations, native vegetation reserves and against the more official assets such as vehicles, sheds and houses.

5.100 Despite these criticisms, there was some positive feedback noting, in particular, the good work of CFA and DSE in protecting assets regionally with the limited losses when compared to previous fire events.

Management of Resources

5.101 In addition to comments about the effectiveness of the firefighting response, comments on resource management were common.

5.102 Specifically, respondents commented on:

- Allocation of resources;
- Availability of skilled people;
- Shift changes;
- Strike teams management;
- Use of Defence Force personnel; and
- Firefighting at night.

5.103 Figure 5.6 gives a snapshot of the positive and negative comments made about the management of resources.

Resource Allocation

5.104 A number of submissions commented that aspects of resource management were successful, however, the overall adequacy of resource allocation was questioned. One submission asserted that, at times, Incident Control Centres were overstaffed leaving field operations short.

5.105 Submissions noted the value and importance of private units attached to the CFA, especially when resources were limited.

Availability of Skilled People

5.106 Submissions consistently stated there was a lack of skilled and experienced people to fight the fires. Respondents claimed those who were available were not always used effectively.

5.107 Further some submissions noted that some former volunteers had not completed and/or maintained accreditation and could not be used to full advantage. Other respondents asserted that increased training requirements were a barrier to their participation. The apparent decline in prescribed burning on public land was seen as disadvantaged. There was also a view that many firefighters were not fit enough for the tasks allocated. Respondents suggested greater importance should be given to the need for rest.

Figure 5.6: Management of Resources

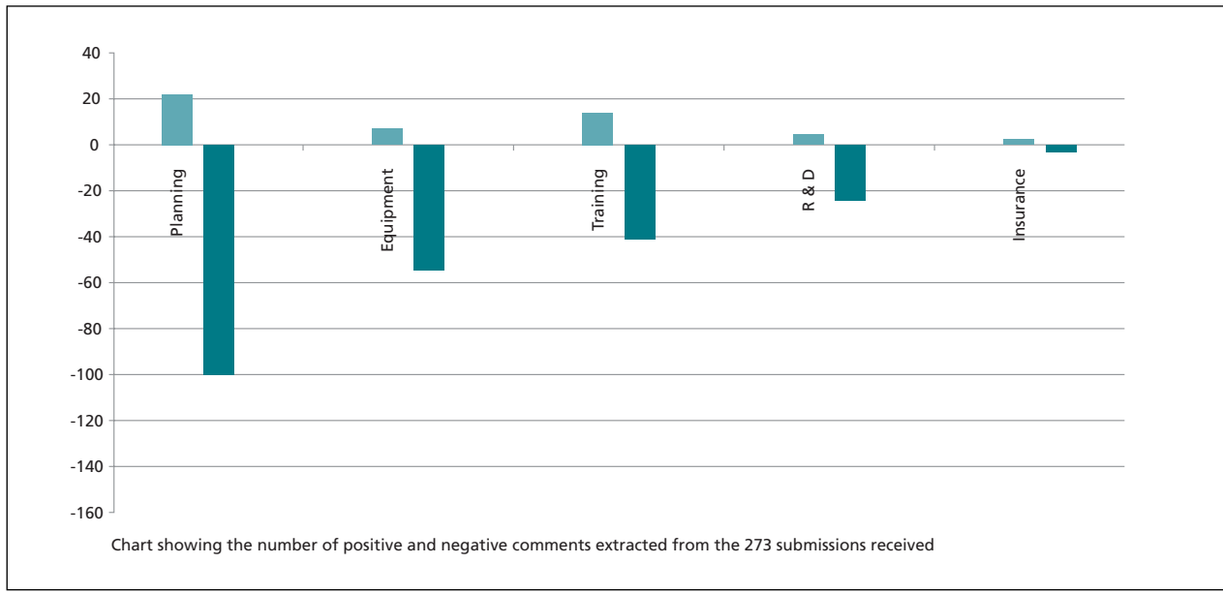


Chart showing the number of positive and negative comments extracted from the 273 submissions received

5.108 Respondents felt this situation was due to increased training requirements and a decline in prescribed burning on public land that meant DSE personnel had less firefighting experience.

5.109 Supportive comments noted the valuable roles played by counselling and therapeutic massage services for firefighters (although this was limited) and some suggested this should be expanded.

5.110 The importance of the volunteers was highlighted frequently, with some submissions mooting a skills register as a valuable tool for the future to match available skills to resource requirements.

Shift Changes

5.111 Several submissions suggested shift structures were inflexible and proposed that changes and possibly briefings should occur at the fire ground; that is 'hot' changeovers, preferably in daylight for maximum advantage. Comments also suggested that set and regular shifts made shift changeover inflexible.

Strike Teams

5.112 There was a perception that Strike Teams were sometimes poorly utilised and directed. Some respondents noted that strike teams (once in place) should have been allowed greater autonomy to make tactical decisions regarding how they would organise to fight the fire.

5.113 Respondents reported that, in some cases, crews remained out of firefighting when conditions were seen as suitable for suppression activities. Others noted that more flexibility was necessary, especially in regard to the 'length of tour' and daily hours.

Defence Force Personnel

5.114 Comments generally supported the use of Defence Force personnel in diverse areas such as co-ordinating accommodation and meals, machinery, logistics and engineering. A number of respondents were dissatisfied that Defence Force personnel were not used on the fire line.

Overnight Firefighting

5.115 Most submissions on this issue focused on the potential to fight the fires at night using a range of techniques, including backburning. Those who commented on night firefighting also felt the practice was not well utilised in some circumstances, and was a lost opportunity.

Recovery Issues

5.116 In addition to response issues and management of resources, submissions also focused on the question of recovery. Respondents identified the following major recovery issues:

- Fences;
- Economic impacts;
- Land rehabilitation;
- Restoration of public utilities; and
- Other recovery matters.

5.117 Figure 5.7 gives a snapshot of the positive and negative comments made about recovery.

Fences

5.118 The restoration of fences and Government's role in providing financial support was a significant issue in submissions. Fencing was also the focus of significant attention during consultations.

5.119 Comments principally asserted that the Government has an obligation to private landowners to replace fences when they are adjacent to public land. Specifically, respondents argued that the Government should be responsible for half of the replacement costs if the fire originated on public land and was inappropriately managed. Further to this, respondents argued that the Government should pay the full replacement cost of fences where they were lost due to backburning.

5.120 Many commented that the Government's approach in applying the fencing assistance policy was inconsistent and caused confusion and anger.

Economic Impact

5.121 Comments regarding the economic impact of the fires were diverse. Examples outlined in submissions are:

- Death and injury of livestock;
- Loss of pasture and fodder;
- Smoke impact on grape crops;
- Cancellation of major tourism events;
- Loss of wages to volunteers when fighting the fires;
- Employers not being compensated for employee hours lost when firefighting;
- Loss of normal business activities, especially when related to the outage of utility services; and
- Cost of repairs in restoring utility services.

5.122 Several submissions pointed out economic recovery would be a long process, especially for agriculture, tourism and other natural resources-based industries in fire-affected areas. Some saw an economic opportunity to recover timber from burnt areas.

Land Rehabilitation

5.123 Some constructive comments were made regarding rehabilitation after the fires. There was a perceived need for an agreement to be reached with agencies in regards to fire control activities private land such as access tracks, mineral earth breaks and creek crossings. The new opportunities to better control pest plants following the fire were also identified.

5.124 Respondents also expressed the view that rehabilitation activities were too slow and inconsistent. They identified the following possible impacts during rehabilitation:

- Impact on water quality and quantity, especially during rainfall events; and
- Probable impact on soil structure, characteristics and ecology due to high levels of heat during the fire.

Figure 5.7: Recovery

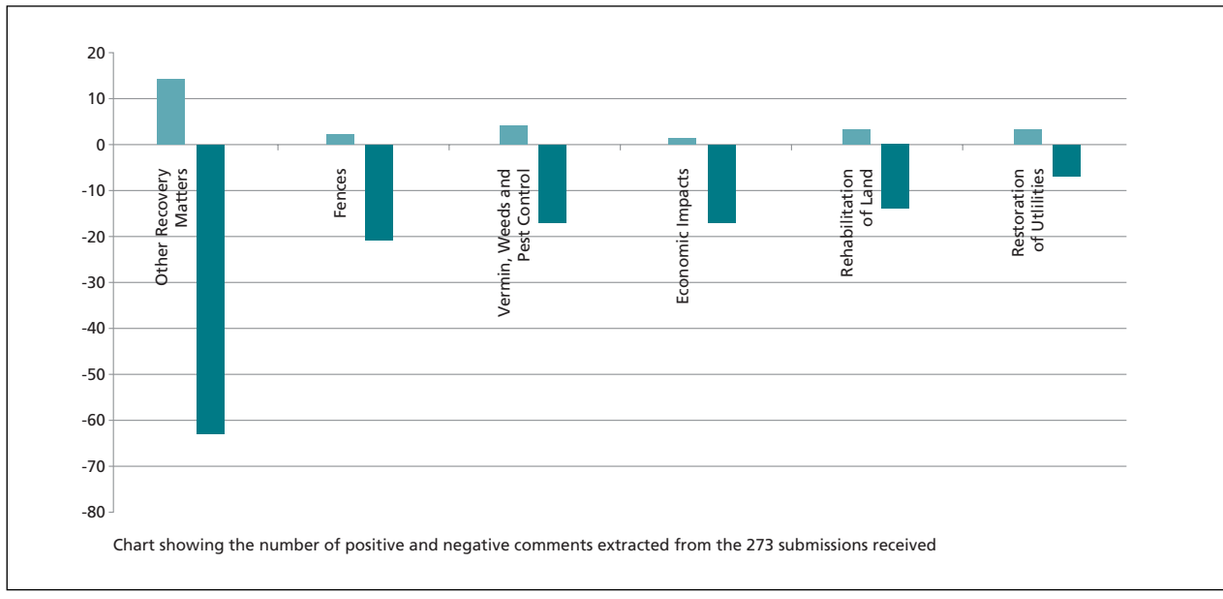


Chart showing the number of positive and negative comments extracted from the 273 submissions received

Restoration of Utility Service

5.125 Some submissions noted undue delays in restoring selected services. However, other comments indicated that some utilities brought in additional skilled crews from other areas to assist in restoration.

5.126 Some respondents recommended that utilities use fire-resistant materials in high-risk areas as flammable materials increased the likelihood of loss of utility services. Many asserted that mobile phone coverage should be improved.

Other Recovery Issues

The Importance of Preparation

5.127 The common message across submissions was that recovery appeared less traumatic when people had planned and prepared for a fire or other emergency event.

5.128 Submissions noted the impact of the ongoing drought on pasture reserves, the decline in animal health and numbers, and the loss of pasture and livestock due to fire, on their ability for pasture to recover to meet their needs.

5.129 There was a perception that recovery was more difficult due to public land managers not being 'good neighbours' as they had not prepared their boundaries to contain possible fires.

Centrelink

5.130 Further criticisms focused on the role of Federal Government support – in particular, Centrelink. Many commented that the support promised by politicians was difficult to access due to problems in the availability of documentation to register. Many claimed Centrelink was not as responsive to the needs of affected families as it should have been.

Water Replacement

5.131 Comments were made about the replacement policy for farm water used in fire suppression. A number of farmers asserted that advice on cleaning out dams after the fires and early rainfall events was inconsistent and inappropriate.

5.132 Others said there needed to be more water reserves on public land, specifically for fire suppression. Comments also indicated that water quality would be an ongoing issue for the next few years. Minimising erosion was seen as a further ongoing recovery challenge. There was some comment that the impact on flora and fauna would be significant and ongoing.

Other indentified issues

5.133 Respondents to the Inquiry also identified:

- A perceived shortage of veterinary services available for livestock assessment;
- The need for more counselling resources;
- Earlier repair and reopening of roads and bridges; and
- The continuation of education for local children.

Conclusion

5.134 Five key themes dominated the submissions and community consultations:

- Land management preparedness;
- Agency preparedness;
- Response issues;
- Management of resources; and
- Recovery issues.

5.135 Within those themes, many issues received critical comment.

5.136 In any call for public submissions, comments are likely to focus on negative events and this Inquiry was no exception. While the Inquiry received more negative comments than positive, this was balanced by the view of respondents that firefighting efforts were exemplary under extreme circumstances.

Chapter 6
Weather Conditions Before and During the Fires of 2002-2003

Overview

6.1 Submissions to the Inquiry varied markedly in their interpretations of the weather conditions surrounding the fires in North East and North West Victoria in 2002-2003.

6.2 The Commonwealth Bureau of Meteorology (Bureau of Meteorology 2003) regarded the conditions as similar to those characterising other years when large fires occurred in Victoria, including 1983 and 1939. They reported that lead-up conditions of drought, combined with higher than average temperatures, set the scene for high fire risk in the 2002-2003 fire season, with the risk of fire spread heightened by extremely dry fuel loads. The coincidence of many lightning ignitions and several to many days of Very High to Extreme fire weather[1] was conducive to rapid fire spread with a reduced likelihood of successful early suppression.

6.3 As we saw in Chapter 5, submissions from a variety of other individuals and organisations disputed this assertion. They claimed weather was *less* severe than in the lead-up to and during the 1939 and 1983 fires, and that relatively benign weather conditions during much of January and February should have been conducive to successful fire suppression.

6.4 The Inquiry investigated the relevant evidence for these varying assertions. Our expert analyses support the findings of the Bureau of Meteorology.

6.5 This Chapter also considers a second point relating to climate – the unusually low total areas burned per year by fire in Victoria from the mid-1980s to 2001.

6.6 We examined the climate evidence in relation to this issue and conclude that improved fire suppression by the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) is the most likely explanation of why so few fires in these years grew to large size, rather than either benign weather or decreased fire due to prescribed burning.

Statewide Weather Conditions

6.7 The Bureau of Meteorology (2003) reported that the drought prevailing at the time of the 2002-2003 fires was one of the most severe in the nation's history.[2] Similar lead-up conditions were experienced prior to the 1939 and 1983 bushfire seasons in which large fires affected substantial areas of Victoria. However, the higher than average temperatures through autumn, winter and spring of 2002 set this fire year apart from any other.

6.8 From as early as mid-July 2002 the Bureau had early warning that conditions in the summer of 2002-2003 would be conducive to major fire events. This was based on the predicted behaviour of the El Niño–Southern Oscillation with forecasted continued drought and early drying of forest fuels. They advised that rainfall in the Victorian alpine region for the remainder of 2002 was likely to be only 50–60 per cent of the average, and higher than average temperatures were also forecast.

6.9 Extremely dry spring and early summer conditions (20–40 per cent of normal rainfall) persisted through January, with some areas by this time recording record or near-record low levels for rainfall for the October–January period. The Bureau of Meteorology's submission notes that another unusual aspect of the 2002-2003 fire season was the long period without rain after the start of the major fires in the North East and Gippsland. The lack of significant rain (defined as more than five millimetres in one day) between 2 January and 20 February 2003 – a period of nearly 50 days – allowed the fires to remain active.

6.10 As we noted in Chapter 4, there were heatwave conditions in many parts of inland Victoria during January 2003, with temperatures of 43–46°C recorded for a number of locations on 25 January. Evaporation over the April 2002–January 2003 period was the second highest on record at Hume Weir (after 1983). In combination with drought and heatwave this may account for the substantial areas of tree death evident on north and west-facing slopes in Central and North East Victoria.[3]

6.11 Over the course of the 2002-2003 fire season, the Bureau of Meteorology issued 30 fire weather warnings (20 from October to December and a further 10 in January). This greatly exceeds the number of fire weather warning days reported for the previous three years (17, 19 and 14 respectively for 2000 to 2002).

1 Forest Fire Danger Index in the ranges 24–50 and 50–100, respectively.
2 The Bureau of Meteorology reports droughts on the basis of total rainfall received over a period relative to the proportion of years where rainfall was equal to or less than that total. Here we also report a drought index, the Keetch-Byram Drought Index (KBDI). The KBDI requires more data than the decile method of the Bureau of Meteorology and so does not cover as long a period at most stations.
3 At Corryong, for example, the KBDI had reached 160 by January.

6.12 Of course, the number of such days for any single location would be fewer than this, and we calculate that Mildura, Melbourne and Corryong had nine, seven and five Extreme fire danger weather days (Forest Fire Danger Index above 50) respectively in 2003.[4] To place these numbers in context:

- Corryong has not had more than one day per year in this range since suitable records for calculation of Forest Fire Danger Index commenced in1973;
- It is the third highest annual total for Mildura after 1983 and 1958, which were years that saw very large fires in the Grampians and Big Desert areas, respectively; and
- It is the highest number for a single year since suitable records for Melbourne airports began in 1951.

Weather Conditions in the Fire-Affected Areas

6.13 This section provides an analysis by the Inquiry of weather conditions for specific locations in or near the fire-affected areas. In particular, it identifies how conditions during the fires of 2003 compare with previously recorded fire weather extremes for these locations. The accompanying figures are in Appendix VI.

6.14 Since the fire complex in North East Victoria covered a large area, we examined weather records for a number of locations. Our analyses focused on weather conditions in the three areas affected by the large fires of 2002-2003: North West and North East Victoria and Gippsland, plus Melbourne.

6.15 For each station, daily information was obtained for 3 pm temperature and wind speed, relative humidity, 24 hour rainfall (to 9 am) and maximum temperature.[5] The Forest Fire Danger Index (FFDI) and Keetch-Byram Drought Index (KBDI) were calculated from the daily climate records and used to describe weather in relation to risk of ignition and spread of unplanned fires.[6]

The North East

6.16 At Corryong, the drought of 2002-2003 was the worst on record:

- The previous KBDI January maximum was passed on 18 January 2003, and the Index continued to climb through to 20 February (Figure 6.1).
- Only 70 millimetres of rain fell in the four months from October 2002 to January 2003, 29 per cent of average for that period.
- Until 22 February, there was no daily rainfall greater than 5 millimetres within the period of the fires.
- On five days in January 2003 the fire danger rating was Extreme (FFDI>50) and, on four days, was Very High. On 7 January the rating passed the highest value recorded for that month (45.6). On 17 January the previous record for any month (58) was passed, and it was higher again on 18 January.
- Over the two weeks from 17–30 January, there were four cycles of Extreme fire danger each followed by one to two days of lower rating (Figure 6.2).
- Above average wind speeds contributed to the elevated FFDIs. On six days, including 17 and 18 January, 3 pm wind speeds exceeded 30 kilometres per hour.

6.17 Temperature and humidity were also extreme:

- On 18 and 26 January, temperatures exceeded 40°C, two of just nine such days on record for Corryong.
- 18 January also saw relative humidity equal the record low of 9 per cent.
- All but six days in February were also above the monthly average (30.4°C) and fire danger approached the Extreme level again on 12 February, in the middle of a long period of high temperatures and low humidity (10 per cent). Wind speed on 12 February reached 26 kilometres per hour at 3 pm.

4 These numbers do not agree with higher numbers cited by Long (unpubl.) who investigated extreme fire weather in Victoria for selected locations for the period 1971 to 1999. The higher numbers documented by Long reflect the use of an assumed maximum value of 10 for the drought factor, and the calculation of Forest Fire Danger Index for four times of day: 9 am, noon, 3 pm and 6 pm. Although Forest Fire Danger Index is usually closest to its maximum value at 3 pm, it is occasionally higher at noon or 6 pm. We use the true value for the drought index (calculated from amount and time of last rainfall greater than 2 mm), and it is often lower than 10, thus reducing the estimated value of Forest Fire Danger Index.

5 Climate data were investigated for the following stations and time-periods: Melbourne airports (Essendon and Tullamarine; 1951–2003), Mildura (1939–2003), Nhill (1939–2003), Walpeup (1998–2003), Benalla (1957–2003), Wangaratta (1956–66, 1986–2003), Albury airport (1983–2003), Corryong (1973–2003), Mt Hotham (1995–2003) and Omeo (1957–2003).

6 These indexes are described in detail in Chapter 7.

Figure 6.1: The Keetch-Byram Drought Index (KBDI) and Rainfall at Corryong, July 1998–July 2003

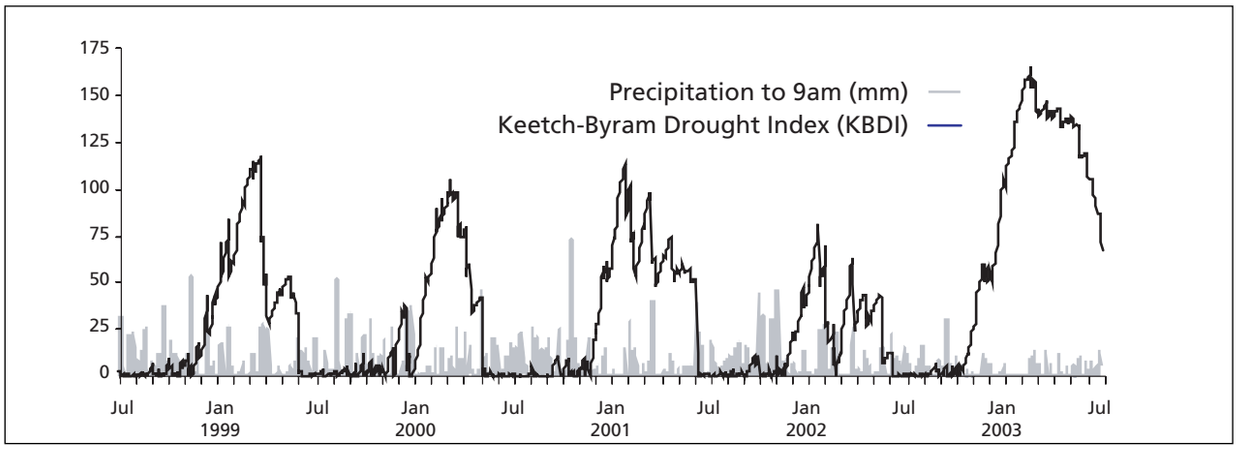
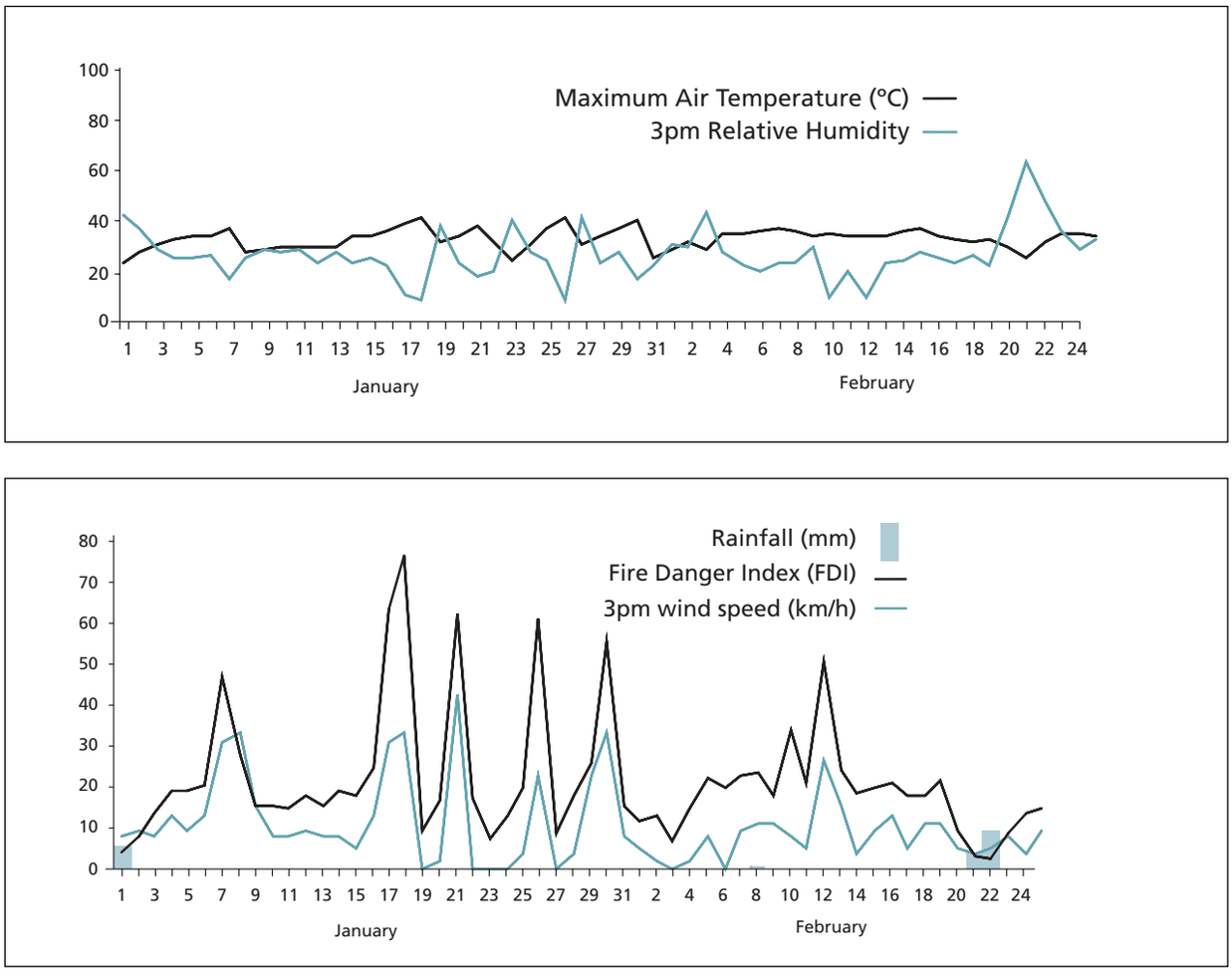


Figure 6.2: Daily Maximum Temperature, 3 pm Relative Humidity (%) and Wind Speed, Forest Fire Danger Index and Rainfall at Corryong, January–February 2003



The Alps

6.18 The climate record at Mt Hotham is short (eight years). While some indicators of fire danger weather prior to and during the fires at Mt Hotham exceeded values recorded in previous years, others did not.

6.19 To give some indication of climate at this time:

- During the drought of 2003, the KBDI exceeded previous records (Figure VI.1, Appendix VI), peaking at 39 on 20 February.[7]
- Humidity reached its lowest ever recorded value of 17 per cent on 12 January and again on 21 January.
- 3 pm wind speeds were high (approximately 50 kph) on 26, 29 and 30 January (Figure VI.2, Appendix VI).
- The highest FFDI in 2003, and the highest on record, was 22 on 21 January, when humidity was low, the wind was strong (39 kilometres per hour), and the temperature peaked at 23°C (the highest temperature recorded at Mt Hotham is just 26.7°C).
- Twenty millimetres of rain fell at the end of January and 42 millimetres had fallen earlier in the month.

Gippsland

6.20 The drought at Omeo in 2003 was comparable in depth to several others in the climate record, where values for KBDI over 95 have been reached in 1965, 1968, 1983 and 1998 (Figure VI.3, Appendix VI):

- The highest KBDI in 2003 was 99 on 21 February, while the highest ever was 127 in April 1968.
- Temperatures exceeded 30°C many times over the 2002-2003 fire season, peaking at 35.5°C on 30 January, short of the record of 38.2° C. (Figure VI.4, Appendix VI). The highest 3 pm wind speed of the summer (37 kilometres per hour) was also recorded on 30 January. These two factors contributed to a Very High fire danger rating on that day.
- Low humidity (9–17 per cent), high temperatures (27–34 degrees) and winds (15–26 kilometres per hour) contributed to Very High fire danger ratings for six other days between 13 January and 12 February (on 14, 17, 26 January, 7 February).

6.21 Missing data points (for example, for wind over the period 20–25 January) mean that some days may have had higher FFDIs than reported here.

The North West

6.22 The Big Desert fires started from lightning strikes on the afternoon of 17 December and spread rapidly up to 21 December, covering by this time 160,000 hectares of the final 181,400 hectares reported for the event. Significant areas continued to be burnt until 26 December and the fires were declared out on 31 December, when 30 millimetres of rain fell – the first significant rain for 34 days, and the highest fall since April 2000. Rainfall and streamflow for the region over the period November 2001 to October 2002 were both in the lowest 10 per cent of records.

6.23 The weather at Walpeup during the period of the Big Desert fires represented extreme conditions for fire. A prolonged and intense drought led to the drying of vegetation and fuels and there was extremely hot and dry air and moderate to high winds, conditions that persisted during this time despite wind shifts from North West to South West.

- In Walpeup, the drought was extreme, with KBDI reaching 170 of a maximum 200 in December 2002 (Figure 6.3), although KBDI was slightly higher than this in February 1983. In the 12 months prior to 16 December 2002 just 135 millimetres of rain had fallen, less than 40 per cent of the annual average.
- For 15 days during December 2002 the fire danger rating was Very High (FFDI over 24 but under 50) and for five days it was Extreme (over 50 on 2, 16, 18, 20 and 21 December). The 11 days from the 14 to the 24 December were all Very High or Extreme (Figure 6.4).
- The maximum daily temperature dropped below 30°C (the December average) just once in this period (24 December), and four days experienced maxima above 40°C, peaking on 21 December at 42.6°C. The December 3 pm relative humidity at Walpeup averages 30 per cent but, during these 11 days, it averaged 11 per cent. The lowest value ever recorded for Walpeup (six per cent) occurred on 16 December, the day before the outbreak of the fires.
- All but five days of December 2002 recorded wind speeds higher than the December 3 pm average of 15 kilometres per hour, peaking at 35 kilometres per hour on 22 December.

7 Drought index values are lower at Mt Hotham than at the other stations we examined, largely because of the lower temperatures and higher rainfall that result from its higher elevation. For example, average annual rainfall at Mt Hotham is 1,179 mm compared with Corryong's 740 mm and Omeo's 680 mm.

Figure 6.3: The Daily Keetch-Byram Drought Index (KBDI) and Rainfall Record for Walpeup, July 1998–July 2003

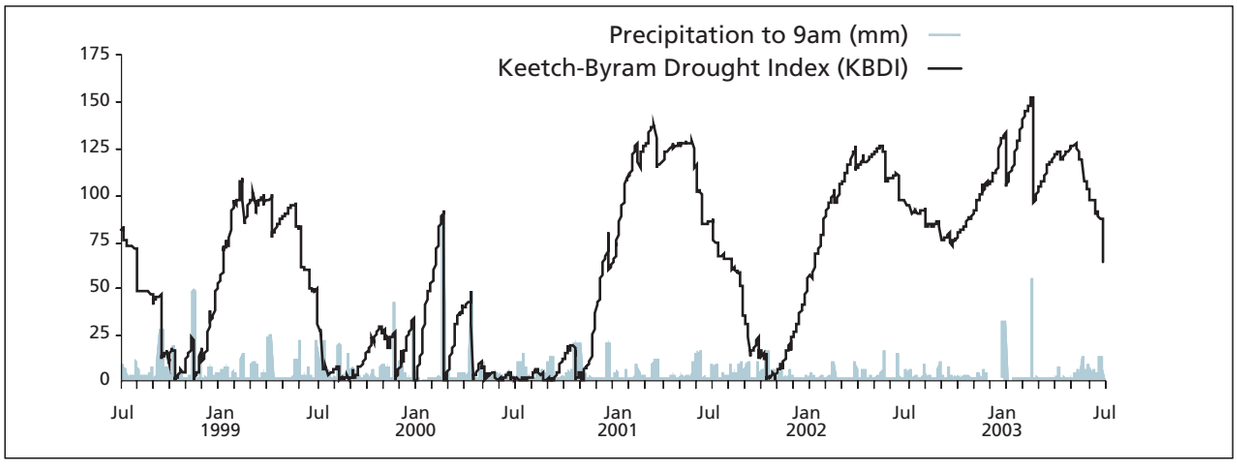
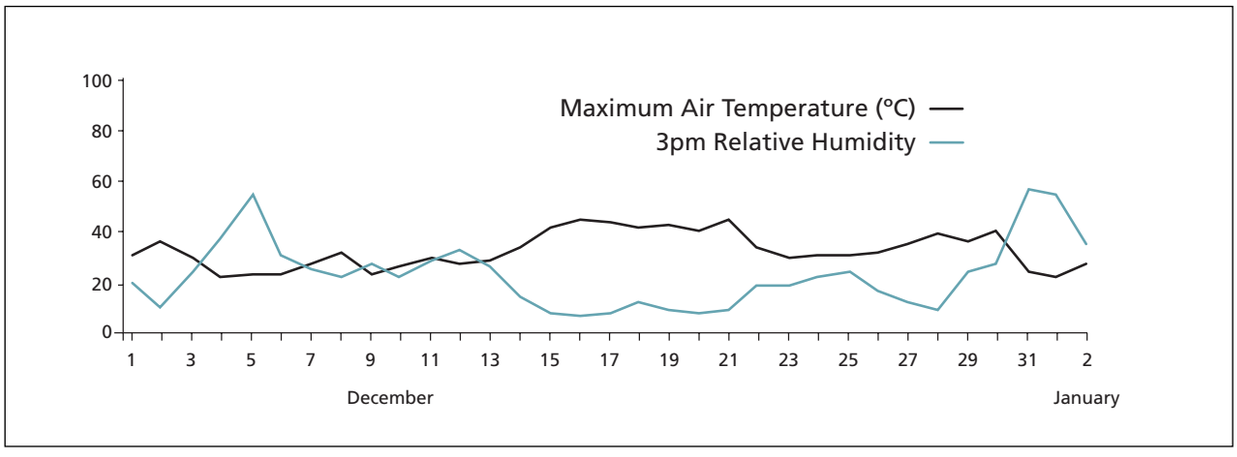
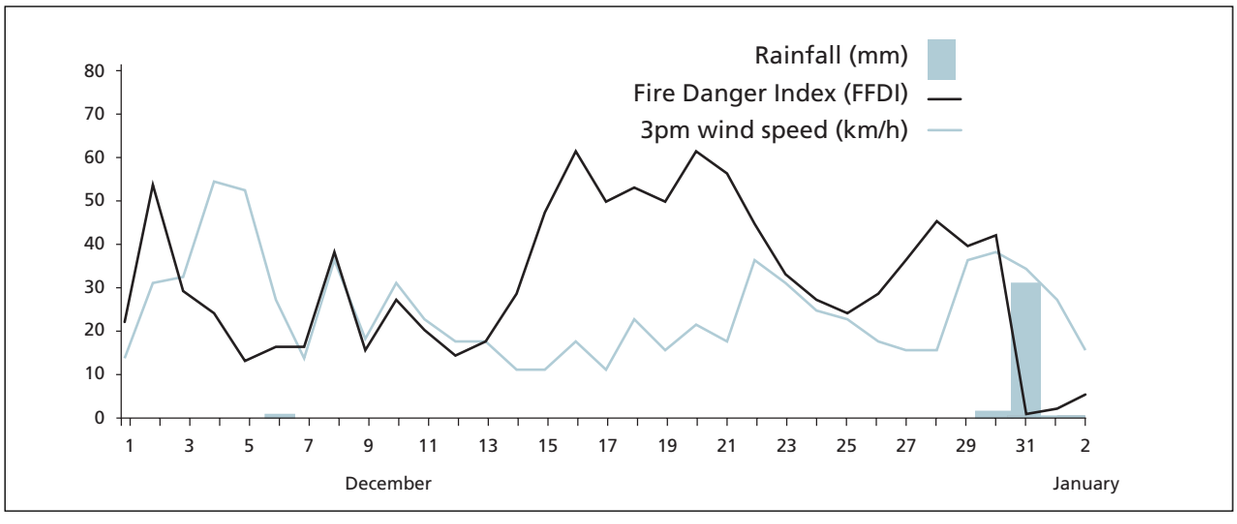


Figure 6.4: Daily Maximum Temperature, 3 pm Relative Humidity and Wind Speed, Forest Fire Danger Index and Rainfall at Walpeup, December 2002–January 2003.





Comparison of Weather Conditions Among Years of High and Low Areas Burned

6.24 The string of low-area fire years from 1986 to 2001 may have been a consequence of one or more of the following:

- Benign weather conditions;
- Higher levels of prescribed burning through the 1980s. This may have provided fewer opportunities for the ignition and spread of unplanned fires; and/or
- More successful fire suppression.

6.25 This section examines the nature of fire weather from the mid-1970s to the present so that some comparison can be made between conditions prior to the 1983 fires and the 2002-2003 fires. Again, Figures 6.5, 6.6, and 6.7 below (and Figures VI.5-6, Appendix VI) offer a graphic representation of the following discussion.

6.26 The large area of Victoria burned by unplanned fires in the early 1980s was followed by low-area fire years between 1986 and 2002 – from 1988 to 1998, unplanned fires burned an average of just 26,500 hectares of public land per year compared with a long-term average of about 120,000 hectares.

6.27 For Melbourne, fire danger was below average during the early 1990s, but was nearly as high in 1997 and 1998 as in the big fire years of 1983 and 2003 (Figure 6.5). Fire danger, on average, has been high in four of the seven years from 1996 to 2003, and the drought index has been high throughout this period. Based on historical patterns of relationship between fire danger statistics and area burned, we would have expected much larger areas burned in the 1997, 1998 and 2001 fire years. Although not large in area, 1997 was the year of the most recent, serious Dandenong Ranges fire and 1998 of the Caledonia fire. Conditions prior to the early 1980s fires were similar to conditions in the early 1990s.

6.28 Omeo had fewer high fire danger years than Melbourne, and very low levels of fire danger through the early 1990s (Figure VI.5, Appendix VI). Again, the data showed 1998 as a year of high fire danger that was not accompanied by large areas of unplanned fire.

6.29 Data for two locations in the North East region, Corryong and Benalla (Figure VI.6, Appendix VI), show that fire danger was low in the early 1990s and high in 1998, without being accompanied by large unplanned fires. This is similar to records shown for Melbourne and Omeo. Several years of high fire danger weather also occurred in Corryong in 1978 and in Benalla in 1979 and 1980 without accompanying large unplanned fires. On the other hand, large fires occurred in parts of Victoria in three years in close proximity shortly thereafter – 1981, 1983 and 1985.

6.30 In the North West region, fire danger was consistently high with only a few years characterised by low fire danger in the mid 1970s and again in the early 1990s (Figure 6.6). Both of these periods were followed by sustained periods of high fire danger. While the late 1970s to mid-1980s saw a strong relationship between high fire danger years and area burned by unplanned fires, the late 1990s through early 2000s (excepting the 2000 fire year) saw no large fires, despite high fire risk, until the Big Desert fire of December 2002.

6.31 In general, years characterised by high values for the sum of daily forest fire danger index, drought index, and numbers of Very High and Extreme fire danger days, are also characterised by large areas of public land burned by unplanned fires.[8] Evidence suggests that weather was mild in the early 1990s for from two to five years in different parts of the State, and there may have been a lessened risk of fire in those years. However, several years in the late 1990s were high FFDI years, yet saw only small areas burned by unplanned fires.

6.32 Comparing the very similar string of fire weather years for Melbourne in the early 1980s with the years from the late 1990s to the present (Figure 6.5), shows that unplanned fires in 1981, 1983 and 1985 burned more than 1.5 million hectares, while about the same total area was burned in a single year (2003) in the latter period.

6.33 Taking a long-term view, there may be little to distinguish these two periods of time and their fire records, except that ignitions leading to large fires didn't occur in several years in the late 1990s when they might have been expected – or fires were successfully suppressed at an early stage.

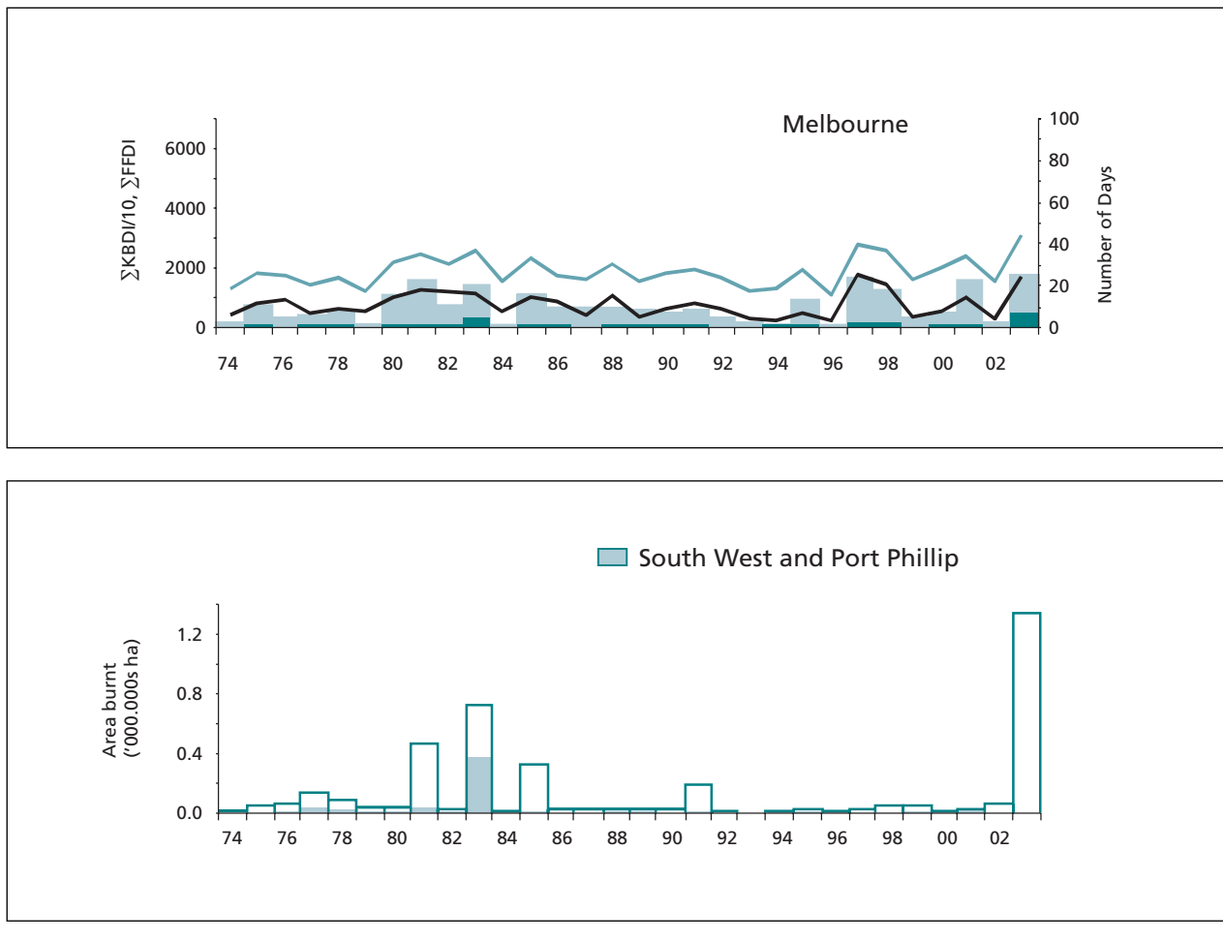
8 Mackey et al. (2002) describe theoretical reasons for a statistical relationship between number of unplanned fires per year and sum of daily FFDI per year, and between area burned by unplanned fires per year and $\sum FFDI^3$.

6.34 Examining the *number* rather than the area of unplanned fires per year on public land shows that there were more fires, as expected, in the high fire risk years of 1997, 1998 and 2001, but that they did not burn large areas (Figure 6.7). This suggests that successful fire suppression by DSE and CFA may have been the main cause of small-area years through the 1986–2002 period, rather than either a lower number of ignitions, or variations in the effectiveness of prescribed burning programs through time.[9] Appendix IV, Fires on Public Land – Historical Data, provides data for the number of fires on public land and area burnt per annum for the period 1921 – 2003.

Figure 6.5: Indices of Fire Weather for Melbourne and Area Burned by Unplanned Fires Per Year

Top Graph:
- Annual Sum of Daily FFDI (Black Line), Annual Sum of Daily KBDI (Grey Line*)
- Number of Extreme (Blue Histogram Bars) and Very High (Grey Histogram Bars) Forest Fire Danger Days Per Year

Bottom Graph:
Area Burned Per Year by Unplanned Fires in the Local DSE Fire Region (Grey Histogram Bars) and in Total for Victoria (Grey Plus Open Histogram Bars).



* Note: This value is expressed as ΣKBDI divided by 10 so that Y-axis values are scaled to allow comparison among all the variables graphed.

9 Appendix IV 'Fires on Public Land – Historical Data' documents the number of fires on public land 1921-2003 and the area burnt per annum.

Figure 6.6: Indices of Fire Weather for Mildura (North West Region) and Area Burned by Unplanned Fires Per Year

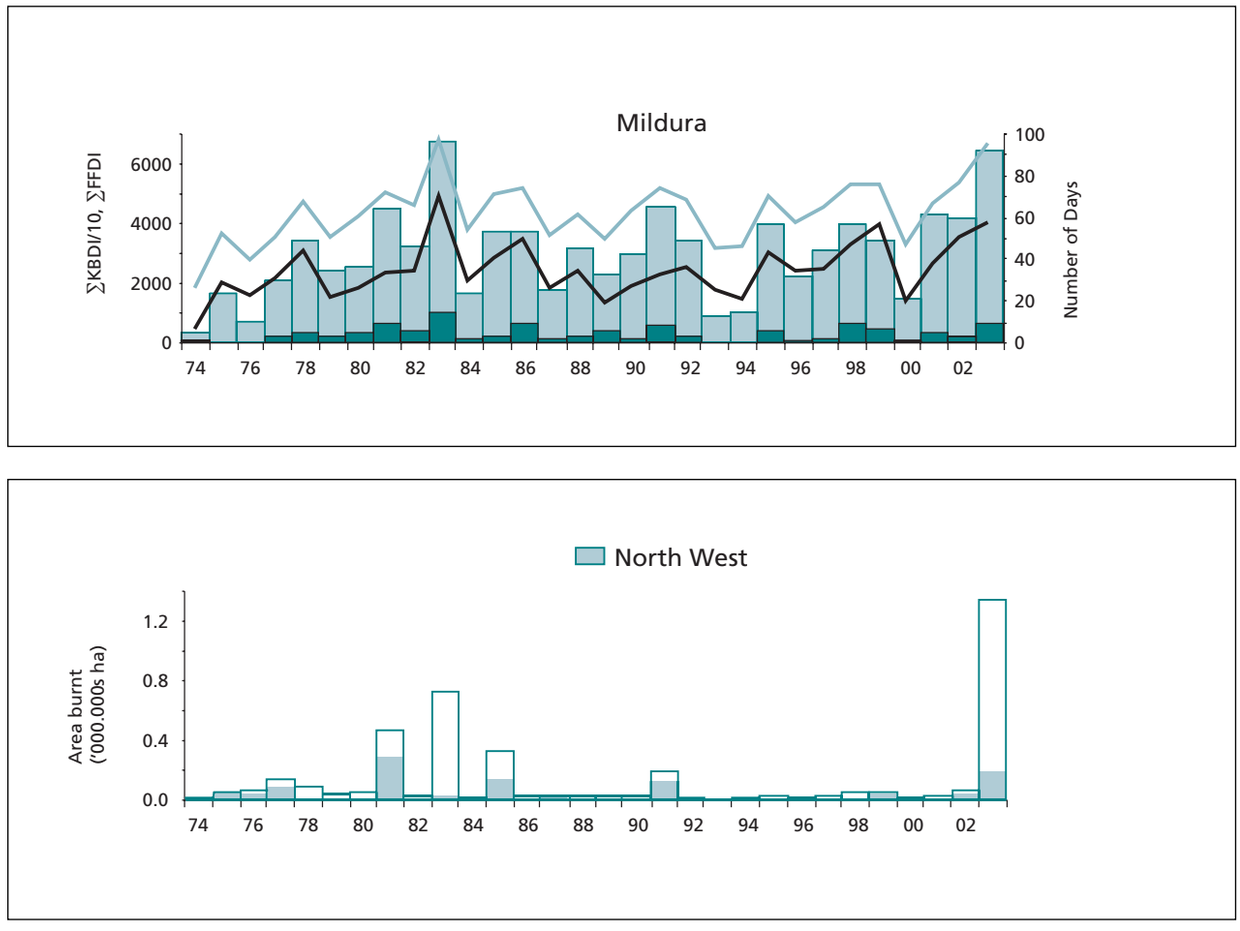
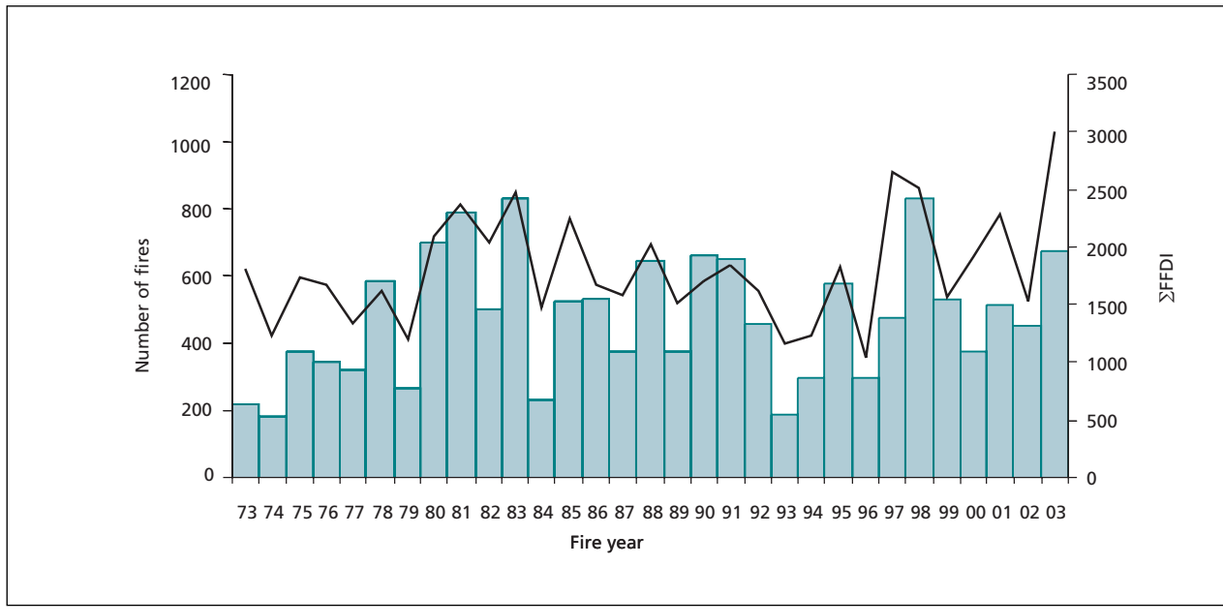


Figure 6.7: Annual Sum of Daily FFDI for Melbourne (black line), and Number of Fires Per Year on public land (green bars) in the State of Victoria, 1972–73 to 2002–03.



Conclusions

6.35 The 2002-2003 fires in Victoria reflect the coincidence of two predisposing factors: El Niño drought and a long string of low fire-area years. Ultimately, high lightning activity and extreme fire weather days led to the ignition and rapid spread of a number of large unplanned fires. Overall, the severity of weather in 2003 was of a similar level to that in 1983.

6.36 The long string of years (1988–2002) leading up to 2003 with low areas burned by unplanned fires included years of high fire danger weather (e.g. 1997 and 1998) accompanied by a large number of ignitions. Improved fire suppression by DSE and CFA, rather than either benign weather or decreased fire due to prescribed burning is the most likely explanation of why so few fires in these years grew to large size.

6.37 Estimating fire weather parameters and storing that information is important to the ongoing scientific investigation of relationships between climate and fire. It supports advances in our understanding of how fires occur and behave and gives us the capacity to improve the managed use of fire. This last point is taken up in Part B.

Recommendations

6.38 That DSE institute additional routine data storage and analysis to supplement current climate records with at least daily 3 pm values for the Grassland and Forest Fire Danger Index, and Keetch-Byram Drought Index, for selected high quality stations representing a cross-section of environments throughout Victoria.

6.39 That DSE and CFA, recognising that the Bureau of Meteorology does not routinely store all variables required to produce the calculations and indices necessary for research and planning into fire occurrence and behaviour, develop appropriate systems to ensure that such current and historical information is readily available and accessible.

References

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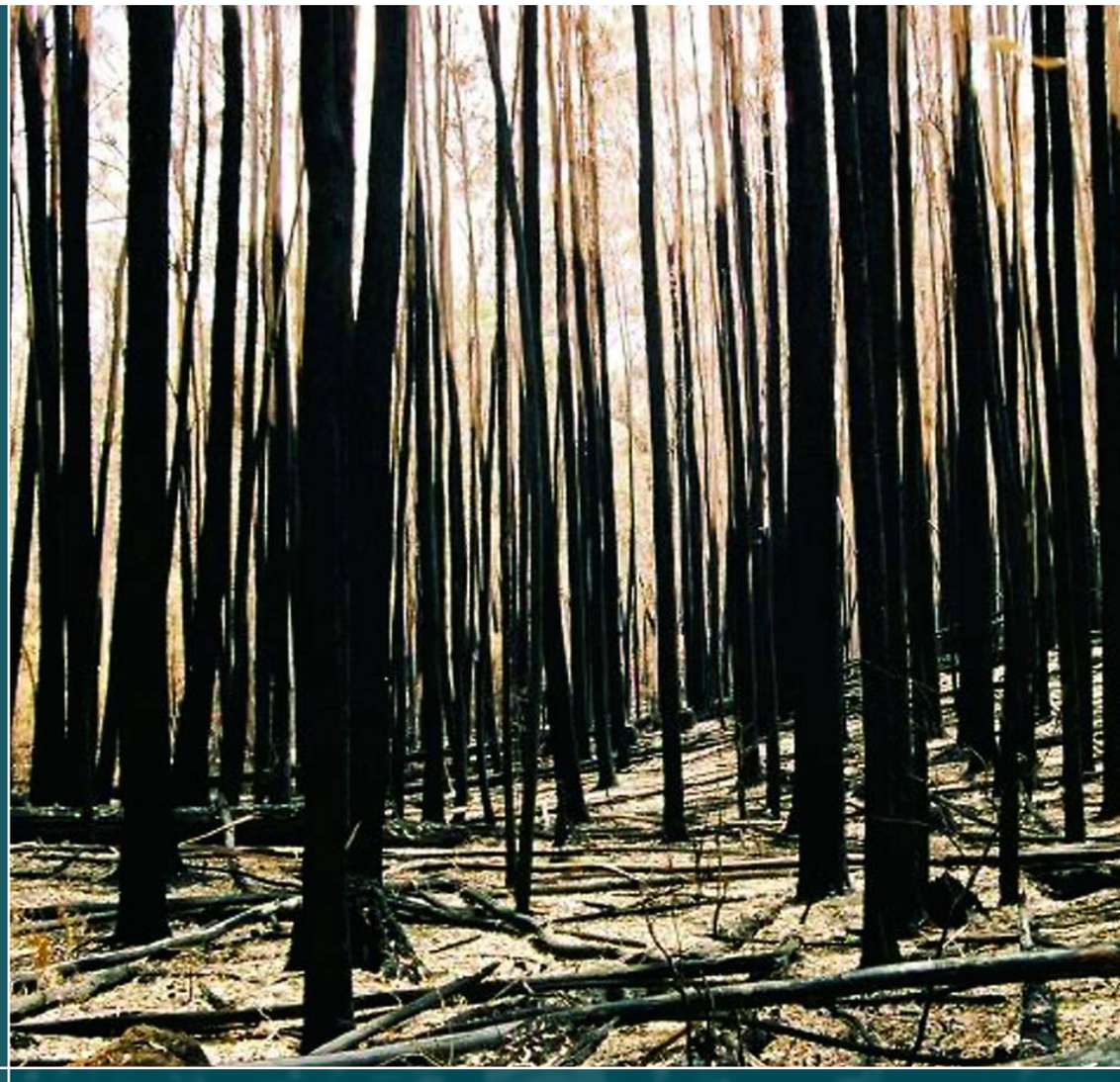
Mackey, B., Lindenmayer, D.B., Gill, A.M., McCarthy, M.A. & Lindesay, J. 2002. *Wildlife, Fire and Future Climates*. CSIRO Publishing, Melbourne.

Part A
Setting the Scene



Burnt Alpine Ash Forest - North East Victoria – DSE

Overview of Part A

Lightning North East Victoria 8 January 2003 - DSE

Part A contains six diverse chapters that set the scene for our later investigations, analyses and recommendations. In the main, these chapters are explanatory and descriptive in focus; they help us to frame relevant questions about the 2002–2003 fires, to be in charge of relevant facts, and allow us to more critically assess responses to the fires.

Chapter 1 provides an introduction to the Inquiry and to this report. As well as describing how the Inquiry was conducted, it explains why the Inquiry was commissioned and what it hopes to achieve.

Chapter 2 turns to geography and history and we consider changes in land use and occupation in Victoria over the past 170 years. We pay particular attention to changing patterns of population distribution and shifts in the interface between public and private land, since these changes have increased the exposure of many Victorians to bushfire risk. The Inquiry notes that Victorians have engaged on a continuous improvement strategy to better cope with our fire-prone environment but there is further scope to advance in our preparedness and response.

One way we can do this is by putting systems in place to adjust progressively to climatic factors like global warming and El Niño that impact on the likelihood of bushfire. We make a recommendation to this effect in Chapter 2.

In Chapter 3 we outline the legislative framework within which firefighters do their work. This is important factual context for our analysis of preparedness and response in Parts C and D. We note that current arrangements are complex, involving a large number of agencies and organisations. Such arrangements can only succeed if there is a high level of co-operation and communication between agencies and the community.

In Chapter 4, we tell the 'story' of the fire and summarise its impacts. We offer a broad-brush picture of what happened, where and when. Later in this Report we give more detailed and critical accounts of particular fire situations and offer a critical analysis of the emergency response (Part D). Here, we present a balanced view of the achievements and losses, as well as the impacts of the fires on firefighters and communities.

The Inquiry received 273 submissions from groups and individuals. In Chapter 5 we summarise those submissions and document the key themes that came out of the community consultations. Interestingly, those themes – land management preparedness, agency preparedness, response issues, management of resources, and recovery were common across the State. As this Chapter is part of 'setting the scene', we make no judgements or assessments about the accuracy of claims.

Chapter 6 clarifies the contradictory views put to the Inquiry about the severity of weather during the 2002–2003 fire season and the implications for firefighting response. Our investigations support the Bureau of Meteorology's findings that conditions were not more benign than in previous, extreme fire seasons such as those of 1983 and 1939.

This Chapter also considers a second point relating to climate – the unusually low number of large fires in Victoria from the mid-1980s to 2001 and we conclude that improved fire suppression by the Department of Sustainability and Environment and the Country Fire Authority is the most likely explanation as to why so few fires in these years grew to large size. We make a further two recommendations here regarding improved data storage and analysis for climate records.

Chapter 1
Introduction

Overview

1.1 This Chapter briefly describes the significance of the 2002-2003 fires and their aftermath. It explains the reasons behind the establishment of the Victorian Bushfire Inquiry and what it hopes to achieve. We provide the three Terms of Reference, describe how the Inquiry was conducted and initial impressions. We then discuss the aims of this Report and explain the broad focus of each of its Parts.

The 2002-2003 Bushfires at a Glance

1.2 Over the summer of 2002-2003, bushfires burnt across the greatest expanse of land in Victoria since 1939.

1.3 The 2002-2003 bushfire season occurred during an ongoing drought – one of the most severe in recorded history – with the first bushfires occurring early in the season in September 2002. By the start of December 2002, the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) had already attended more than 375 fires in Victoria, almost three times the twenty-year average. The 2002 calendar year closed with Victoria experiencing its largest bushfire in 20 years, a fire in the Big Desert Wilderness Park in North West Victoria affecting 181,400 hectares of both public and private land.

1.4 On 7 and 8 January 2003, a dry storm swept across the predominantly forested and alpine areas of North East Victoria and Gippsland, and lightning strikes started over 80 fires. While the majority of these were controlled within a few days (17 remained by 11 January), a small number were unable to be controlled and ultimately joined to form the fire complexes in the North East and Gippsland areas. In terms of area burnt, these fires were of a scale approaching that of the devastating Black Friday fires of 1939. They eventually burnt approximately 1.1 million hectares of land in Victoria, including more than 108,000 hectares of private land.

1.5 Public and private assets were destroyed and environmental amenity compromised. Coming on top of the unbroken drought, the length and severity of the fire season tested the capacity of fire agencies and community resources. Victorians witnessed the personal toll on communities and firefighters. The fires also captured unprecedented attention from the media and Victorians generally.

1.6 When we compare outcomes of the 2002-2003 fires to extreme fire events from Victoria's past – taking into account six consecutive years of drought – they are not as severe as they might have been. Given the eventual scale of the fires, loss of property and assets were significantly below what might have been expected. No lives were lost as a direct result of the fires and injuries were minimal.

1.7 However, some communities were severely affected by fire and felt let down by the fire services. Others lived with the threat of fire for days and even weeks. Many individuals and communities were engaged in the firefighting effort for a protracted period requiring them to put aside their normal businesses or employment. Many businesses in the affected regions suffered losses.

After the Fires: Questions

1.8 It is not surprising then that fires of this scale generated a wide range of views, including considerable criticism of the management of our forests. For many of those most affected, the fire season was seen as avoidable – the result of perceived negative changes in Victoria's public land management regime over many years.

1.9 For others, the recent fires were a repeat of 1939 where fires also followed a severe drought; they were a harsh reminder that the Victorian environment is subject to periodic, extreme bushfires.

1.10 The fire experience in Victoria, the repeated fire events in New South Wales and the devastation caused by bushfires in the Australian Capital Territory, caused many Victorians to ask: Could Victoria have prevented these fires? Were there problems with how the fires were suppressed?

1.11 A range of significant issues has been raised about these fires, in particular the management of public land to reduce fire risk and the way in which the fires were fought.

1.12 It was in this context that the Emergency Services Commissioner was invited to chair an Inquiry into the 2002-2003 Victorian Bushfires. Under section 21c of the *Emergency Management Act 1986*, the Commissioner is required to monitor the performance of emergency service agencies and to advise, make recommendations and report to Government on any issue in relation to emergency management (prevention, response and recovery).

Victoria is not alone in experiencing fire events such as that of last fire season. Parts of Europe and Canada have also experienced extreme fire weather over the summer of 2003.

- More than 800 forest fires in Canada have burned more than 345,000 acres and resulted in the deaths of two firefighters by the 18th August 2003.
- On 26 August a fire in British Columbia, Canada approached a heavily populated area, destroyed 200 homes and forced 30,000 to leave their homes. This fire was the eighth fire to threaten a populated area this summer, unprecedented for British Columbia.
- Portugal has had the worst fire season on record with 19 people killed, and 362,000 hectares burned.
- In France and southern Italy large areas have been burned. Five people died in France and tens of thousands of hectares of woodland burned.

The summer of 2003 has clearly been an extreme fire year in the northern hemisphere with threat to urban areas in Canada and more than five times the average area burned across France, Italy and Portugal.

1.13 The Government requested that the Inquiry report at the end of September 2003 to allow maximum opportunity to implement recommendations prior to the 2003-2004 fire season.

Terms of Reference

1.14 The Terms of Reference for the Inquiry were to:

1. Examine the effectiveness of preparedness for the 2002/03 bushfire season, including hazard reduction and mobilisation of resources;
2. Assess the effectiveness of the response to the 2002/03 bushfires, including emergency management procedures, cross agency response and co–ordination and resource deployment; and
3. Provide recommendations for future bushfire management strategies, including any required improvements to existing emergency management arrangements including public communications, community advice systems, infrastructure, training and overall resourcing.

Expert Input to the Inquiry

1.15 Two independent experts were appointed to the Inquiry. They are:

- Dr Malcolm Gill, Honorary Research Fellow, retired from CSIRO Plant Industry, Canberra. Dr Gill has published widely on wildfire and its role in forest ecosystems in Australia and was awarded an Order of Australia Medal in 1999 for his contribution to research on bushfires and the environment; and
- Professor Neal Enright, School of Anthropology, Geography and Environmental Studies, and Executive Director, Office for Environmental Programs at the University of Melbourne. Professor Enright specialises in the fire ecology of plants, re–vegetation and rehabilitation, has been published widely and has conducted extensive research and consultation.

1.16 Their appointment brought a breadth of knowledge in bushfire behaviour and environmental science to the Inquiry to complement the expert knowledge of the Emergency Services Commissioner in the planning for, and management of, emergency situations. The Inquiry members were supported by a Secretariat located in the Department of Premier and Cabinet.

How the Inquiry was Conducted

1.17 The Inquiry members approached the task with no predetermined views about the eventual findings. Considerable time was spent building an understanding of the fire events themselves, their impacts on communities and the environment, the quality and efficacy of planning and what was done to prevent and suppress the fires. A wide range of issues requiring consideration were identified. A phased process was developed to explore and evaluate these issues.

1.18 The Inquiry called for public submissions by 30 May 2003 as a way of framing the key issues for consideration. Inquiry members then toured Victoria, following the path of the fires in North West and North East Victoria, East Gippsland and Gippsland, talking in situ to firefighters, incident controllers, regional and local staff of DSE, the Department of Primary Industries, Parks Victoria and the CFA.

1.19 The Inquiry received 273 submissions from a range of individuals and organisations. These are listed at Appendix I. These submissions, combined with a substantial volume of information gathered during and after the tour of fire-affected areas (from public land managers, and staff and volunteers of the fire agencies), allowed us to understand the community's principal issues of concern.

1.20 This was followed by a series of meetings with community members, Local and State Government Departments and agencies, and other organisations. These discussions were held at most of the fire-affected areas on farms and plantations; at the site of fires; at CFA sheds and fire stations; at DSE, CFA and PV offices; at shire offices and community halls – as well as in Melbourne.

1.21 In all, Inquiry members met over 400 people, both individually and in small groups and these are listed in Appendix II. This process ensured a broad cross section of the community had the opportunity to put their views to the Inquiry.

1.22 While submissions were not protected by parliamentary privilege, Inquiry members are unanimous in their view that information was provided in an open way by volunteers and agency staff involved in land management or fire suppression, and by community members.

1.23 The public consultations allowed Inquiry members to hear and discuss community and individual concerns, ensure everyone had a say, and draw out community views on the Terms of Reference – specifically, how fire prevention and suppression and community recovery could be improved or strengthened. Comments and criticisms were surprisingly uniform around the State, and issues raised with the Inquiry fell into a series of themes repeated from the far North West to the far South East of the State. These are outlined in Chapter 5.

1.24 The Inquiry's public consultations also provided an opportunity for expression of rural anger. Most affected communities were in drought prior to the fires and, following the fires, remained in drought – but with less feed and water available for their remaining stock, a need to rebuild fencing and make good other fire suppression works combined with, in some cases, significant loss of tourism in their community.

1.25 Communities were asked what they wanted to see in the Inquiry recommendations to prepare and respond better for future bushfires. Solutions covered the full spectrum of views but were consistent in seeking greater effort by all parties to fire prevention planning, more community involvement in decision making and better use of local knowledge in fire suppression.

1.26 The Inquiry made it clear that its recommendations would be developed independent of Government and of the public land management agencies and fire services. However, we also stressed that the success or failure of the final recommendations would rely to a large extent on all parties implementing and owning the outcomes. Communities need to move forward in partnership with Local Government, Departments, agencies and the CFA.

1.27 Inquiry members informed communities and government agencies that, to the extent possible, recommendations would be tested or 'ground truthed' with selected communities. Accordingly, a number of return visits were made and this process commenced as the consultations continued over the six weeks of rural visits. Emerging themes were discussed with individuals and groups.

1.28 In addition to considering submissions and participating in public meetings, the two expert Inquiry members, Dr Malcolm Gill and Professor Neal Enright, undertook scientific research into some of the issues associated with prescribed burning and its value in suppressing and reducing bushfire intensity. They also examined the climatic conditions that existed over the fire season and how these compared to previous years, especially those years when significant bushfires occurred.

1.29 Additionally, an external review of the effectiveness of the management of aerial firefighting resources over the fire season was undertaken and the outcomes of this review form part of the final report (Chapter 22).

1.30 The Inquiry also examined the *Emergency Management Act 1986* and arrangements in place, the findings and implementation of previous bushfire inquiries and reviews and the adequacy of co-ordination between DSE and the CFA in fire planning/prevention and response for rural Victoria.

Aims of this Report

1.31 The purpose of the Inquiry has been to learn from the recent bushfire experiences in order to further improve Victoria's preparedness and response to future fire and other emergencies.

1.32 Reviews following any large-scale emergency identify both successes and mistakes. They also identify lessons to be learnt and improvements to be made. In saying that, the Inquiry's purpose has not been to attribute blame nor to engage in the public humiliation of individuals working on behalf of their community or organisation, paid or unpaid.

1.33 Rather, the Inquiry has identified areas for improvement in fire prevention planning, preparedness and response and developed realistic recommendations to ensure a longer-term continuous improvement strategy is implemented for Victorians. Systemic problems and issues requiring policy change by Government, or changes to the State's emergency management arrangements, were of critical interest.

1.34 Our report aims, first and foremost, to be a constructive document that provides recommendations for enhanced bushfire safety in Victoria. The report acknowledges positives such as progress made in Victoria's Emergency Management arrangements since 1983 and the significant improvement in co-operation and co-ordination across the many agencies involved during and after the fires. To some extent, it also aims to be educative, providing the context for a discussion of fire in the Victorian environment, a framework for rational debate and a way forward based on objective data and evidence.

1.35 The report has five Parts. Part A sets the scene for our later analysis. Parts B and C respond to the first Term of Reference and look at fire on public land and community and agency preparedness. Part D tackles the complex questions of response and recovery and addresses the second Term of Reference. Part E looks forward and makes recommendations for the future in line with the third Term of Reference.

1.36 Among other things, the report deals with many of the criticisms made in submissions and in consultations. It cannot, however, engage in point by point forensic analysis of every incident raised with the Inquiry. Instead, we note distinct themes and commonality of purpose and provide recommendations based on evidence and research. In saying this however, five case studies and the lessons learnt are discussed in Parts C and D.

1.37 The report also discusses in detail the efforts of the two principal fire suppression agencies, DSE and the CFA, during the North East and Gippsland fires and their relationship with the other agencies engaged in fire and emergency management. We comment on the effectiveness of arrangements now in place and recommend changes for the future.

Interim Report: August 2003

1.38 The Inquiry was invited to present an Interim Report to Government if issues were identified that needed immediate attention. The Inquiry took this opportunity and an Interim Report was forwarded to Government in August 2003. The report contained six recommendations concerning prescribed burning, use of local knowledge, fencing policy, rehabilitation and protection of water catchments. The Premier released the report on August 26, accepting all recommendations. The Interim Report of the Inquiry into the 2002-2003 Victorian Bushfires is at Appendix III.

Chapter 2
The Changing Victorian Environment

Overview

2.1 Victoria has one of the most fire-prone environments in the world due to the combination of its landscape and vegetation with climate and weather conditions. Add to this mix Victoria's high population density relative to other States, and the dispersed nature of rural and regional assets, and we have a high-risk fire environment for many Victorians.

2.2 The Victorian landscape has always been subject to fire, with much of the flora and fauna necessarily adapted to particular fire regimes.[1] It has been estimated that prior to the 1840s, around 88 per cent of Victoria was covered by forests or woodland. Extensive clearing, mostly for agriculture, led to considerable change in the vegetative cover. Combined with the ever-increasing population, this influenced the pattern of fires and fire risk to which the land and people were (and are) exposed.

2.3 Despite advances in our approach to the prevention and management of fire, the recent fire season demonstrates that the State remains at high risk of fires including major fire events. Given that higher temperatures, changes in rainfall, and consequent altered ecosystem dynamics may lead to an increased fire risk for Victorians, we argue it is important to have systems in place to meet wider changing circumstances.

The Victorian Landscape

2.4 This section looks at Victoria's diverse geography and landscape and notes areas of particular concern in relation to fire risk.

2.5 Victoria is traversed by the Great Dividing Range – a series of low hills in the west that increases in height across to the New South Wales border in the North East of the State. However, in western Victoria, the term 'range' is not a good description for the plateaux and ridges which are generally relatively low and undulating, with only a few peaks reaching more than 1,000 metres. There are areas of woodland and shrubland across parts of these uplands, as well as in the Grampians. The Grampians National Park contains the main area of fire-prone, rugged forested ranges in the west. Lightning has ignited a significant number of fires there over the years, posing a fire risk to surrounding properties.

2.6 To the north is the area called the Wimmera – the riverine plain and the Mallee dunefields which are largely flat and increasingly arid, with large areas of broadacre cropping and some grazing. The natural vegetation of the Mallee is mainly sparsely vegetated shrubland, most of which remains in the park areas of the Little Desert, Big Desert, Wyperfeld and the Sunset Country.

2.7 Fire has shaped this landscape, and the management of these park boundaries with private land is therefore given priority from the point of view of fire mitigation and impact on local communities.

2.8 South of the ranges is mainly farmed coastal plain, with the exception of the forested Otway Ranges which have experienced significant fires and adjoin major coastal resort areas that rely predominantly on tourism. The region's wool industry has contributed significantly to Victoria's wealth in the past. However, over recent years it has lessened with the rise of other land use. A large proportion of the growth in private plantations (i.e.100,000 hectares) across Victoria during the past five years has been mainly in the South West, largely replacing areas previously used for sheep grazing.

2.9 Grass fires are a risk to pasture, cropland areas and plantations across the plains and undulating hills of the western district and North West. Significant grass fires occurred in 1944 (burning more than 1 million hectares of grassland) and 1977 (103,000 hectares were burnt), as illustrated in Table 2.1.

2.10 In central Victoria the ranges begin to rise, with the urban areas of Melbourne on the plains to the south. North of the central ranges is the riverine plain which extends to the Murray River, supporting a large proportion of Victoria's high-value agriculture. The ranges north west of Melbourne are characterised mostly by relatively low elevations with scattered areas of forest in small National and State Parks such as Macedon Ranges, Wombat State Forest and Lerderderg Gorge. Despite the fragmented nature of forests across this region, the growing population in these areas makes them of concern for fire safety and asset protection. To the near east of Melbourne, the eucalypt forests across the Dandenong and Yarra Ranges provide high environmental amenity for the encroaching suburban population, but also pose a significant fire risk.

1 Plants and animals are adapted to sequences of fire rather than one single event; these sequences are called 'fire regimes'. Effects of individual fires on the environment can be observed at the time but the state of the environment at the time of each fire is likely to have been influenced by the effects of the previous fire event.

North East Alpine Areas

2.11 It is in the North East of the State that the ranges become rugged, mountainous alpine areas. The region is covered by extensive areas of normally cool, moist temperate forest such as Mountain Ash, as well as drier sclerophyll forest at lower altitude and on drier slopes. Moist gullies are filled with tree ferns. These worn, rounded mountains are high by Australian standards, reaching over 1,900 metres. There are many steep slopes making access very difficult across much of the region.

2.12 On the high plains, low alpine vegetation and Snow Gums predominate across the middle of the highest ranges providing the environment for winter snow-based recreation and, in summer, tourism and some cattle grazing. But the chief characteristic of their terrain is forested mountain ridges interspersed with long river valleys to the north and south, many of which contain scattered, isolated farming communities that are frequently exposed to high levels of fire risk. These valleys to the south gradually widen to become coastal plains across much of Gippsland, although at the easternmost end, the forested ranges extend almost to the sea.

Gippsland

2.13 The population of East Gippsland is relatively low and mostly confined to coastal villages and towns around a predominantly public estate of forested land. Small pockets of agriculture are interspersed within the steeper terrain. Farmland in central and west Gippsland provides an important source of agricultural income and supports a higher population in towns such as Warragul, Traralgon, Moe and Morwell. The mountain ranges in the east of the State provide much of the water for Melbourne via the Thomson Dam and water from the northern slopes feed Eildon and Dartmouth (to name but two water storages), and the Murray River.

Fire in the Victorian Environment

2.14 Fire has been a natural phenomenon within the Australian and Victorian landscape since time immemorial. However, the extent of fire appears to have increased with European settlement. (Chapter 12 discusses this in more detail.)

2.15 The recent history of bushfires demonstrates the nature of disastrous fire in the Victorian environment. A study in 1986 estimated that in the past 100 years,[2] more than two thirds of Australian bushfire-related deaths and more than half of the significant bushfire-related property losses occurred in Victoria.

2.16 Particular fire seasons such as 1939 and 1983 tend to be remembered for their severe impacts. Figures 2.1, 2.2 and 2.3 illustrate the areas burnt during the 1939, 1983 and 2002-2003 fires.

2.17 The number of fires and the size of area burnt give one perspective on the history of bushfires in Victoria but the impacts on life and assets provide another. Loss of life, property and other assets cannot be solely predicted by the number and severity of fires. Some relatively small fires have had a significant impact. These fires, as well as large-scale fires, have contributed significantly to fire-management arrangements.

2.18 Table 2.1 is a summary of significant fire events on all land across Victoria from 1851 through to 2003.[3] It lists impacts on life and assets.

2.19 Additional historical information is provided at Appendix IV (Fires on Public Land - Historical Data) and details the annual number of wildfires attended by public land managers between 1921 and 2003 and the area burnt.

2 J. Hickman & M. Tarrant (1986) '*Australian Bushfires and their Real Cost*', Fire Science, 4th Australian National Biennial Conference, 21–24 October, Perth, Institution of Fire Engineers, Perth.

3 While there is a lack of accurate information, particularly regarding fires during the nineteenth century, a significant fire event in 1851 reportedly affected about a quarter of the State. The information has become more reliable during the twentieth century with better record keeping, especially for fires since 1939.

Table 2.1: Significant Fire Events in Victoria[4]

Date	Location	Losses and area affected
Black Thursday 6 February 1851	Wimmera, Portland, Gippsland, Plenty Ranges, Westernport, Dandenong districts, Heidelberg	Approx. 12 people One million sheep Thousands of cattle Approx. five million hectares (a quarter of Victoria)
Red Tuesday 1 February 1898	South Gippsland	12 people 2,000 buildings 260,000 hectares
Early 1900s (esp. 1905, 1906, 1912, 1914)	Gippsland, Grampians, Otway Ranges	Varied (100,000 hectares in 1914)
1926	Noojee, Kinglake, Warburton, Erica, Dandenong Ranges	60 people Many farms and houses
1932	Many districts across Victoria, particularly Gippsland	9 people
Black Friday 13 January 1939 (December 1938–January 1939)	Large areas of the North East and Gippsland, the Otway and Grampian ranges and the towns of Rubicon, Woods Point, Warrandyte, Noojee, Omeo, Mansfield, Dromana, Yarra Glen, Warburton, Erica	71 people More than 650 homes/shops 69 timber mills 1.5–2 million hectares
3–4 March 1942	Hamilton, South Gippsland – Yarram (burning on a 60 mile front)	1 person 100 sheep 2 farms More than 20 homes
22 December 1943	Wangaratta	10 people Thousands of acres of grass country
14 January 1944	Central & western districts	49 people 500 homes Huge stock losses More than one million hectares of grassland and 160,000 hectares of forest
14 February 1944	Morwell, Yallourn	Plant, works, open cut mine and buildings
5 February 1952	Benalla area	Several people 100,000 hectares
14 January 1962	The Basin, Christmas Hills, Kinglake, St Andrews, Hurstbridge, Warrandyte, Mitcham	More than 8 people 454 homes
17 January 1965	Longwood	7 people (all from one family) 6 houses
21 February–13 March 1965	Gippsland	More than 60 homes/shops More than 4,000 stock 300,000 hectares of forest 15,000 acres of grassland
19 February 1968	Dandenong Ranges, The Basin, Upwey	64 homes and other buildings 1,920 hectares

4 This list is not definitive but gives an idea of the major fire events, particularly after 1939 when the reliability of information increases.

Date	Location	Losses and area affected
8 January 1969	280 fires broke out affecting Lara, Daylesford, Bulgana, Yea, Darraweit, Kangaroo Flat, Korongvale	22 people 230 homes 21 schools/church/halls More than 12,000 stock 250,000 hectares
December 1972	Mt Buffalo	12,140 hectares
12 February 1977	Penshurst, Tatyoon, Streatham, Creswick, Pura Pura, Werneth, Cressy, Rokewood, Beeac, Mingay, Lismore, Little River	4 people more than 100 houses/shops Approx. 200,000 stock 103,000 hectares
15 January 1978	Bairnsdale	2 people 1 house 6,500 stock
28 December 1980–6 January 1981	Sunset country and the Big Desert	119,000 hectares
31 January 1983	Cann River	250,000 hectares
1 February 1983	Mt Macedon	50 houses 1,864 hectares
Ash Wednesday 16 February 1983	Monivae, Branxholme, Cockatoo, East Trentham, Mt Macedon, Otway Ranges, Belgrave Heights, Warburton, Cudgee, Upper Beaconsfield, Framlingham	47 people More than 27,000 stock Over 2,000 homes/shops 210,000 hectares
14 January 1985	Avoca/Maryborough, Little River, Springfield, Melton	3 people 182 homes 400 farms 46,000 stock 50,800 hectares
27 December 1990	Strathbogie	1 person 17 homes More than 12,000 stock
23 Feb 1995	Berringa	10,000 hectares (mostly forest)
21 January 1997	Dandenong Ranges, Creswick, Heathcote, Teddywaddy, Gough's Bay	3 people 41 houses 400 hectares
December 31 1997–9 January 1998	Caledonia River area of the Alpine National Park, Carey River State Forest	32,000 hectares
2 December 1998	Linton	5 CFA firefighters, 1 CFA tanker 780 hectares
17–19 December 2000	Dadswells Bridge	29,000 hectares of grassland
17–31 December 2002	Big Desert	1 abandoned house 181,800 hectares
8 January–8 March 2003	Over 80 fires started by lightning, North East Victoria, Gippsland	1 person (indirectly) 41 houses 9,000 livestock 1.1 million hectares

Sources: CFA website; DPI/DSE website; R.H. Luke and A.G. McArthur, *Bushfires in Australia*, AGPS, 1978; Reports of the 1939 and 1944 Royal Commissions; A.G. McArthur, N.P. Cheney and J. Barber, *The fires of 12 February 1977 in the Western District of Victoria*, CSIRO and CFA, 1982; R. Murray and K. White, *State of Fire: A History of Volunteer Firefighting and the Country Fire Authority in Victoria, CFA, 1995*.

Figure 2.1: The 1939 Fires

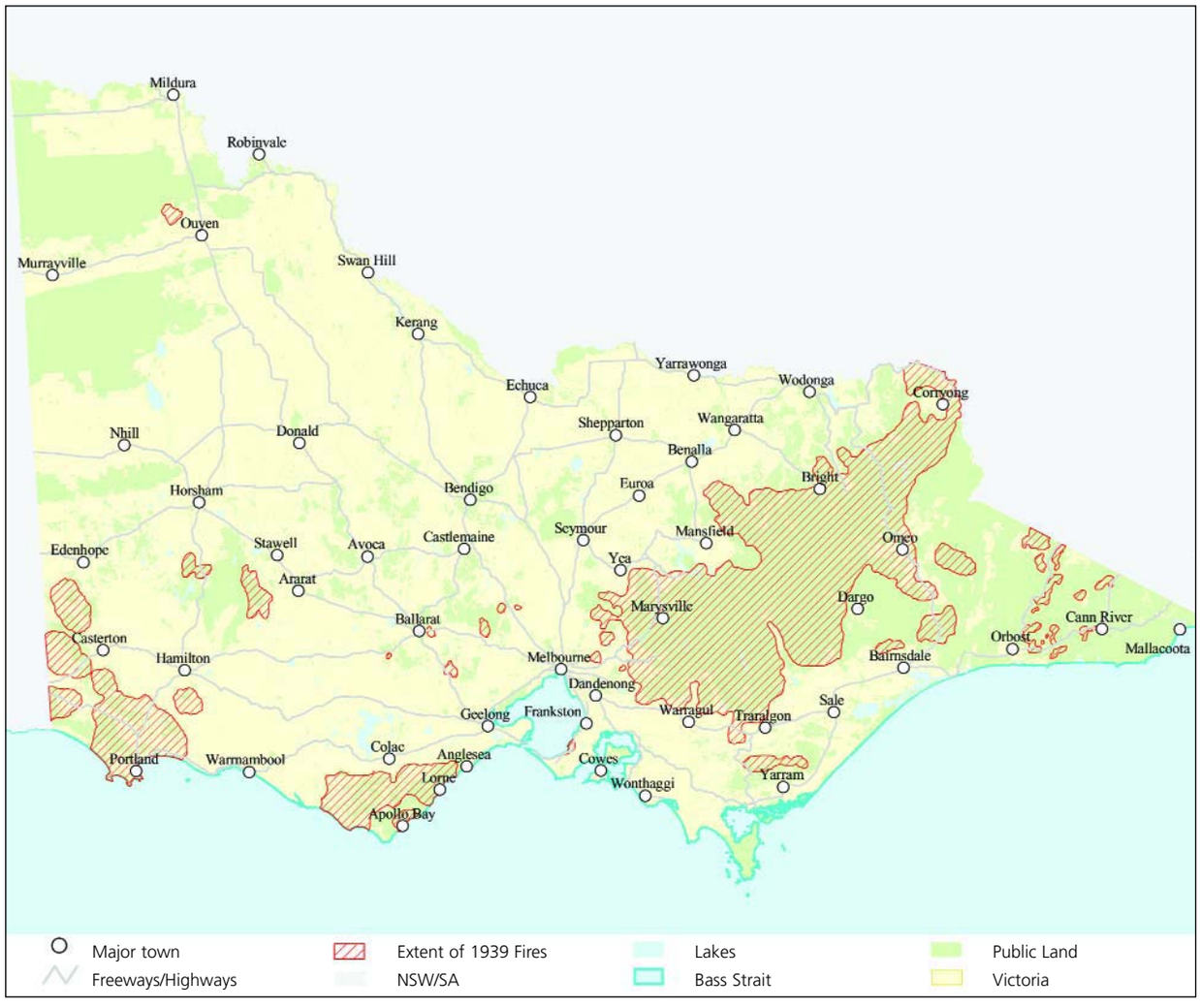


Figure 2.2: The 1983 Fires

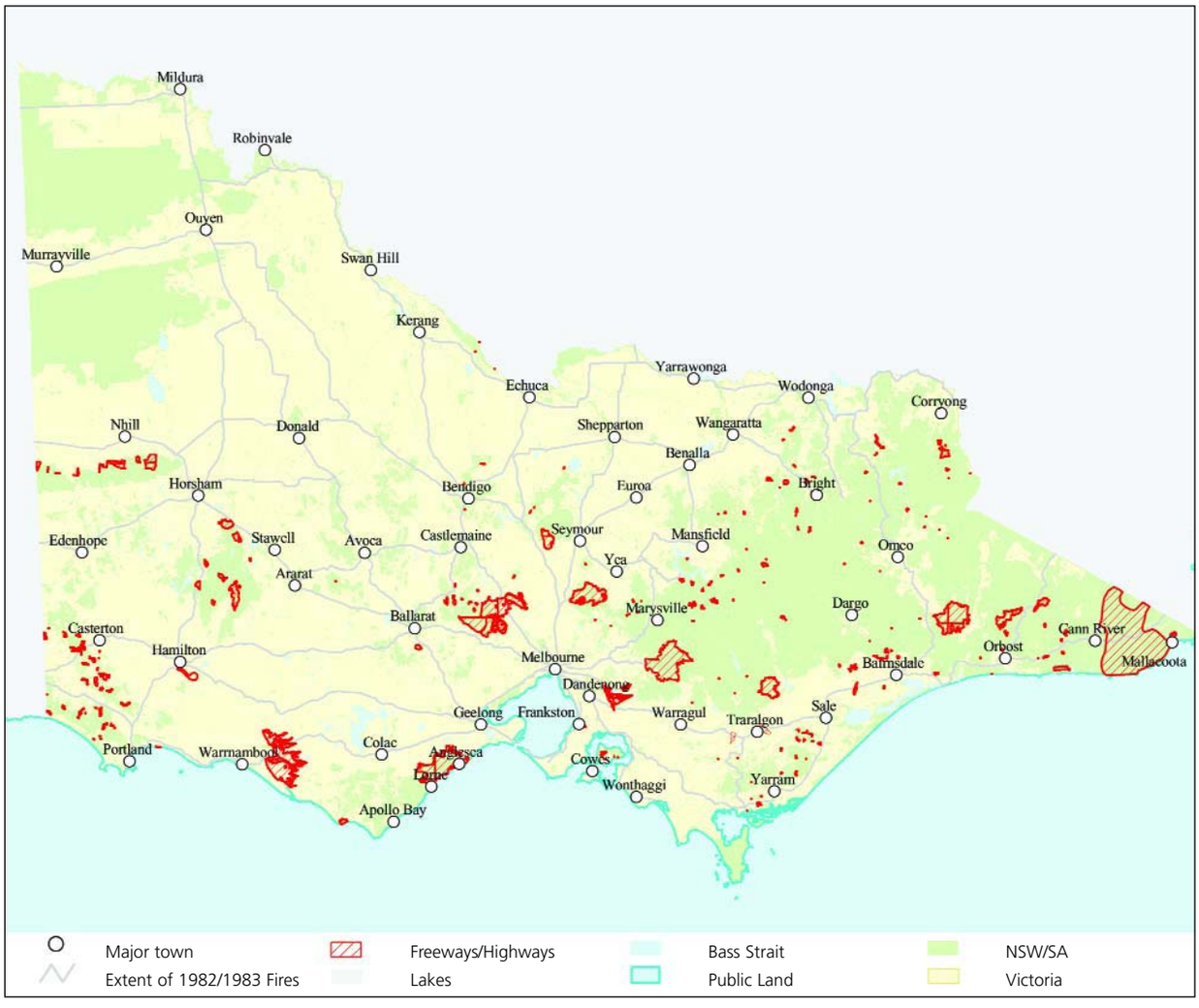
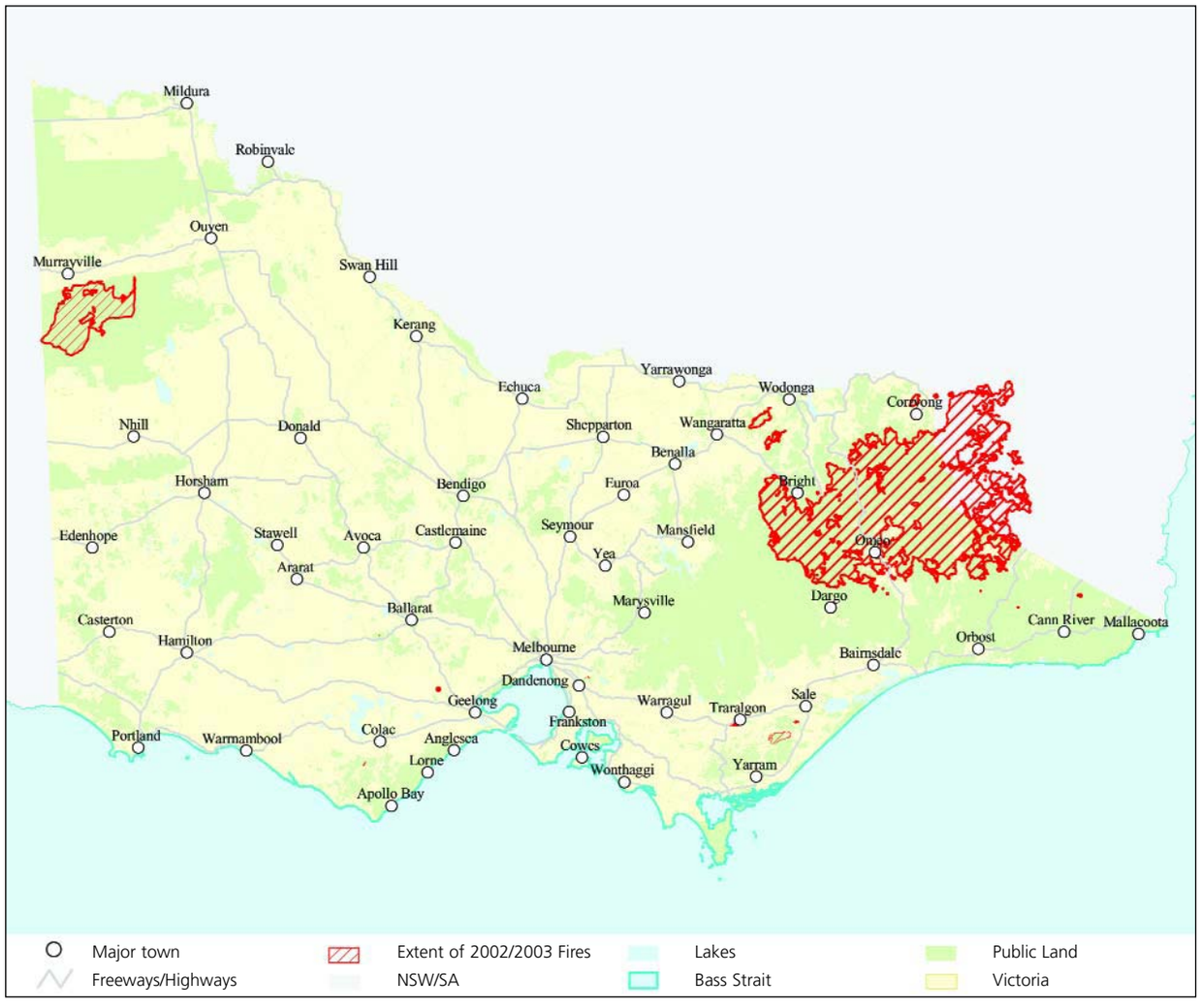


Figure 2.3: The 2002-2003 Fires



Exposure of People and Assets to Bushfire Risk

Population Density

2.20 Victoria has the highest density of population in Australia with one quarter of the nation's population occupying just three per cent of Australia's total land area.[5] The population of Victoria at 30 June 2001 was 4.83 million, with approximately 1.30 million people living in rural and regional areas outside the Melbourne Statistical Division (broadly the greater Melbourne area).[6]

2.21 Most of the people living in rural and regional Victoria are exposed to bushfires since, apart from regional town centres, bushfires occur across all parts of the rural landscape putting lives, houses, farms, businesses and a range of other public assets at risk. People living and working on the fringes of metropolitan Melbourne and regional towns are also at significant risk as demonstrated by the Ash Wednesday fires in 1983, which resulted in 47 deaths. Table 2.1 includes major fires that have occurred on the Mornington Peninsula, the Western grasslands and across the Macedon, Dandenong and Yarra Ranges.

Agricultural Assets

2.22 Agricultural production currently occupies around 56 per cent of the State's land base. Of this, the major land use is broadacre dryland pasture and broadacre cropping, approximately 95 per cent of agricultural land.[7] The remainder consists of irrigated pasture, horticulture and plantations.

2.23 A range of high-value agricultural assets is therefore exposed to fire risk, including stock, pasture, plantations and other crops. Some farmers made the value of these assets clear to the Inquiry when they stated that protection of these agricultural assets was a higher priority than their houses. Similarly, plantations represent valuable assets that are very vulnerable to fire. While there have been changes in agricultural land use across Victoria over the years, particularly the change from grazing to private forestry, the impact of these changes on total fire risk is not clear.

2.24 The area of farmland and number of farms has declined, especially since the early 1970s. At the same time, tourism has become a key growth industry in regional Victoria, particularly in areas of scenic quality. Visits to National Parks have increased between one and six per cent per annum for the past 10 years.[8] Increased tourism has contributed to greater value being placed on the natural environment in many rural areas.

Public Land

2.25 Approximately two thirds of the State's land area is privately owned and the remaining third, some 7.7 million hectares is public land, principally parks and forests. Heightened community awareness of conservation issues has led to an increase in the area of National Parks at the expense of State Forests. The area of protected parks in Victoria (National Parks and other protected parks and reserves) has progressively expanded from some four per cent of the State in the early 1970s to approximately 16 per cent or 3.6 million hectares today.[9]

Timber Production

2.26 The area of State Forest is 3.5 million hectares, of which just over one million is managed sustainably for timber production under the co-ordination of DSE. The remainder is in reserves for ecological and recreational use.

2.27 Commercial State Forests supply timber that in 2001–2002 totalled 2,216,000 cubic metres (gross).[10] From this, 741,000 cubic metres (or approx 33 per cent of total volume) of sawlogs was produced. Through recent policy developments (*Our Forests Our Future* released in February 2002), a proposal to reduce licensed sawlog volumes by approximately 30 per cent Statewide has been agreed and implementation strategies are being developed.

5 Government of Victoria, *Atlas of Victoria* 1982, J. S. Duncan (ed), p82.
6 Australian Bureau of Statistics, 2002 Victorian Year Book, pp 7-8.
7 Australian Bureau of Statistics, Agricultural Census 2001.
8 Source: Victoria Research, Parks Victoria.
9 Department of Natural Resources and Environment – Submission to Linton Coronial Inquiry, Sept 2000 and Park Victoria – State of the Parks 2000.
10 This represents $39,38m and $25.566m respectively product charge invoiced, which is made up of the royalty, roading and silviculture charges. Source: Forests Service.

Public Land and Private Property

2.28 There are approximately 60,000 kilometres of boundaries between public land and private property.[11] Issues associated with the interface between public and private land, such as the spread of fires, weeds and feral animals, has been the source of community debate for many years. There are concerns about the cross-boundary impacts of native animals on private pastures and crops, of livestock on forest understories, and of pest plant and animal problems. The interface also provides a source of concern in terms of fire risk.

2.29 The recent fire season saw fires originating on public land, typically from lightning strikes, and burning across the boundary into private property. By clearing valleys and plains, European settlement has created steeper, more inaccessible and marginal farming country that generally has remained as public land. This type of country is not only more prone to lightning strikes, it is more likely to be heavily vegetated, providing ready fuel for bushfires.

2.30 The boundary with private land is sometimes the point where access is easier and fuel loads change, providing a point at which the fire is likely to be fought and controlled more easily. While public land may pose a risk to private land it should also be noted that fires do originate on private property, presenting a threat to public land.

Population and Cultural Change

Population Decrease in Some Fire Risk Areas

2.31 Since European settlement, fundamental population changes have occurred across rural Victoria. While the population increased significantly during the nineteenth century, this trend has reversed in the second half of the twentieth century. The modernisation of agriculture from the 1950s saw changes that resulted in fewer jobs in the primary industry sector, precipitating population loss across many rural areas, particularly in the west of the State.[12] A cycle of decline became cumulative in these areas, contributing to a concentration of settlement around large metropolitan and regional centres, declining small towns, and an ageing rural population.

2.32 An important implication of the decreased population in these rural areas has been the reduced capacity of communities to participate in CFA and DSE summer crews and the State Emergency Service. For example, the number of CFA volunteers, particularly rural volunteers, has declined around 4.2 per cent per year during the last decade.[13]

Population Increase in Some Fire Risk Areas

2.33 There has been significant population increase in areas within commuting distance of Melbourne – in both regional towns and areas of high landscape amenity. For example, the extended Melbourne commuting region, and the Melbourne weekend and rural retreat region, both experienced population increases of around 38 per cent between 1976 and 1991.[14] Second homes are generally found in some of the major urban centres and coastal, historic, hobby farm and recreation zones. This means that population increases have occurred in areas at high risk of bushfires, particularly those located in and near forest and coastal heathland.

2.34 There has also been a significant increase in tourism throughout regional Victoria with employment in tourism-related services representing more than 25 per cent of the workforce in some areas.[15] Some newer residents in these areas may have no experience with fire and be unaware of how to protect themselves and their property from fire.

2.35 An even greater population increase between 1976 and 1991, of 122.5 per cent, was experienced on the Melbourne urban-rural fringe where many properties are exposed to high bushfire risk.[16] These population trends continue despite fires such as Ash Wednesday in 1983, the 1997 Dandenong Ranges fires and the Sydney fires in 1994 and 2001-2002.

11 Auditor-General Victoria, *Fire Prevention and Preparedness*, May 2003.
12 Department of Infrastructure, *Regional Matters – Atlas of Regional Victoria 2002*, pp 10-13.
13 Submission to the Inquiry by the Country Fire Authority, *From the Foothills to the Alpine Heights 2003*, p. 211.
14 T. Budge, 'Population decline in Victoria and Tasmania' in P.W.Newton and M.Bell (eds) *Population Shift – Mobility and Change in Australia* published by AGPS, 1996 pp 193–4.
15 Department of Infrastructure, *Regional Matters – Atlas of Regional Victoria 2002*, p. 27.
16 T. Budge, 'Population decline in Victoria and Tasmania' in P.W. Newton and M. Bell (eds) *Population Shift – Mobility and Change in Australia* published by AGPS, 1996 pp 193–4.

Cultural Change: Changing Attitudes to Fire

2.36 The search for landscape amenity has been paralleled by an increased interest in environmental issues and conservation. This is shown by the increased membership of conservation and similar groups, including membership in rural areas. For example, the State Government's Land for Wildlife program, in which landholders are supported to provide habitat for native wildlife, has grown to over 5,800 properties in Victoria since 1981. The Victorian National Parks Association now has some 16,000 members and supporters, around half located outside of Melbourne.[17]

2.37 A major change has also taken place in attitudes about the place of fire in the Victorian landscape. In the early days of European settlement in Australia, fire was an important tool for farmers and many others to assist with clearing and stimulating pasture growth. The widespread use of fire, as well as carelessness in its use, is clear from the Report of the Royal Commission into the 1939 bushfires. Since then, however, attitudes to fire have slowly changed so that where fire is used it is controlled and recognises safety issues.

2.38 Nevertheless, reports following the 1939 and 1977 major fires identified apathetic attitudes towards fire except where danger was immediate.[18] Increasing concern about the impacts and risks of prescribed burning – impacts on ecological values and health; risks to property and businesses such as tourism – has also led to apathy around bushfire prevention. In recent years, considerable effort has been put into community education to increase awareness and preparedness for bushfires. This issue of public awareness and preparedness is discussed further in Chapter 13.

Changes in Victorian Response to the Threat of Unplanned Fire

Changes to Legislative and Organisational Structures

2.39 The response of early Victorians to the threat of fires was initially reactive and ad hoc. During the second half of the nineteenth century, fire brigades and volunteer town and bush brigades slowly evolved to help protect lives and assets. In 1890, the *Fire Brigades Act*[19] established the separate responsibilities of the Metropolitan Fire Brigades Board and Country Fire Brigades Boards and ensured some consistency in their funding. However, the country brigades remained relatively small, scattered and inadequately organised to meet the threat of any major bushfires as their primary focus was townships and the (then) outer metropolitan area.

2.40 By 1914, a second fire brigade movement was gaining momentum – the bush fire brigades, centred on rural landowners. These brigades, the forerunner to the Rural Brigades,[20] were informal and had no formal source of funding. In 1928, the Bush Fire Brigades Association was formed to provide a voice.

2.41 In 1926, bushfires led to significant loss of life and property in Victoria and subsequent efforts were made to improve legislation and systems for fire management. However, in 1939 the largest bushfires in living memory occurred, resulting in 71 lives lost in one day and considerable loss of assets.

2.42 The subsequent Stretton Royal Commission[21] eloquently highlighted the need for Government to address wildfire prevention and suppression needs on all rural land in Victoria. The Government of the day did not immediately act on the findings.

17 Source: Victorian National Parks Association.

18 Stretton, L.E.B, *Report of the Royal Commission to Inquire into the Bushfires of January*, 1939 and *Report of the Board of Inquiry into the Occurrence of Bush and Grass Fires in Victoria*, 1977.

19 *The Fire Brigades Act 1890* established the Country Fire Brigades Board (CFBB) and the Metropolitan Fire Brigades Board. The CFBB had extensive powers and responsibilities over volunteer fire brigades that were based more than 10 miles from Melbourne. Funding was provided in equal parts from the state of Victoria, from municipalities and from companies insuring against fire.

20 Bush Fire Brigades were the forerunner to the CFA Rural Brigades and were groups of landowners who banded together to replace the old informal arrangements. A formal organisation to support Bush Fire Brigades did not exist until 1928 when the Bush Fire Brigade Association was formed. Bush brigades relied chiefly on levies placed on landowners and donations from volunteers and the community.

21 Stretton, L.E.B, *Report of the Royal Commission to Inquire into the Bushfires of January*, 1939.

2.43 Following further extensive fires in 1944 and a second Stretton Royal Commission[22] the Government legislated for clarity in the organisational arrangements. Responsibility for wildfire prevention and suppression on public land went to the Forests Commission (a responsibility now assumed by the Secretary of the Department of Sustainability and Environment [DSE]) and the remainder of rural Victoria to the Country Fire Authority (CFA), which replaced and subsumed the Country Fire Brigades Board and the Bush Fire Brigades. In the area of fire prevention and planning, the CFA was to work with Local Authorities and their designated 'Proper Officer' (now the Municipal Fire Prevention Officer). This model continues today. The CFA commenced operation on 1 January 1945.

2.44 In managing fires on public land, DSE and previous government agencies have always relied primarily on paid employees, permanent and casual, as has the Metropolitan Fire and Emergency Services Board. However, on private land, the tradition of volunteer firefighting continues to this day in the CFA, with 1,129 career (including support and administrative) staff and 57,985 volunteers involved in fire management on private land and other support roles.

Changes to Science, Technology and Administration

2.45 Not only did the legislative and organisational structure for fire prevention and suppression change over the last century, so did the science, technology and administration. These changes have broadly been in the areas of:

- Increased emphasis on research and development into the science and ecology of bushfires in order to develop a greater understanding of fire behaviour and the factors influencing this;
- Increased use and understanding of fuel reduction and other fire mitigation strategies to reduce fire intensity and assist in fire suppression (discussed in detail in Part B of this report);
- Increased investment in research and development into firefighting equipment, clothing, the effect of fire on a range of materials, buildings and products and building design;
- Increased consideration of wildfire in the planning schemes and the Building Codes;
- Increased emphasis on training and development of all firefighters, supervisors and strategists; and
- Gradual improvements in information and communication technology, the use of satellite technology, firefighting and communications equipment; and the increased use of aircraft – all of which have significantly improved suppression efforts over the years.

Changes following Ash Wednesday and Linton Fires

2.46 In more recent years, two fire events have led to important changes in fire management arrangements: the Ash Wednesday fires in 1983 and the deaths of five volunteer firefighters at Linton, Victoria in 1998.

2.47 Following the Ash Wednesday fires of 1983 and the report of the Inquiry conducted by Police Commissioner Millar in 1984,[23] the State introduced the *Emergency Management Act 1986*. This Act recognised that emergency response is not confined to one agency and that all agencies must work in concert to deliver effective outcomes for Victoria.

2.48 The Ash Wednesday fires also prompted considerable progress in community education programs to improve community awareness and preparedness for bushfires, particularly during the 1980s.

2.49 In 1998, a relatively small fire near Linton, resulted in the deaths of five CFA firefighters. The response to this tragedy was to ensure firefighter safety was paramount in the priorities and procedures of fire suppression agencies.

Climate Change and Increased Bushfire Risk

2.50 As we have seen, unplanned fires will always be with us. But can we expect an increase in the number of bushfires over coming years?

2.51 Climate and weather provide the context within which fires such as those of 2002-2003, occur. Weather at the time of unplanned fires can be critical in determining how successful fire suppression efforts are likely to be, and the extent to which fires might impact on people and property.

22 Stretton, L.E.B, Report of the 1944 Royal Commission.

23 Report of the Bushfire Review Committee on Bushfire Disaster Preparedness and Response in Victoria, Australia, Following the Ash Wednesday Fires 16 February 1983, April 1984.

2.52 Victoria experiences a climate conducive to the occurrence and spread of unplanned fires in nearly every summer somewhere in the State. During periods of drought, such as those associated with El Niño events, evidence indicates there is an increased risk of large fires. Additionally, climate change throughout the present century is predicted to lead to increased temperatures and, with them, a heightened risk of unplanned fire.

2.53 As part of our Inquiry, we investigated whether Victoria must plan for an increased frequency of extreme fire weather days as the climate becomes hotter. Specifically, we investigated whether there is an increase in extreme fire weather during strong El Niño–Southern Oscillation events in eastern Australia.

2.54 The Commonwealth Bureau of Meteorology has compiled summary statistics on Australia's weather and climate and maintains an up-to-date analysis of short and long-term trends in key climate parameters, especially temperature and rainfall. To assist analysis, the Bureau provided more detailed climate data, based on individual climate station records Melbourne and other selected locations in Victoria.

2.55 Long-term records for a number of climate stations in Victoria were used to estimate the daily 3 pm Forest Fire Danger Index and the Keetch-Byram Drought Index, two measures of environmental conditions widely accepted to be related to the probability of fire ignition and spread. These parameters were then analysed in relation to time and to the Southern Oscillation Index to investigate the strength of evidence for trends and cycles in the occurrence of extreme fire danger weather in Victoria.

2.56 We also examined the results of relevant investigations into extreme fire weather conditions described in reports and working papers written by Bureau of Meteorology staff.

2.57 Specific findings of our investigation are outlined in detail in the paper 'Climate, Weather and Unplanned Fires in Victoria', attached as Appendix V to this report.

2.58 To summarise here: Our exploratory investigations of the ways that global climate warming and cyclical phenomena such as El Niño drought contribute to fire risk in Victoria reveal possible increases in fire risk as climate warms, and a higher likelihood of fire in El Niño drought periods.

2.59 It is therefore possible that a higher fire risk future for Australians will result from higher temperatures, changes in rainfall, and consequent altered ecosystem dynamics (i.e. changed growing conditions for plants, including altered competitive interactions, possible increased biomass production and changed fuel types).

2.60 This points to the importance of having systems in place to adjust progressively to changing circumstances.

Recommendation

2.61 **That DSE and CFA as part of their long term planning, and in conjunction with the Commonwealth Bureau of Meteorology, consider ways in which evidence for climate change and El Niño–Southern Oscillation cycle impacts on the likelihood of unplanned fire, can be better incorporated into preparedness and response planning.**

Conclusion

2.62 Land use has changed significantly over the last 170 years of European settlement in Victoria and, to a large degree, changing patterns of population destination has mirrored this. The interface between public and private land was once an issue for the farmer only; this is no longer the case with increasing growth in both permanent and weekend communities now at the direct interface with public land.

2.63 Last century, Victorians realised that unplanned fire would always be with us and they introduced a range of legislative and organisation responses to prevent and suppress fires. There is no doubt that Victorians are significantly more skilled in both these areas and have engaged on a continuous improvement strategy to better cope with our fire prone environment. Much of this report details the significant advances that have been made and opportunities for Victorian to advance further.

Chapter 3
Current Legislation and Co-operative Arrangements

Overview

3.1 This Chapter describes the Victorian legislation relating to the management of emergencies – in particular, fire. It also describes co-operative arrangements in place to minimise the impact of those emergencies on the community.

3.2 Current arrangements are complex; they involve a large number of agencies and organisations and can only succeed if there is a high level of co-operation and communication between agencies and the community.

3.3 This Chapter gives the legislative context for Victoria's multi-agency preparation and response to bushfire events. Later Chapters assess the effectiveness of agencies in preparing for and suppressing the 2002–2003 fires.

Victorian Legislation

3.4 Key legislation includes:

- *Emergency Management Act 1986*;
- *Metropolitan Fire Brigades Act 1958*;
- *Country Fire Authority Act 1958*;
- *Forests Act 1958*;
- *Planning and Environment Act 1987*; and
- *Local Government Act 1989*.

3.5 A number of other Acts impact on agencies charged with protecting Victoria from fire. These include:

- *Electricity Act 1998*;
- *Flora and Fauna Guarantee Act 1988*;
- *Alpine Resorts (Management) Act 1997*;
- *National Parks Act 1975*;
- *Transport Act 1983*;
- *Environment Protection Act 1970*; and
- *Catchment and Land Protection Act 1994*.

3.6 In addition, a number of agreements and Memoranda of Understanding provide detail for organisations and agencies on how these agencies implement their responsibilities. The Agreement of most interest to the Inquiry is the Co-operative Agreement between the Country Fire Authority (CFA) and the then Department of Natural Resources and Environment, September 2002.

Emergency Management Act 1986

3.7 The *Emergency Management Act 1986* gives the Office of the Emergency Services Commissioner (OESC) a broad role in emergency prevention planning, including the fire services. The OESC can set and monitor performance standards for the Metropolitan Fire and Emergency Services Board (MFESB) and CFA and encourage and facilitate co-operation between the agencies to effectively utilise fire and emergency services.

3.8 The *Emergency Management Act* also addresses:

- Recovery planning and management;
- 'State of Disaster' arrangements; and
- Compensation arrangements of registered emergency workers.

3.9 Part 3A of the Act outlines the State Emergency Recovery Plan. This includes the appointment of a co-ordinating agency for recovery, a State Recovery Co-ordinator and the establishment of state and regional recovery committees. Part 5 of the Act outlines the declaration, powers and duties of the Co-ordinator-in-Chief and Part 6 covers compensation arrangements for registered emergency workers.

3.10 Further to these arrangements, the Act outlines specific responsibilities for the development of response planning and co-ordination for emergencies, including fire. Of particular note are the obligations and responsibilities placed on Municipal Councils, including Alpine Resort Management Boards, to plan for emergencies that may occur within their jurisdiction. This task is carried out under the sponsorship of Police Municipal Emergency Response Co-ordinators (usually an Inspector or Senior Sergeant), located within each municipality.

The Fire Agencies

3.11 Three agencies respond directly to fires in Victoria:

- Metropolitan Fire and Emergency Services Board;
- Country Fire Authority; and
- Department of Sustainability and Environment (DSE).

Of these, it is the latter two agencies that deal predominantly with bushfires.

Metropolitan Fire and Emergency Services Board

3.12 Under section 7 of the *Metropolitan Fire Brigades Act 1958*, MFESB has the function of suppressing and preventing fire in the Metropolitan Fire District. This covers the Melbourne Central Business District through to Laverton in the west, Tullamarine and Somerton in the north, Croydon in the east and Clayton and Mentone in the south. This is an area of approximately 1,100 square kilometres with a population of approximately 2.2 million.[1]

3.13 In the Metropolitan Fire District there are few opportunities to engage in fighting bushfires. However, there are some areas of protected public land – for example, along the Merri Creek and the Yarra – which DSE would normally have control of in respect of fire suppression. Following agreement between the Chief Officers of the MFESB and DSE, MFESB have assumed control for fire suppression in these areas. DSE and CFA assist MFESB as required if specific bushfire expertise or equipment is needed.

3.14 While some small pockets of the Melbourne Metropolitan Fire District contain public land and/or abut CFA areas (and could therefore be viewed as potential bushfire areas), CFA and DSE are the agencies that deal mainly with bushfire.

Country Fire Authority

3.15 The CFA is established under section 6(1) of the *Country Fire Authority Act 1958* (CFA Act) and is mandated to provide for the 'more effective' control and prevention and suppression of fires in the country area of Victoria.

3.16 The country area of Victoria is defined in the CFA Act to mean that part of Victoria outside the Metropolitan Fire District, not including forest, National Park, or protected public land. CFA is therefore responsible for fire protection to all other parts of Victoria including outer metropolitan Melbourne and regional centres, rural areas and plantation forests. This equates to approximately 15 million hectares of land, approximately one million homes and 2.6 million people.

3.17 Section 20 of the *CFA Act* states that the general duty of the CFA is 'superintending and enforcing all necessary steps for the prevention and suppression of fires and for the protection of life and property in case of fires…'.[2] However, CFA does not have sole responsibility for fire prevention in the country area of Victoria. It must work with the Municipal Councils and public authorities to fulfil its fire prevention role.[3] Both CFA and Local Government have a duty to prevent fire.

3.18 CFA fulfils its fire prevention role through a number of means. These include the Declaration of Fire Danger Periods[4] within a municipality or part of a municipality, and Declarations of Total Fire Bans.[5] CFA also provides leadership within the fire prevention planning process and provides training, advice and support to Municipal Fire Prevention Officers. CFA undertakes community education programs to deliver appropriate fire safety and prevention messages to the community. These include intensive face-to-face activities.

Department of Sustainability and Environment

3.19 DSE is responsible for fire prevention and suppression for Victoria's 7.7 million hectares of public land including forests, National Parks, and protected public lands. Section 62(1) of the *Forests Act 1958* states that the Secretary's duty is 'to carry out proper and sufficient work for the prevention and suppression of fire in every State forest and national park and on all protected public land…'.[6]

3.20 Protected public land is defined in section 3 of the *Forests Act 1958* and includes State Forests, National and State Parks, wilderness areas and Crown Reserves. This includes areas managed by an Alpine Resort Management Board.

3.21 DSE fire management planning operates at three distinct levels:

- Strategic fire plans;
- Fire operations plans; and
- Individual burn plans.

1 Based on 2001 ABS data.
2 The powers given to the CFA to achieve its suppression and prevention roles are set out at ss20AA, s23, s28, s29, s30, s33 and a variety of ancillary provisions of the *Country Fire Authority Act, 1958*.
3 s43, *Country Fire Authority Act, 1958*; S8 and Schedule 1 of the *Local Government Act 1989*.
4 s4, *Country Fire Authority Act, 1958*.
5 s40, *Country Fire Authority Act, 1958*.
6 DSE's powers to carry out its fire suppression and prevention roles are contained generally in ss63–69 of the *Forests Act 1958*.

3.22 Strategic fire plans identify five fuel management zones that provide a guide to appropriate treatments and priority for fuel management works. These plans, which are developed for each DSE district, guide the development of fire operations plans and individual burn plans for specific locations. These plans are developed through a consultation process with relevant stakeholders including Parks Victoria and the wider community. They are discussed in more detail in Chapter 14.

3.23 Communication about respective fire prevention strategies for public and private land is through relevant CFA Group meetings and the Municipal Fire Prevention Committee. Where the municipal district is adjacent to or adjoins any part of a forest or National Park, DSE has a representative on this Committee. DSE also undertakes further consultation with the broader community.

3.24 DSE has the discretionary power to direct the removal of fire hazards on private land within 1.5 kilometres of any National Park or State Forest.[7] This relates to both control and lighting of fires. However there are some locations around the State where that power has been transferred to the CFA, making delineation unclear.

3.25 DSE undertakes its fire responsibilities by running education programs, declaring prohibited periods, applying and promoting the *Code of Practice for Fire Management on Public Land*[8] and through its systematic planning approach to the implementation of the strategies set out in its Fire Protection Plans.

CFA and DSE Suppressing Fire Together

3.26 Depending on whether the fire is located on private or public land, either CFA or DSE respectively will have responsibility over suppression (see Figure 3.1). When the fire traverses public and private land, one agency is deemed the control agency for the fire. This arrangement is outlined in the *Emergency Management Act 1986* which provides that any of the Chief Officers in respect of fire (including the MFESB) may appoint an officer of one of the agencies to have overall control of response activities. This ensures there is a clear line of authority in respect of each fire and ensures the agencies work together in the suppression of fire.

3.27 In addition to the *Emergency Management Act 1986*, further co-operative arrangements between DSE and CFA were put in place following the Linton tragedy with the aim of achieving seamless co-ordination between the two agencies. This arrangement – most recently agreed to in September 2002 and detailed in the Auditor-General's May 2003 report *Fire Prevention and Preparedness* – sets out the extensive incident control and co-operative arrangements in place.

3.28 Most importantly for fire response, a jointly-staffed incident control centre is established to:

- Determine and co-ordinate strategy;
- Co-ordinate communication;
- Co-ordinate the requests for and management of resources;
- Oversee implementation of tactics;
- Provide information to affected communities and the wider community; and
- Liaise with media.

Other Agencies and Organisations in Fire Management

3.29 Fire preparedness and prevention involves a myriad of agencies or bodies:

- MFESB, CFA and DSE;
- Office of the Emergency Services Commissioner;
- Other parts of DSE's portfolio through the Office of Planning, the Building Commission and Parks Victoria;
- The 79 Municipal Councils;
- Alpine Resort Management Boards; and
- The electricity industry, the Office of the Chief Electrical Inspector, the forest industry, Water Authorities, VicRoads, and VicTrack – to name some of the many agencies involved.

3.30 Current Victorian legislation does not provide specific requirements for the participation of many of these agencies.

Municipal Councils

3.31 In conjunction with the CFA, Municipal Councils[9] (and public authorities), have a significant primary fire prevention role in the country area of Victoria.

7 *Forests Act 1958*; s65.
8 Department of Natural Resources and Environment, *Code of Practice for Fire Management on Public Land, 1995*
9 *Local Government Act 1989* S8 and Schedule 1 confer the function of "fire prevention and protection" on Municipal Councils.

Figure 3.1: Public and Private Land in Victoria

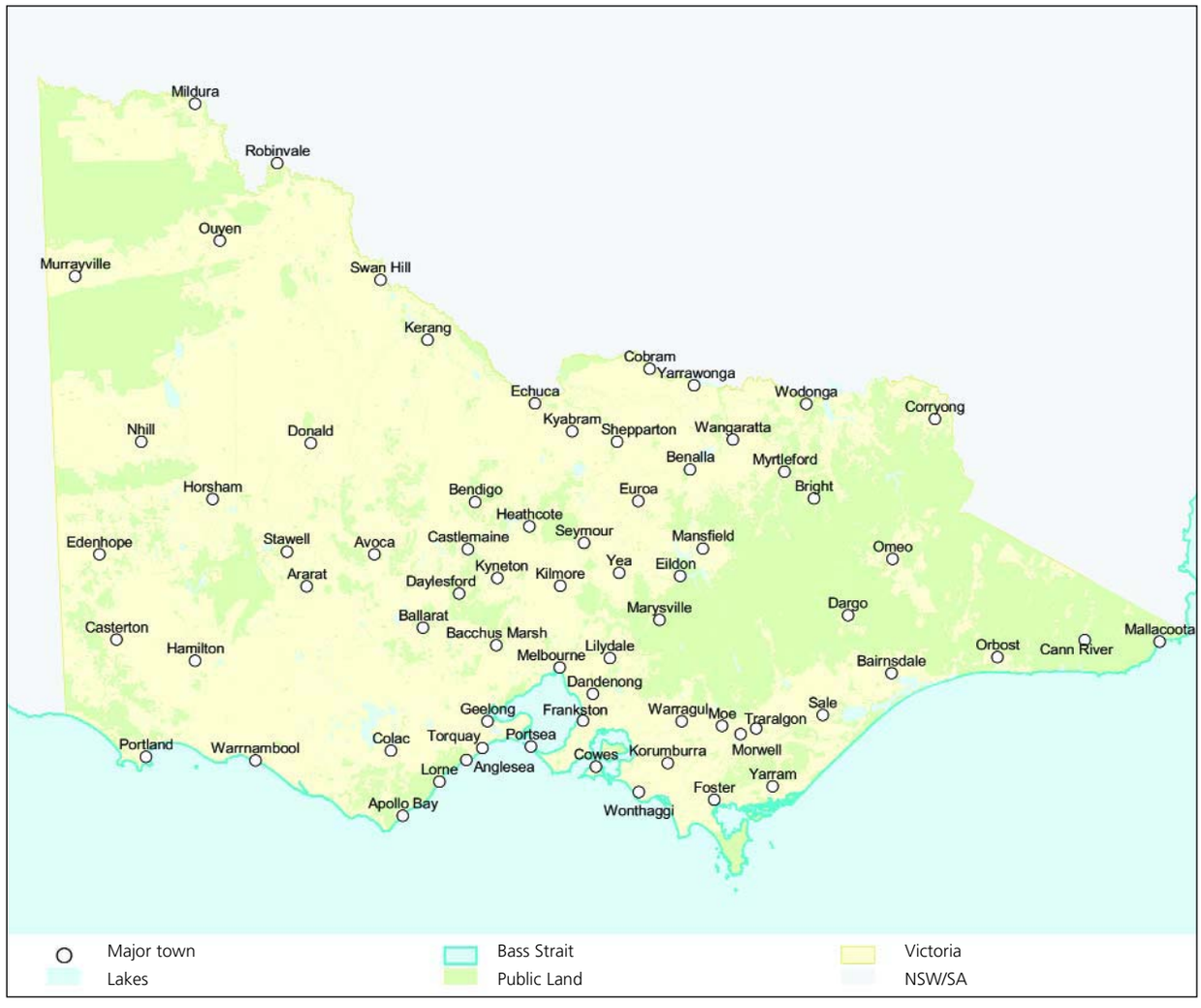


Table 3.1: Public Land Types for which DSE has Fire Management Responsibilities

Category	Approximate area (ha)
Public land	7.70 million
Parks & other Conservation Reserves	4.23 million
State forest	3.50 million
State forest for timber production	(1.05 million)

Source: DSE. Note 1: Total land base for Victoria is 22.83 million hectares. Note 2: 1.05 million hectares of State forest is available and currently used for timber production.

3.32 Section 43 of the CFA Act states 'it is the duty of every municipal council and public authority to take all practicable steps (including burning) to prevent the occurrence of fires on, and minimise the danger of the spread of fires on and from – any land vested in it or under its control or management; and any road under its care and management'.

3.33 Further, section 55A of the CFA Act states all Municipal Councils must have a Fire Prevention Plan. The Municipal Fire Prevention Committee (which must be established according to section 54 of the CFA Act) oversees the development of this plan. In addition, all Councils must appoint a Municipal Fire Prevention Officer (s96A of the CFA Act). To enforce Council's duties in respect of fire prevention, a council may also issue a fire prevention notice or a fire prevention infringement notice.

3.34 Municipal Councils cannot be sanctioned if they fail to fulfil their obligations under the CFA Act. However, the CFA can ask the Governor-in-Council to transfer a Municipal Council's fire responsibilities to the CFA if it is satisfied that a Municipal Council or Public Authority is failing to carry out its fire prevention responsibilities (ss45–46 CFA Act). To date, this procedure has not been invoked.

3.35 Under Section 14 of the *Planning and Environment Act 1987*, Municipal Councils are required to develop, administer and enforce a planning scheme to set out the use, development and protection of land for an area. This planning scheme sits within the Statewide Planning Policy Framework, administered by the Office of Planning within DSE. There is an overarching guideline (the wildfire planning guide) that requires councils to identify priority hazards in planning schemes, consider fire hazards in planning decisions affecting identified areas, have regard to specific fire protection guidelines and seek the advice of relevant fire authorities.

3.36 Clause 15 of the *Planning and Environment Act 1987*, allows Municipal Councils to apply a Wildfire Management Overlay (WMO) to the planning scheme. The WMO identifies land where the potential fire intensity is high enough to warrant special treatments to mitigate the effects of fire. Twenty-six councils have WMOs and this classification is noted on their planning scheme maps. Municipal councils may also need to deal with other environmental measures that impact on fire prevention and preparedness such as the Native Vegetation Framework and the implementation of the Flora and Fauna Guarantee.

10 s62(2) *Forests Act 1958*.
11 s33(1) *Country Fire Authority Act 1958*.

Parks Victoria

3.37 Parks Victoria is a Statutory Authority within the DSE portfolio. It is the largest land manager in Victoria with responsibility for National Parks, Wilderness, State and regional parks, Melbourne's metropolitan parks and open space network. Parks Victoria also has responsibilities for the recreational management of the Lower Yarra, Maribyrnong and Patterson Rivers, and Port Phillip and Westernport Bays.

3.38 DSE has statutory responsibility for fire prevention and suppression on all National Parks and also has a statutory obligation to seek agreement with Parks Victoria prior to fire prevention works being undertaken.[10] Parks Victoria is a major stakeholder in the development of Fire Protection Plans and Fire Operations Plans for each DSE Fire District and is consulted when DSE audits its annual fire operations plans and its strategic Fire Protection Plans.

3.39 Before Fire Protection Plans are finalised, Parks Victoria and the Executive Director, Fire Management Branch, DSE, review them and resolve differences. Finally, any aggrieved party can ask the Secretary, DSE to review the Plans.

3.40 Land managed by Parks Victoria includes substantial assets such as:

- Infrastructure (e.g. management buildings, accommodation, information and interpretive centres, walking trails);
- Cultural sites relating to Aborigines, early settlers (e.g. mountain cattleman huts) and industry (e.g. mine sites, logging tram tracks and trails); and
- Ecological sites (for rare and threatened species).

Alpine Resorts

3.41 Although Alpine Resorts are located on public land and are therefore a DSE responsibility, all resorts except Mount Baw Baw are under CFA's fire prevention responsibilities following an agreement between DSE and CFA.[11] DSE still retains responsibility for managing fuel on public land up to the boundary of the Alpine Board of Management Area.

3.42 Alpine areas are managed by Alpine Resort Management Boards. These Board are deemed to be a Municipal Councils for the purposes of the *Emergency Management Act 1986*.[12] As such, Boards must prepare and maintain a Municipal Emergency Management Plan (under section 20 of the *Emergency Management Act 1986*). Such plans are primarily for emergency prevention, response and recovery. While they encompass fire prevention and suppression, the plans are cast at a management rather than operational level.

3.43 Despite this classification, Alpine areas do not have to participate in Municipal Fire Prevention Committees and are not required to prepare and maintain Municipal Fire Prevention Plans and have those plans audited by CFA every three years. They do not need to appoint a Municipal Fire Prevention Officer.

Water Authorities and Catchment Management Authorities

3.44 Providing water is the province of five water authorities (wholesalers), three metropolitan retailers (licensees), 15 regional urban authorities, and one irrigation trust. In the Melbourne metropolitan area there is one wholesaler (Melbourne Water) and three retailers. In the rest of Victoria there are four rural water authorities, one water trust and 14 regional urban water authorities.

3.45 Despite this number of entities, DSE and Parks Victoria are primarily responsible for fire prevention and suppression in Victoria's water catchment areas. This is because, for the most part, Victoria's significant reservoirs and catchment areas are located in National Parks or State Forests.

3.46 Some water authorities (for example, Melbourne Water Corporation [MWC] and Goulburn Murray Water) also own freehold land on which balancing storages are located. Because these are located in the country area of Victoria, CFA has fire prevention and suppression responsibility. The authorities work with the CFA and the Municipal Fire Prevention Committees to manage the fire risk on these properties.

3.47 MWC and DSE entered into an agreement in December 1995 (shortly after the Melbourne Metropolitan Board of Works was dismantled and became MWC) that recognises that DSE has the primary legal responsibility for fire prevention and suppression (under the *Forests Act 1958*) but acknowledges MWC's role in this respect (under section 321 of the *National Parks Act 1975*). That agreement states MWC must be consulted about, and agree with, the preparation of Fire Protection Plans for its water catchment areas. MWC has its own standing fire suppression force of approximately 50 full time staff, which is trained up to DSE standards and which, like DSE's own force, is supplemented during each fire season.

3.48 Interfacing with the Water Authorities and DSE are ten Catchment Management Authorities. Their general responsibilities (outlined in section 4 of the *Catchment and Land Protection Act 1994*) are to maintain and enhance long-term land productivity while also conserving the environment. Catchment Management Authorities aim to maintain and enhance the quality of the State's land and water resources (and associated plant and animal life). They have no explicit statutory responsibility for fire prevention. The Fire Protection Plans and Fire Operations Plans developed by DSE are required to take into account the special characteristics of the catchment areas.

Electricity Industry and Office of the Chief Electrical Inspector

3.49 The Office of the Chief Electrical Inspector (OCEI) has the statutory authority for ensuring that electrical companies minimise the risk of fire to the community. This authority is derived from Part 8 of the *Electricity Safety Act 1998*, which sets out the regime for electric line clearance in Victoria, and is backed by the Electric Line Clearance Regulations 1999, the Electricity Safety (Bushfire Mitigation) Regulations 2003 and the Code of Practice for Electric Line Clearance. The regime contained in the Act, Regulations and Code requires all electricity suppliers to prepare a bushfire mitigation plan for the area their supply covers.

12 s5 *Alpine Resorts (Management) Act 1997*.

3.50 There are seven main companies who, in conjunction with OCEI, must prepare an annual bushfire mitigation plan. These are the main transmission company SPI PowerNet and the six supply companies: TXU, Powercor, AGL Energy, Country Energy, Citipower and United Energy. Bushfire mitigation plans for the companies with areas designated as a hazardous fire risk area are audited annually by OCEI. Of the main electricity suppliers only Citipower do not have any areas designated as a hazardous fire risk area and are not required to prepare a bushfire mitigation plan.

3.51 As of 1 July 2003 following introduction of the new Electricity Safety (Bushfire Mitigation) Regulations, OCEI prescribes the content and minimum standards for bushfire mitigation plans.

3.52 OCEI also oversees the Electric Line Clearance Consultative Committee. Representatives from all relevant stakeholders provide advice and recommendations on the preparation of the Code of Practice for Electric Line Clearance. OCEI are not required to consult with the CFA, OESC or the Victoria State Emergency Service (VICSES) to ensure that the Code or the Bushfire Mitigation Plans are in accordance with wider fire prevention plans, nor are those plans audited by any of those bodies.[13]

The Forest Industry

3.53 Under amendments to the CFA Act, where a plantation owner has more than 500 hectares of plantation within a 25 kilometre radius, they may be required to establish, equip and staff a forest industry brigade.[14] This requirement is open to interpretation, as it does not cater for owners who might have significant holdings over a more dispersed area.

3.54 The forest brigades came into being when Victoria's State-owned plantations were privatised. They were set up to ensure CFA local brigades did not carry a disproportionate burden for fire suppression in plantations.

3.55 There are now over 25 such brigades in operation, controlled by 15 different plantation owners.

Roads: VicRoads and Councils

3.56 VicRoads are responsible for maintaining all declared roads (such as major arterials, forest roads and tourist roads). Municipal Councils are responsible for all other local rural roads. VicRoads and Municipal Councils are responsible for keeping roads clear and safe from a fire prevention and risk management perspective. Private roads are the responsibility of the private owner.

3.57 VicRoads' duties in respect of roads are contained in the *Transport Act 1983*.[15] Councils' roles in respect of roads are derived from their general responsibilities for roads in the *Local Government Act 1989* coupled with their general responsibility for fire prevention under the CFA Act. Neither agency is required to co-ordinate its road maintenance program with the main fire prevention agencies, however, Municipal Councils co-ordinate any road clearance work within their broader Municipal Fire Prevention Plan.

VicTrack

3.58 VicTrack is the trading name of Victorian Rail Track, a body corporate established by the *Rail Corporations Act 1996*. VicTrack has the responsibility to establish, manage and maintain railways and rail infrastructure.[16]

3.59 VicTrack also has the power to serve a notice on owners and land occupiers, requiring them to fell or remove any tree or wood that could be an obstruction or danger if it is within 60 metres of a railway track.[17] In other words, VicTrack has the statutory function and the means to require that land around railway tracks be kept clear and safe. Although not explicitly mentioning fire, this function includes fire mitigation and prevention work.

3.60 VicTrack has delegated these functions through a head lease to the Public Transport Division of the Department of Infrastructure. They, in turn, have sub-leased Victoria's rail track to two main lessees – who, in turn, allow other operators to use the track. These sub-lessees have the operational responsibility for carrying out VicTrack's statutory fire responsibilities. Both sub-lessees have sub-contracted rail line maintenance to another contractor.

13 See sections 6.7 to 6.15 of Auditor-General Victoria's *Fire Prevention and Preparedness* for further detail.
14 Amendments to the *Country Fire Authority Act, 1958* (s23AA).
15 Specifically, sub-sections 16(1)(a)(b) and (e).
16 Pursuant to s11(1) of the *Rail Corporations Act 1996*.
17 Pursuant to s60 of the *Rail Corporations Act 1996*.

3.61 If fire prevention works are not carried out, VicTrack cannot be compelled to carry out works by Municipal Councils or the CFA as it is a public authority and not subject to the serving of a fire prevention notice by a Municipal Council.[18] However, such a notice may be served on the lessees of railway track, because they are private companies.

3.62 The chain of command for fire prevention work on and around railway track is unclear and, as the Auditor-General's 2003 Report noted, many municipalities are themselves unclear as to who has responsibility for addressing fire prevention concerns on leased lines.

3.63 The Public Transport Division of the Department of Infrastructure has a co-ordinated Emergency/Incident Management Response Plan that includes bushfire. The Public Transport Division also holds bi-monthly co-ordination meetings with the rail bodies. The CFA, OESC, VICSES or any other body with fire management experience does not audit this plan.[19]

Building Commission

3.64 Under the *Building Act 1993* and Building Regulation 1994, Councils can identify bushfire-prone areas and apply a WMO. WMO and bushfire-prone areas are now mapped using identical requirements. The effect of building a development in a bushfire prone area is that construction must be in accordance with the Building Code of Australia requirements.

3.65 The Building Code of Australia is generally reliant on the Australian Standard AS 3959 (the Standard) to provide specific requirements relating to construction in bushfire-prone areas. The Standard generally includes requirements for burning debris and ember protection, radiant heat and flame contact protection, controls on the combustibility of external materials, and the protection of openings, such as windows and doors. It is prescriptive in specifying construction requirements. The criteria for identifying the various risk categories in bushfire-prone areas is an aspect of the Standard more open to interpretation.

Conclusion

3.66 As noted at the start of this Chapter, current legislative arrangements are complex and involve a large number of agencies and organisations. Co-operation, communication and goodwill are essential for such a complex system to work well.

3.67 Chapter 5 notes the many submissions that praised and criticised the effectiveness of co-operation and communication between agencies and the community. In Chapter 16 we assess how well our emergency management procedures work within this legislative framework.

18 s41(1) *Country Fire Authority Act 1958*.
19 For further detail, see Auditor-General Victoria, *Fire Prevention and Preparedness*, 2003, 6.16–6.31.

Chapter 4
The Story of the 2002-2003 Victorian Fires

Overview

4.1 There can be no single, definitive story that gives justice to the multiple and complex experiences, responses, successes and challenges of Victoria's 2002-2003 fire season.

4.2 This was a widespread, long-lasting, fire season involving 3,000 fires and many thousands of personnel, including agency firefighters and community members. People worked together – not just to fight the fires, but in many other support roles. Thousands of people living in fire-affected areas have their own stories of fear, loss and triumph. Victorian communities – industry, the media and the public – were also affected and they, too, contribute to the broader fire story.[1] Not surprisingly, the Department of Sustainability and Environment (DSE) described the task of piecing together a record of the 2002-2003 fires as 'formidable'.

4.3 This Chapter outlines some of the significant achievements as well as the losses, which were part of the story of the 2002-2003 fires. It serves as an important context for our later analyses and recommendations against the three Terms of Reference. First, it reminds us that the 2002–2003 fires were exceptionally severe in terms of length, multiple outbreaks and geographical spread. And second, it tells us that suppressing these extreme fires in a flexible, responsive and co-operative way – with minimal loss – was a major achievement on the part of all involved.

4.4 We start by highlighting an important context for the fires – drought. A chronological narrative of the key fire events from December 2002 to March 2003 follows, based on detailed daily records prepared by the DSE[2] and the Country Fire Authority (CFA).[3] Both records can be accessed on the Department of Premier and Cabinet website.

4.5 Onto this story of drought, dramatic weather, remote country, threatened townships and the co-ordination of human resources and equipment we overlay the stories of multi-agency co-operation and community engagement. We then tell another story – one of positive and negative impacts on firefighters and affected communities.

Drought – A Key Context for the Fires

4.6 In the period leading up to the fires, severe drought in its sixth year had a major impact on rural communities. The drought resulted in considerable water supply issues. The state of water storages was, on average, better in May 2002 than at the same time in 2000 and 2001. However, the lack of winter and spring rainfall in 2002 kept streamflows and water storages low.

4.7 By the end of 2002, water restrictions of varying severity were in place across Victoria, with the situation most severe in the North Central and North West regions. By 6 December, 235 towns across Victoria were on water restrictions; seven were on severe restrictions, 32 on moderately severe restrictions and a further 196 had low levels.[4]

4.8 For the farm sector, the drought meant a significant reduction in farm incomes and farm employment, particularly in northern Victoria. Poor pastures meant increased costs for hand feeding stock and moving stock to find feed. (This, in turn, had a potential impact on breeding stock.) The drought threatened fruit trees, vines and other horticulture. It meant lower water allocations to irrigators.

4.9 Low water levels in streams, the Hume Dam and in Lakes Eildon and Eppalock impacted on recreation and tourism and created potential for algal blooms and other water quality problems.

4.10 As the State asked communities, householders and CFA volunteers to prepare for the forthcoming fire season, rural communities faced significant social and economic stress that left them vulnerable to the impact of the bushfires.

4.11 For many in rural communities who had already been doing it hard, the bushfires provided an additional source of hardship. Communities were frequently torn between priorities, including:

- Handfeeding and watering stock;
- Earning an income from other forms of employment, sometimes in remote locations;
- Maintaining businesses; and
- Defending their own and others' property from fire over a long and difficult season.

4.12 Understandably, the recovery effort has seen the need for support of various kinds including financial and general counselling.

1 For example, industry and the public gave significant donations to firefighting agencies to help with fire suppression and recovery.
2 The 2003 Alpine Fires, DSE, July 2003.
3 Country Fire Authority, From the *Foothills to the Alpine Heights,* CFA's Submission to Victoria's 2002-2003 Bushfire Inquiry, 2003 Appendix F.
4 DSE website: Victorian Resources Online.

Figure 4.1: Big Desert Fire Area

The 2002-2003 Fire Season

4.13 The first fires of the 2002-2003 fire season were reported in September. Many fires had been attended by the time the North East and Gippsland fires started in early January. At the beginning of summer, after a warm, dry spring and the ongoing drought, the Government received notice from the Bureau of Meteorology that conditions were similar to those leading up to the 1983 Ash Wednesday fires. Fire agencies across the State – already aware of the significant risk following the Bureau's July Seasonal Outlook – went on high alert.

The Big Desert Fire – 17 to 25 December

4.14 On 17 December, a lightning storm started two fires in the Big Desert Wilderness Park in Victoria's remote North West. Several days of very high temperatures and erratic winds followed, producing high fire intensity. Atmospheric conditions in the region, generated by the fire itself, caused a localised thunderstorm. Within days, the two original fires had merged, covering large areas of the Big Desert Wilderness Park and part of Wyperfeld National Park. On the northern edge of the park, driven by uncharacteristic southerly winds, fingers of fire burned on to private land, running across drought-affected paddocks. Not just weather, but terrain posed a challenge: access was difficult in the undulating sand dune country and areas of dense mallee scrub.

4.15 The Big Desert Fire was, at the time the biggest fire in Victoria in 20 years, affecting 181,400 hectares of predominantly public land and requiring significant resources (Figure 4.1).[5]

Yambulla Fire – 6 to 11 January

4.16 Two days before the lightning strikes of 7 and 8 January, lightning ignited a fire in the Yambulla area, North West of Genoa in East Gippsland. The fire was seen as posing a major threat and required significant firefighting resources. At the time the main fires started on 8 January, a total of 180 DSE firefighters were allocated to the Yambulla fire, supported by bulldozers and firebombing aircraft. The fire was contained within a few days. The level of resourcing did, however, impact on the local resources available to fight the multiple outbreaks that followed.

4.17 The Big Desert fires and the Yambulla fire (as well as four fires burning in Kosciusko National Park near the Victorian border) provided a taste of the extreme fire season ahead.

The North East and Gippsland fires

The First Week – 7 to 14 January

4.18 Late on Tuesday January 7 and early the next day, dramatic, dry thunderstorms brought widespread lightning strikes that ignited over 80 fires in Victoria's North East and Gippsland. Many were in mountainous, forested areas of the Alpine National Park. Another eight fires were reported in other regions and a further 42 fires were ignited by lightning over the border in New South Wales. January 8 is considered day one of the North East Victoria and Gippsland fires (see Figure 4.2).

4.19 Around 280 DSE personnel were involved in the fire effort on the first day with a further 265 being moved from other areas. The CFA also responded to a large number of fires on both private and public land.

4.20 The situation was extremely complex. Accurate detection of the number and location of so many fires was difficult for the firefighting agencies. The remote country, in which the ignitions started, as well as the weather conditions, compounded this. These issues are fully discussed in Chapter 17.

4.21 There were early successes. By the second day, 40 of the initial fires were contained or under control.[6] By 14 January a small number of fires remained. These fires – mostly in steep, inaccessible forest in the North East – continued to burn.[7] These fires presented huge challenges to firefighters especially Anderson's Peak on the Mt Buffalo plateau, Mt Arthur, Razorback and Mt Feathertop. Hand crews and aircraft continued to attack the fires and construct control lines. The number and location of the fires as well as turbulence hampered aerial support. Firefighters described the progress of the fires at this stage as 'not raging but inexorable'. Despite their efforts, fires continued to break through control lines.

4.22 Figure 4.3 shows the fires burning on 11 January.

5 At the peak of the fire, over 300 firefighters, nine bombing aircraft and 75 vehicles were deployed.

6 For example, the Genoa fire, ignited prior to the main alpine fires, was classified as contained and the Sale, Erica, Heyfield and Yarram Incident Management Teams were closed over the week with most fires under control in the area.

7 Those fires in the North East were grouped into complexes managed by the Ovens and Corryong Incident Management Teams. Corryong managed the Cravensville fire and the Pinnibar fire near the NSW border. The latter was managed as a joint incident with NSW, with fires threatening to cross the border from NSW. Ovens managed the Mt Buffalo fire and five fires in the Mt Beauty, Mt Bogong, and Mt Feathertop/Harrietville area. The Razorback/Mt Cooper fire north of Omeo was managed by the Incident Management Team at Swifts Creek.

Figure 4.2: Lightning Strikes 7 and 8 January 2003

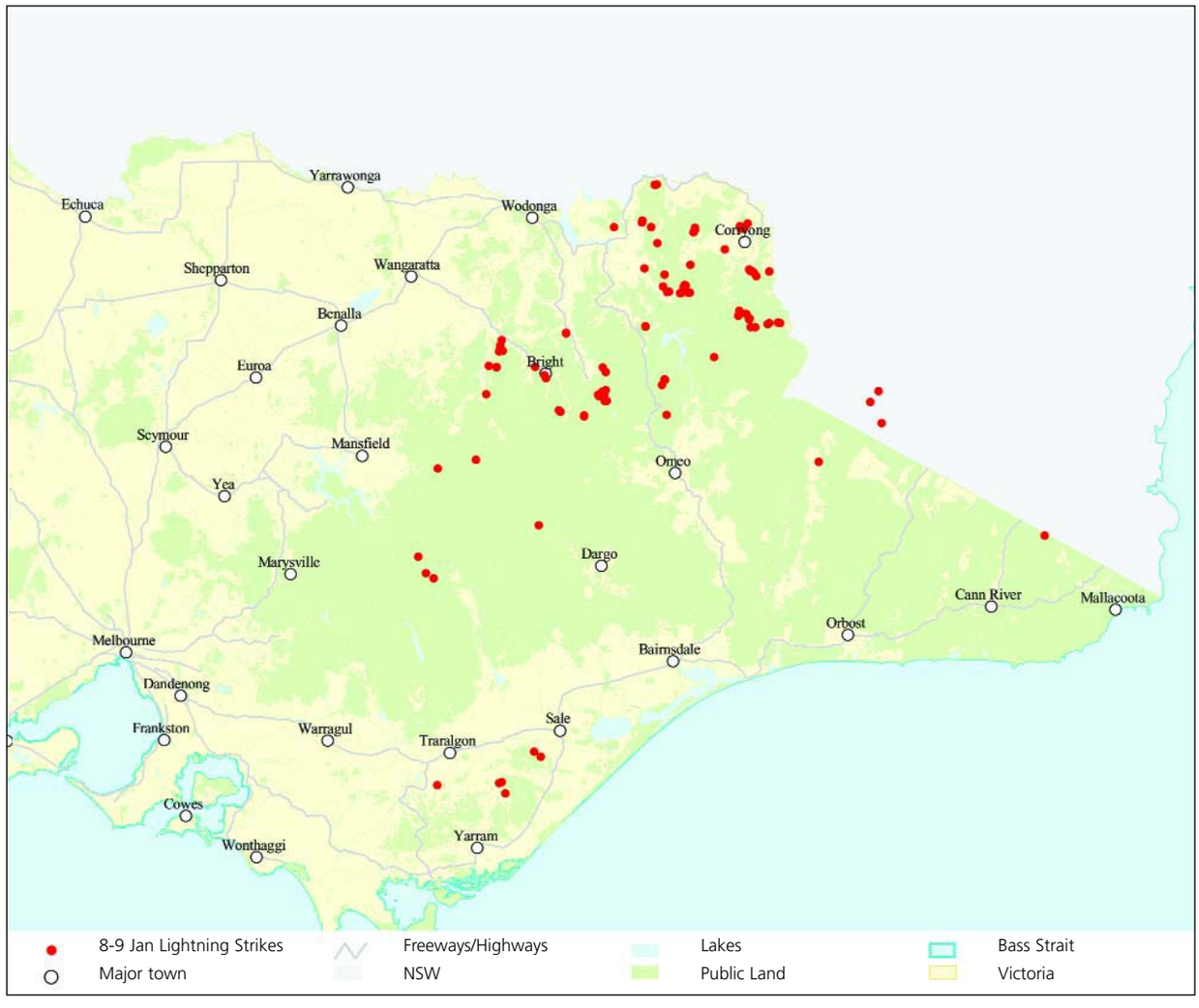
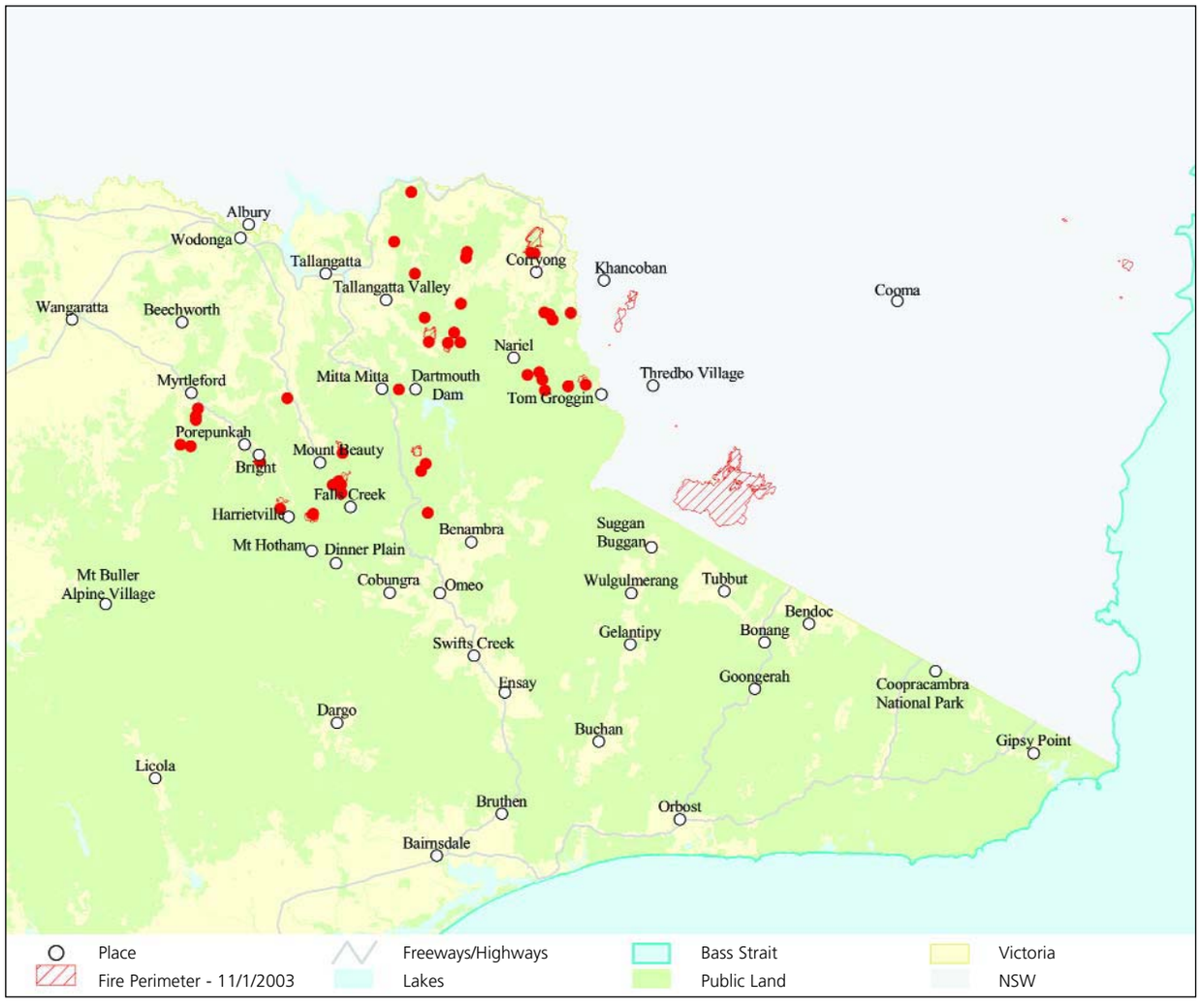


Figure 4.3: Fires Burning Day 4, 11 January 2003



The high volume Erickson aircrane, other aircraft and other resources were deployed early to Gippsland to help contain the fire there due to the threat to assets and private property. Despite this level of resourcing, two Gippsland fires – the Mullungdung fire north of Yarram and the Emu Track fire south of Sale – burnt around 8,000 hectares during the first three days, including private plantations worth four million dollars. The Mullungdung fire was the largest in the first week, requiring significant resources. However, by 11 January both these fires were contained.

The Fires Escalate – 14 January to 2 February

4.23 The weather deteriorated over the next fortnight and fire behaviour was increasingly intense and erratic. By 30 January, fire behaviour was at its most extreme.[8] The area affected by the fires increased exponentially. From more than 27,000 hectares burning on 15 January, the affected area increased to more than 230,000 hectares on the 24 January and around 700,000 hectares by 2 February.

4.24 The threat escalated dramatically as the fires impacted on private land and townships throughout the North East and Gippsland.

4.25 The fourteen fires in North East Victoria were grouped into two complexes: Upper Murray and Ovens. An Incident Management Team, staffed with DSE and CFA personnel, managed each fire.

4.26 January 14 saw a significant advance in all directions of the Mt Feathertop fire, particularly toward the Mt Hotham Alpine village. Fires from both New South Wales and Victoria crossed the border on 17 and 18 January.

4.27 On January 18, the day fires devastated Canberra,[9] there was a major expansion of the fires in Victoria. The largest fires were the Razorback (in the Mitta valley) and Pinnibar (south of Corryong) fires. On 18 and 19 of January, those fires began to join and create very large complexes as shown in Figures 4.4 and 4.5. Specifically:

- The Pinnibar complex fires joined;
- The Mystery Lane fires south of Corryong joined with the fires in the Kosciusko National Park (in New South Wales); and
- The Mt Feathertop and Bald Hill fires joined with the fires around Mt Bogong and Razorback, all of which were in remote, steep mountain country.

4.28 At this time, Harrietville and the Alpine resorts of Falls Creek, Dinner Plain and Mt Hotham were threatened and crews were deployed to help protect private assets. Among other new fires, lightning ignited a fire in the National Park near Tubbut in far-East Gippsland (near the border with New South Wales) on 17 January. This fire placed further demand on DSE and CFA at a time when resources were described as 'very stretched to whole time'.[10]

4.29 On 21 January, six fires started in the vicinity of Beechworth. Of these, four were controlled but the remaining two, known as the Stanley and Eldorado fires, spread rapidly with south-westerly winds gusting up to 50 kilometres per hour, very low humidity and temperatures over 30 degrees.[11] The Stanley fire threatened the outskirts of the Stanley township, destroying four houses and a large area of pine plantation. These fires were contained by 27 January.

4.30 On 22 January, residents of Bright, Wandiligong, Freeburgh and Porepunkah were warned that the Mt Buffalo fire was travelling in their direction. Fire was within 500 metres of Harrietville and the town of Dartmouth was under threat.

4.31 On 25 January, a Total Fire Ban was declared for the whole of the State and temperatures in the North East were in the 40s. (Melbourne's temperature that day was 44.5 degrees – the second highest on record after Black Friday, 1939.) Houses were threatened in the Buckland Valley, North West of Bright. CFA attended 237 incidents across the rest of Victoria on this day, some of which had the potential to become large outbreaks.

4.32 Another day of Total Fire Ban in the North East and Gippsland was declared on 26 January. The fire danger index was one of the highest of the fire period; fire behaviour was extreme and erratic. There was continuing threat to property at Mt Hotham and Dinner Plain; the township of Benambra was threatened, with three houses lost. A further six houses were lost near Cobungra along with sheds and stock.

8 A total fire ban was declared on nine days during this fortnight for either the North East or the State.
9 On 18 January, fires near Canberra destroyed pine plantations and generated a large, dry thunderstorm and tornadoes. The fire reached Weston Creek at the same time as a tornado. Combined, they resulted in the tragic devastation to Canberra suburbs, including Duffy, Chapman, Holder and Kambah. Overall, the fires burnt almost 70 per cent of the ACT – around 160 000 hectares.
10 DSE Submission to Inquiry; Victorian Alpine Fires, January to March 2003.
11 An Incident Management Team was established in Beechworth to manage these new fires.

Figure 4.4: Geographic Areas Affected by Fires Day 11, 18 January 2003

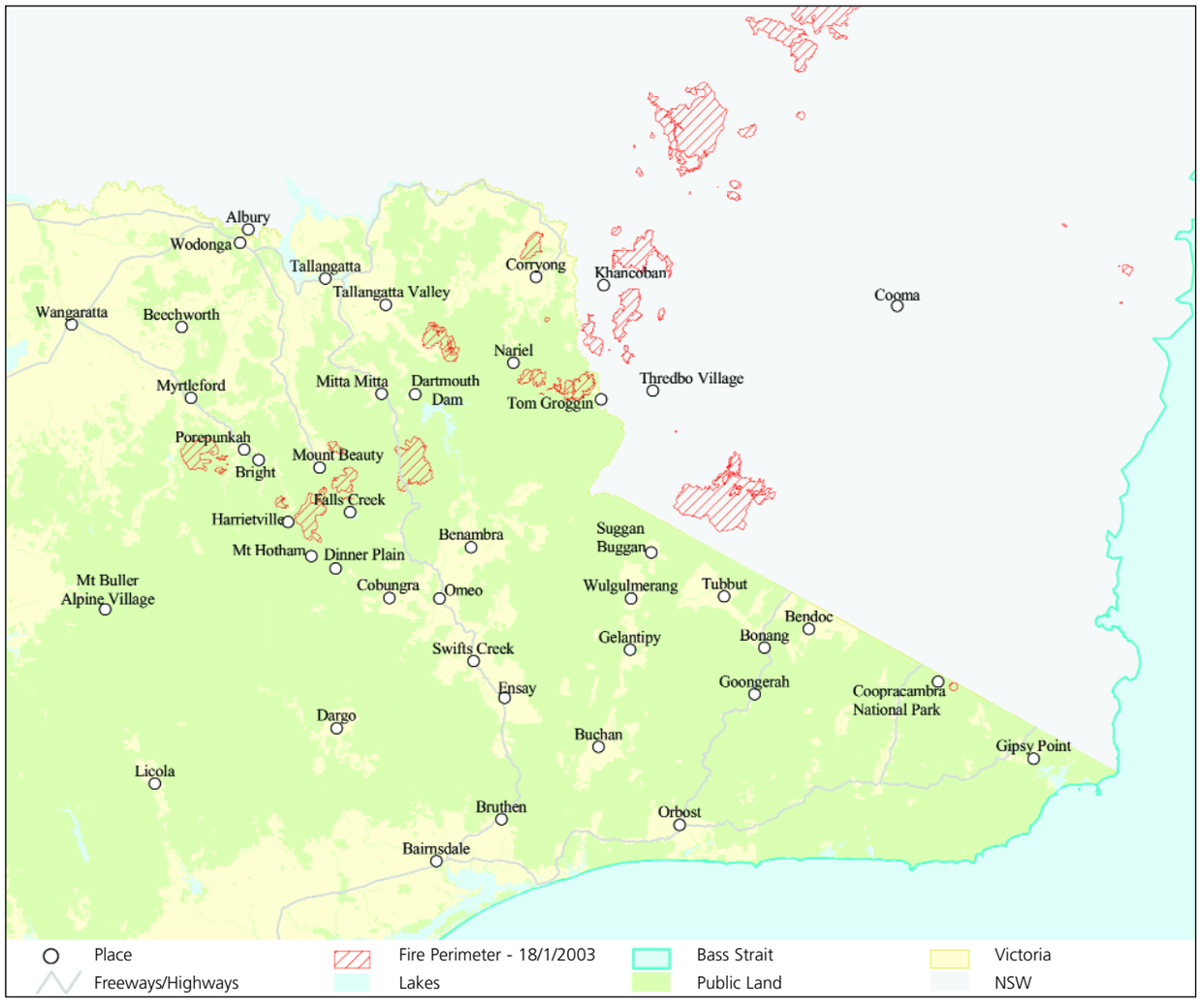
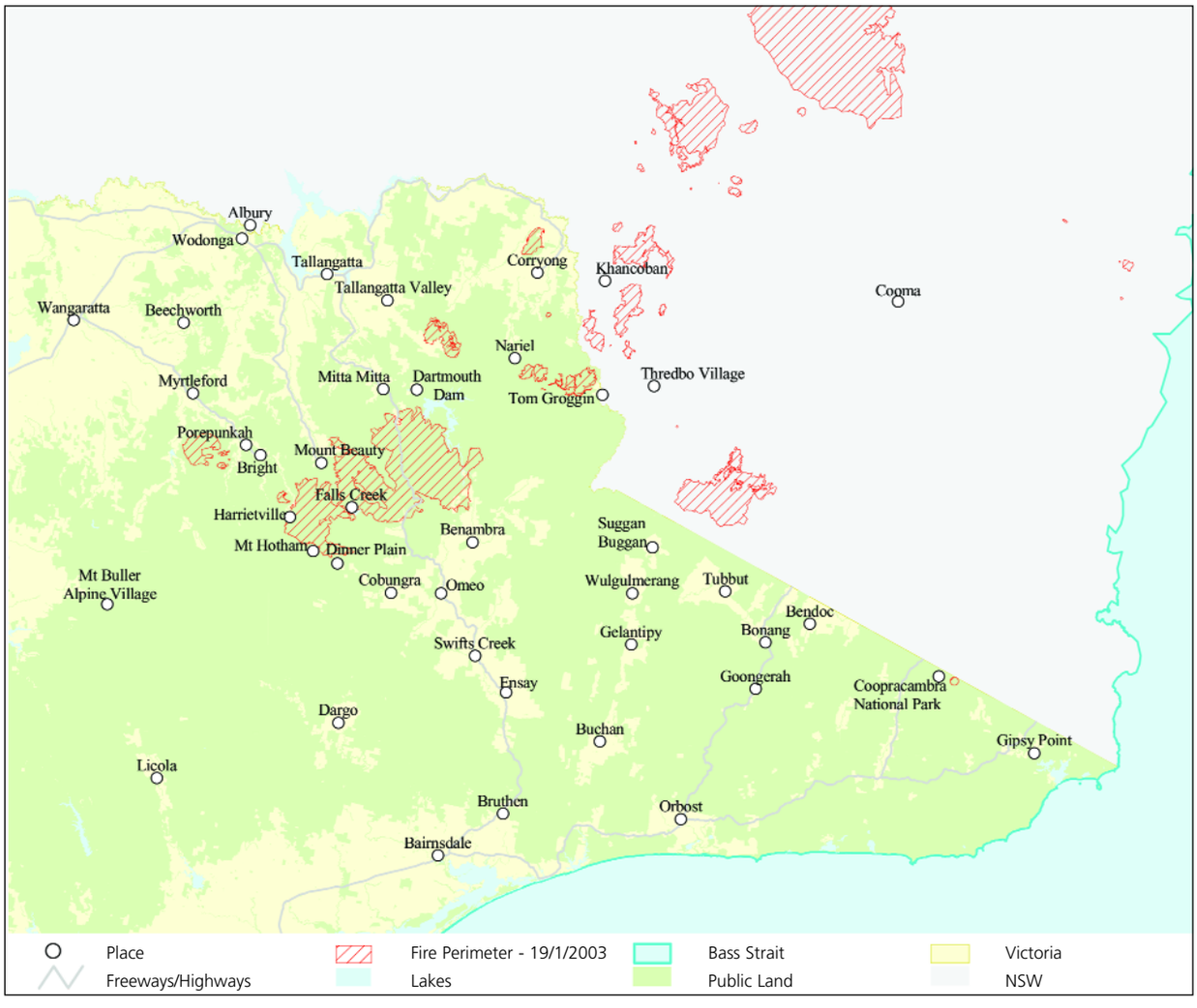


Figure 4.5: Geographic Areas Affected by Fires Day 12, 19 January 2003



Benambra is in a valley surrounded by the Alpine National Park. The town experienced significant threat from the fires for approximately 40 days, with three houses, grazing land and stock lost. Yet maps of the area burnt by the fires reveal a large section of unburnt country around the township, illustrating the community was galvanised into action to prepare and defend their land and assets under effective local CFA leadership. This included:

- Organising shifts of local people to act as lookouts at strategic locations, day and night, to report any fire or spotting activity;
- Establishing a most effective Divisional command post in the town;
- Establishing a community UHF operational network; and
- Organising support for operations.

4.33 The Pinnibar and Bogong complexes joined and this created a continuous area of fire stretching from Mt Hotham to Canberra. The Mt Buffalo fire grew rapidly in size. Extreme fire behaviour on the Bogong West complex required sustained firefighting with the fire burning to the edge of Dartmouth township and a fire run into Bogong Village that saw four houses burnt.

4.34 The fire reached within three kilometres of Omeo and Swifts Creek; Swifts Creek experienced an intense ember attack. The townships of Bright, Wandiligong, Freeburgh, Harrietville and Porepunkah were surrounded by fire for a week.

4.35 By late January, suppression efforts in these areas were focused on asset protection in and around townships and private property. As weather deteriorated, with hot to very hot conditions forecasted, a number of communities went on heightened alert.

4.36 Figure 4.6 shows the geographic area affected by fire on the 27 January 2003.

January 30: Intense and Erratic Fire Behaviour

4.37 January 30 was probably the single worst day of the fire season with intense and erratic fire behaviour:

- The Bogong and Pinnibar fires merged and stretched over 90 kilometres from the New South Wales border to Harrietville.
- The fire made a number of major runs of up to 40 to 50 kilometres in one day, speeds that were unprecedented. One of the largest extended from near Benambra in a south-easterly direction into Gelantipy and Wulgulmerang, another from south east of Mt Hope along the Victorian-New South Wales border towards the Snowy River.
- A satellite image shows a dramatic, intense area of fire approximately ten kilometres wide and two deep in the Dargo River catchment near the Great Alpine Road.
- The fires caused one or more thunderstorms in East Gippsland with lightning strikes occurring east of Gelantipy in the Snowy River National Park.
- A number of communities were under considerable threat including Benambra, Swifts Creek, Cassilis, Bindi, Mitta Mitta, Eskdale and Harrietville.
- The Mt Hotham Village was subject to a fire spotting and ember attack with the fire coming within metres of the buildings in the village.
- Four houses were lost in and around Omeo but extensive and aggressive firefighting saved further significant property damage.

4.38 Figure 4.7 shows the area affected by fire on 2 February.

Reduced Fire Activity – 1 February to 7 March

4.39 Several new fires were ignited by lightning on 31 January,[12] however, the following three weeks brought milder weather which generally reduced fire activity and reduced threat to assets.

4.40 This meant renewed effort could go to:

- Strengthening containment lines – especially around threatened communities;
- Protecting assets;
- Fighting spot fires;[13]
- Backburning;
- Patrolling and mop up in some areas; and
- Planning for rehabilitation of fire areas.

12 For example, on 31 January, new fires started near Cann River, Tubbut and Bonang.
13 These continued to be problematic – for example, on 6 February spot fires in Benambra and Bindi areas burnt 800 hectares of grazing land.

4.41 Despite this, some areas of the fire continued to create problems for Incident Controllers:

- The south-west perimeter of the fire from Abbeyard to Dargo was in very rugged, steep and rocky terrain. A long and protracted campaign was undertaken to establish control lines, with the fire continually breaking out for more than a month before the area was secured.
- The Tubbut and Deddick valleys experienced weeks of threat from fires in the surrounding National Park. A long campaign was waged to secure control lines to stop impact on private grazing land.

4.42 Figure 4.8 shows the areas affected by fires on 9 February 2003. By 10 February, fire had burnt over one million hectares of land.

21 February to 7 March

4.43 Rain in most areas across Gippsland helped to quieten fires. While lightning continued to ignite some fires in this region, they were quickly controlled. By 1 March, at least 95 per cent of the fire edge was contained. Crews and strike teams were rested or released.

4.44 On 26 February, storms and localised flash flooding washed a DSE vehicle into a stream in the upper Buckland Valley. Sadly, a DSE seasonal firefighter lost her life; the other two crew were rescued from the vehicle. During that same afternoon, a fixed-wing fire bombing aircraft crashed south of Mt Buffalo, injuring the pilot.

4.45 On March 7, the Chief Fire Officer of DSE officially declared the fire contained

Agency Response to the Fires

4.46 Firefighters attended over 3,000 fires during the December to March period. The total personnel directly engaged on the North East and Gippsland fires were 15,725.[14] Maintaining effective firefighting capacity over such a long period was an exceptional achievement on the part of Victoria's firefighting agencies.

4.47 In total, over 35 agencies – both government and non-government – were involved in the North East and Gippsland fires. In addition, DSE and CFA 'recruited' recently retired staff with specialised skills in developing containment strategies, mentoring, and managing the construction of containment lines.

Firefighting Personnel

4.48 Fires of this scale and intensity involve very large numbers of people and equipment.

4.49 In early February, at the peak of the fires, around 3,760 people were involved in the fire effort, excluding local CFA brigades. This figure includes 160 Defence Force staff, over 300 interstate firefighters, 33 alpine firefighting specialists from New Zealand and 35 personnel from the United States.

4.50 Apart from direct firefighting, staff worked in command and control operations, planning operations and logistics, aircraft-related duties, base camp support, media and community liaison, and liaison with police and other agencies.

4.51 DSE's narrative of the North East and Gippsland Fires provides a detailed, day-by-day account of staff and equipment deployed on the fire effort. In that report, DSE also describes an 'all hands to the pump' attitude in agencies and across government throughout the suppression activities. The utility companies, especially power and telecommunications, also worked co-operatively and pro-actively to maintain and restore services.

Keeping the Community Informed

4.52 The public's need for information grew exponentially during the fire event. This need for information is likely to increase during future fire events and the resourcing implications of this are discussed in Chapter 24.

4.53 In addition to traditional media such as television, press and radio, a range of flexible and localised communication strategies kept communities informed and engaged:

- Over 80 **community meetings** in the North East and Gippsland to brief residents on the fire situation and a further 172 in non-fire areas at the request of residents for information. Over time, these meetings moved to recovery issues;
- Specialist **call centres** set up in response to public demand;[15]
- **Community newsletters** updated and distributed twice daily by individual Incident Management Teams to keep people informed;
- **CFA and DSE's websites**, which were updated several times daily with fire information (the DSE website had 106,000 'visits' during the fire period);

14 Country Fire Authority, *From the Foothills to the Alpine Heights*, CFA's Submission to Victoria's 2002-03 Bushfire Inquiry, 2003.

15 For example, due to public demand, an enhanced call centre was set up at World Vision headquarters on 24 January. Nine hundred and thirty eight calls were received in the first five and a half hours. On 25 January, 3,554 calls came in over a fourteen-hour period. An additional call centre was set up in Traralgon to give specific information to east Gippsland residents.

Figure 4.6: Geographic Areas Affected by Fires Day 20, 27 January 2003

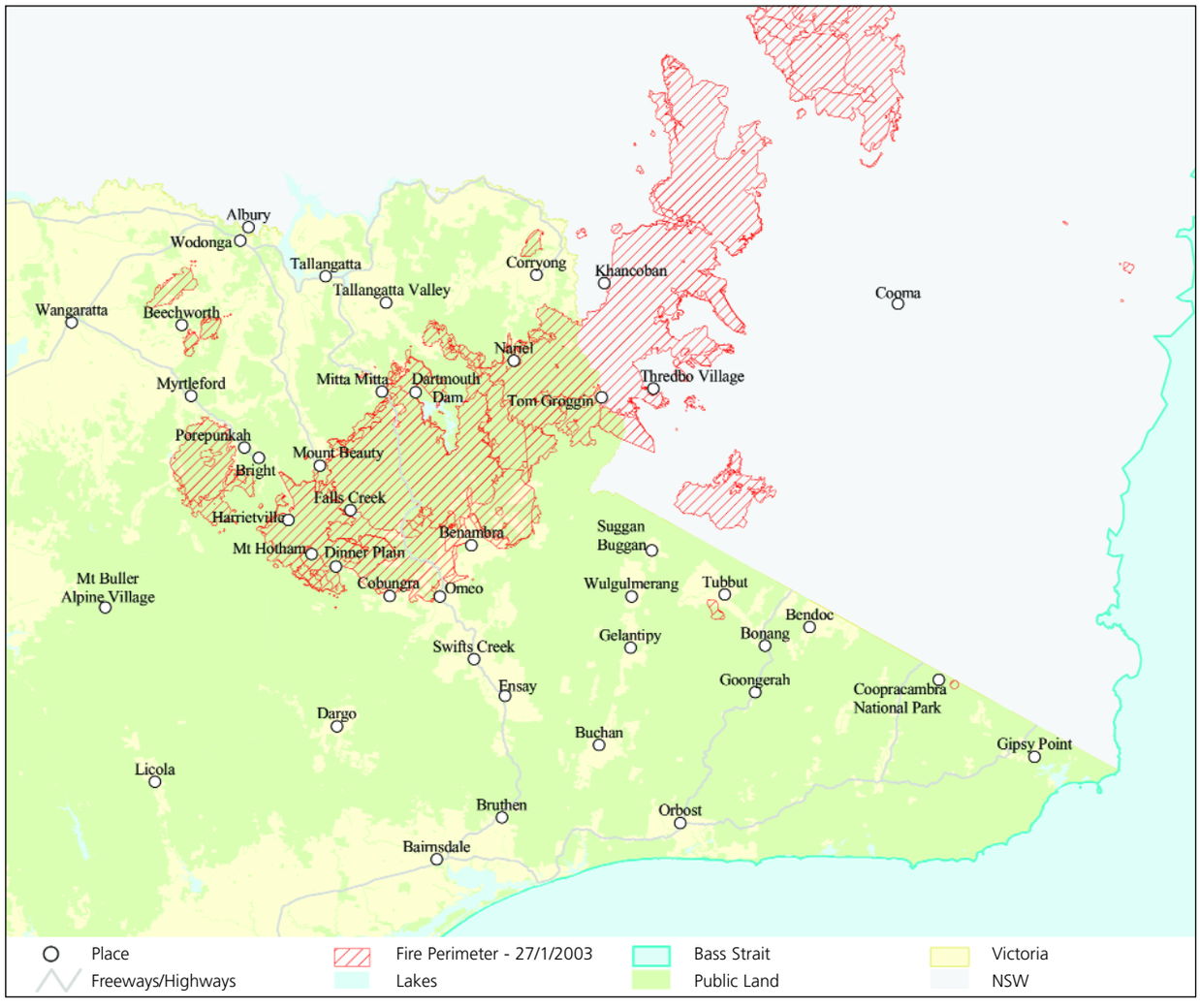


Figure 4.7: Geographic Areas Affected by Fires Day 26, 2 February 2003

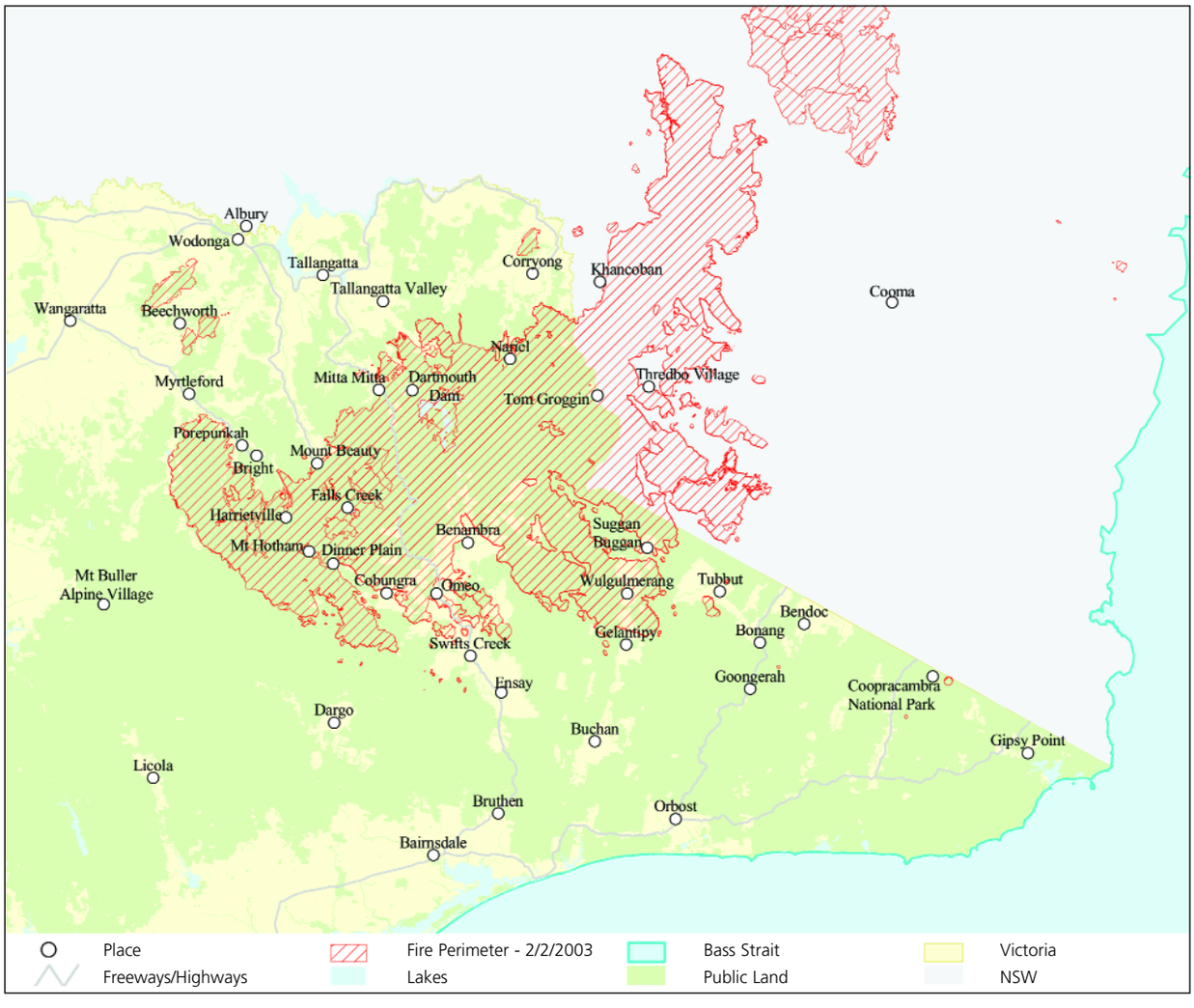
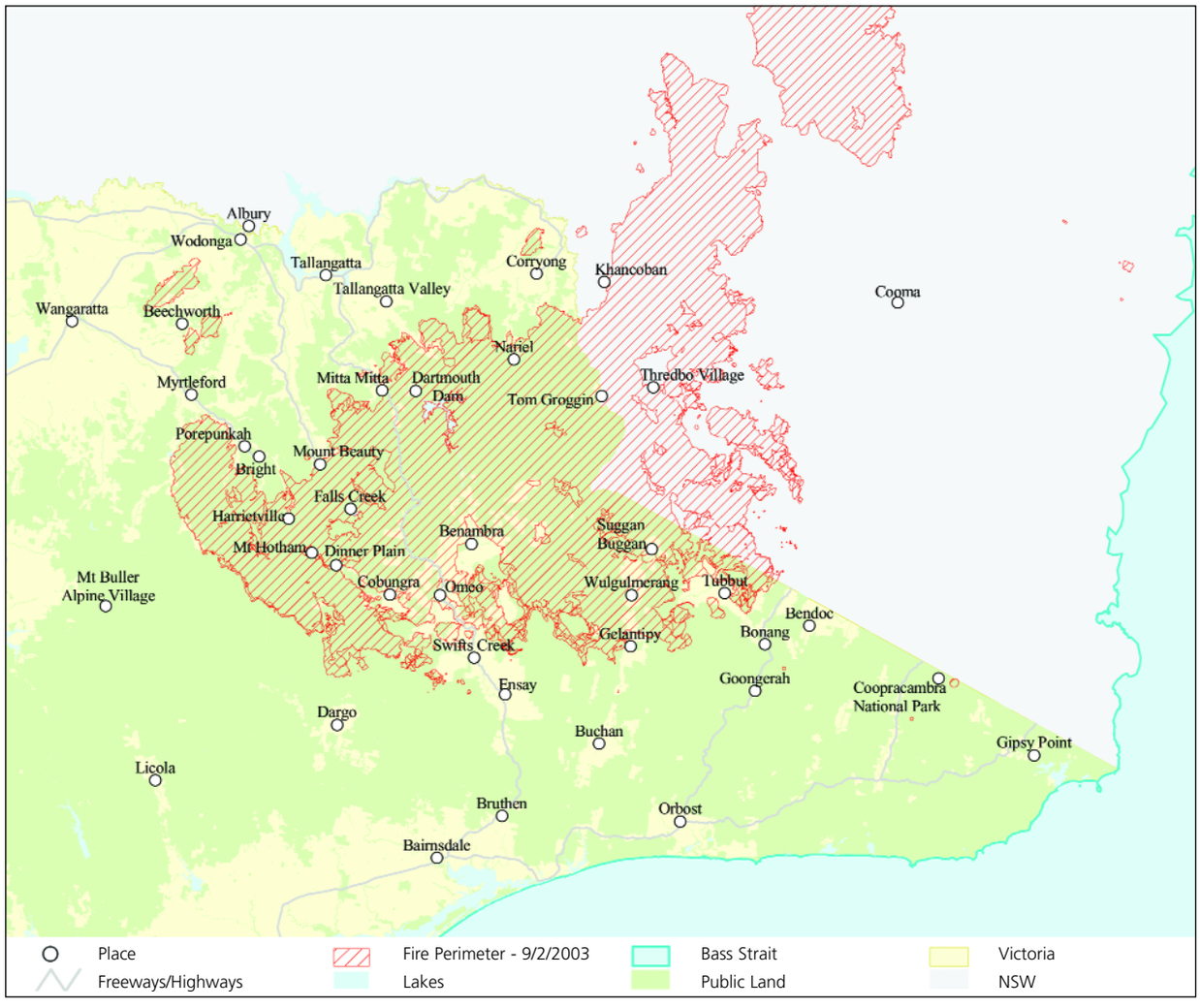


Figure 4.8: Geographic Areas Affected by Fires Day 33, 9 February 2003



More than half of the estimated 15,725 personnel engaged in the fires were CFA volunteers. 8,595 volunteers from 674 brigades fought a long, difficult campaign often giving up their normal businesses or employment.

"Many of our CFA members are dairy farmers. Some had to pay for relief milkers to replace them while they went out to the fire fronts. Others relied on family members to maintain their businesses."

Quote from Submission by John R. Cardwell, Captain, Mitta Rural Fire Brigade, Deputy Group Officer, Tallangatta Group. Submission no. 119.

- **Information phone lines** maintained by CFA, Victoria Police and specific shires;
- **Media releases** to alert residents of threat and advise on appropriate actions and where to get more information;
- **Regional radio and TV** stations used effectively to communicate fire information to rural communities; and
- CFA **'phone trees'**, a system whereby messages are communicated though the community by a series of phone calls from person to person.

The Media's Role

4.54 The media is a natural partner in emergency situations, imparting information during the event. It acts as a source of information throughout recovery and the critical community debrief phase.

4.55 The media was a valuable partner over the summer of 2002–2003 and National, State and regional radio stations, print and electronic media, played important roles throughout the fires. DSE states that the media generally, but regional radio in particular, assisted Incident Management Teams to get urgent information to communities across the fire area. This level of partnership is without precedent.

4.56 In particular, ABC regional radio should be commended for services to Victorians during the bushfires. ABC regional radio was a reliable source of information for Victorians throughout the entire summer fire season, most notably in the response effort to the North East and Gippsland fires. Submissions and consultations noted that they provided reliable information.

Impacts of the Fires

4.57 The 2002-2003 fires affected 1.12 million hectares in North East Victoria and Gippsland and 181,400 hectares in the Big Desert. Vast areas of forest were burnt, some very intensely. The drought meant that mountain gullies and southerly slopes that in most other fires would remain unburnt, were dry enough to burn. This extensive impact is second only to that caused by the 1939 fires which also had a substantial effect on both people and environment.

4.58 Throughout the fire emergency, the safety of fire crews and the wider community were afforded the highest priority. DSE is right to claim it is a significant achievement that no lives were lost as a consequence of what was, at times, extremely dangerous fire behaviour.[16]

4.59 While extensive hectares were burnt, there was minimal damage to structures compared to earlier fire events and similar events elsewhere. Some 108,393 hectares of private land (including farms and 2,500 of plantations), 41 houses, over 213 other structures, over 3,000 kilometres of fences and over 9,100 stock were confirmed lost.[17]

4.60 While this is clearly serious for those affected, the levels of loss were relatively low given the length of the fire campaign and its severity. This is testimony to both the careful preparations by individuals and communities and to the skill of fire crews once the fire front arrived.

16 For example, a CFA strike team in the Tambo/Bairnsdale area was in a near-miss situation when their truck became trapped in the fire at Cobungra in an intense ember attack.

17 Country Fire Authority, *From the Foothills to the Alpine Heights*, CFA's Submission to Victoria's 2002-03 Bushfire Inquiry, 2003. Appendix G pp 1–3.

Lost:	41 houses
Protected:	1,000 houses within the perimeter of the fires
At risk:	7,000 houses within five km of the fire perimeter and 12,000 houses within 10 km

Source: Country Fire Authority, *From the Foothills to the Alpine Heights*, CFA's Submission to Victoria's 2002-03 Bushfire Inquiry, 2003. Appendix G.

Impacts on Firefighters

4.61 DSE employed psychologists throughout the fires to support staff in what was a long campaign with many setbacks and difficulties. CFA deployed Critical Incident Stress Peer Support teams to provide emotional support to firefighters and incident managers throughout the fires. In their report to DSE, the psychologists stated that the main issue facing staff was fatigue. While, early in the fire, high morale and a spirit of co-operation countered this, morale suffered as the fire campaign progressed. For those who experienced danger, there was often a sense of bewilderment, shock and disbelief at what had transpired. Others experienced fear.[18]

4.62 The Inquiry's consultations and conversations support these observations. Keeping in mind the positives of camaraderie and co-operation, firefighters told us of fatigue, frustration, stress and distress.

Impacts on Communities

4.63 The Inquiry heard and read hundreds of stories about the impact of the fire on individuals and communities. Understandably, many found the fires an overwhelming experience. Those in fire-affected areas spent weeks under great pressure as they lived in a state of fire readiness with decreased air quality and visibility. In addition, they lived with the fear of losing their homes, property, stock, fences and land.

4.64 For others, those losses were very real, with significant financial impacts and implications for their future livelihood. The continuing impacts on communities are no less significant as they face regional economic hardship, continued water quality problems and reduced infrastructure and amenity.

4.65 However, many submissions to the Inquiry also highlighted the positive impacts of the fires. First, community bonds were forged through hardship. Second – and perhaps more importantly – there was a renewed and heightened awareness among communities of the serious and ongoing risk posed by fire. A person from Mt Hotham expressed this well:

'None of us were or are firefighters but we came away with renewed respect for what mother nature is capable of dishing out and we will ensure that we remain cognisant of the precautions we must continually take to fireproof our properties. My last bush fire experience at Hotham was during the 1985 fires but nothing then prepared me for this latest event.'[19]

4.66 Consultations showed that many communities and individuals affected by the fires were able to make informed choices because of the CFA's community education programs.

Conclusion

4.67 This Chapter has outlined the significant achievements and losses that are part of the 2002-2003 fire story.

4.68 That fire story is far from over. The impact on our land, our communities and our firefighters continues with environmental, financial and psychological costs. As our next Chapter shows, the fires strained relationships between communities, agencies and Government. Effective recovery must therefore involve working together and rebuilding productive relationships between communities, agencies and Government must be a priority.

18 DSE, Victorian Alpine Fires, January to March 2003, p. 18

19 Quote from Peter Malkin from a CD-ROM produced by the CFA: Bushfires 2003, about the experience of communities at Mt Hotham and Dinner Plain during the fires.

Health Impacts of Smoke during the 2002–2003 Bushfires

The Department of Human Services (DHS) reported the following statistics in relation to the 2002 –2003 bushfires. DHS states there is no conclusive trend in relation to possible direct health impacts of the fires – for example, through acute or chronic smoke inhalation.

- Total State Hospital Admissions for January to March 2003 (compared to same period 2002) was 265,572 admissions (down five per cent from the previous year). Of these figures there were 6,148 respiratory-related admissions in the same period (up 2 per cent).
- DHS conducted a study of potential smoke impacts in the North East during these three months. The total admissions for the first three months of 2003 were 7,847 (7,977 for the same period in 2002). Of these, respiratory disease contributed 157 admissions; in 2002 this figure was 161.

Source: Department of Human Services

The 2002-2003 Fire Season at a Glance

- Over **3,000 fires** burned from December to March.
- Firefighters worked on the ground for **over 70 days**.
- Over **1.12 million hectares** were affected in Victoria's North East and Gippsland.
- Over **181,400 hectares** were affected in the Big Desert.
- Over **35 agencies** were involved in fighting the fires and support roles, as well as interstate, New Zealand and US firefighters.
- The total personnel directly engaged on the North East and Gippsland fires was **15,725**. A peak of over **3,760 personnel** were involved at any one time.
- **8,500 people** attended over 250 community briefings.
- DSE's website had **106,000 visits** during the fire season.

Chapter 5
Submissions and Community Consultation

Overview

5.1 The Inquiry received 273 written submissions from individuals and organisations and spoke with over 400 people as individuals, or in groups. The submissions were diverse, ranging from the highly critical to notably positive. Within individual submissions comments on issues would often vary markedly. The consultations echoed the submissions, the complexity of issues raised and solutions proposed; thus presenting a challenge for the Inquiry.

5.2 This Chapter documents the five key themes raised in the submissions and consultations, relevant to the first two Terms of Reference. These are:

- Land management preparedness, particularly the issue of fuel reduction on public land;
- Agency preparedness;
- Response issues relating to how the fire was fought;
- Management of resources; and
- Recovery issues.

5.3 Our summary makes no comment or judgement on the views contained in the submissions and consultations. Instead, we aim to convey to the reader the breadth, and depth, of issues raised and to document areas of particular concern. These provide important context for our later analysis, discussion and recommendations in Parts B, C and D.

5.4 The Terms of Reference required the Inquiry to give recommendations for a way forward (the third Term of Reference) and the community responded to this. The specific comments addressing the third term of reference have not been included in this analysis as they were difficult to codify due to their wide-ranging nature but have been used to inform Part B through to Part E of the Report.

5.5 In broad terms, fire-affected Victorians asserted that the few fires that got away did so because of a complex combination of circumstances and poor decision-making. They identified three key strategies to improve future efforts:

- Better use of local knowledge;
- Better communication and planning between the agencies and local community; and
- Greater consistency from all levels of government on key policy issues such as fuel reduction burning, and private/public and urban/rural land interface.

5.6 Having said this, our community consultations showed that many Victorians were sincerely appreciative of those who fought in and supported the fire efforts.

The Submission and Community Consultation Process

5.7 The Inquiry called for 'written, signed submissions from persons or organisations who wish to provide factual information or express an opinion on the terms of reference or any aspect of them'.

5.8 The Inquiry's Terms of Reference (outlined in Chapter 1) were published in the Melbourne metropolitan papers and country papers in April and May 2003. While the deadline for submissions was 30 May 2003, the Inquiry continued to take submissions until August 2003.

5.9 Over half of the 273 submissions were from individuals or households commenting on the specific Terms of Reference; others related personal experiences or the experiences of family, friends and neighbours. A quarter of all submissions were from commercial and private organisations or groups, with the remainder from Government, authorities and individual fire brigades. Some submissions were highly specific; others were a more general response to the Terms of Reference. Some were scientifically based. Within submissions, comments on various issues varied markedly.

5.10 In addition to written submissions, the Inquiry also undertook a community consultation process, to:

- Revisit some of the recurrent issues raised in written submissions;
- Hear from those who were unable to participate in the formal, written processes; and
- Meet face to face with those who had prepared a submission so that their concerns could be more thoroughly explored.

5.11 However, some issues that arose during consultations did not feature strongly in the submissions. These issues may have gained importance as time passed and the environment calmed and again this has informed our thinking in Parts B to E.

5.12 Throughout this Chapter the reader will note that negative comments outweigh the positive statements. This is to be expected when one seeks views from the community and specialist stakeholders' on how to improve the State's planning, preparation and response to the threat of bushfires. This process was no exception.

5.13 Finally, it was not possible for the Inquiry to investigate in detail every anecdote and incident raised in submissions and consultations. Rather, the Inquiry focused on the broad themes and issues that emerged from the submissions and consultations and this informed our research, investigations and eventually our recommendations. There were however five exceptions. Five case studies relating to specific incidents and lessons that can be learnt from these events are detailed in Parts C & D.

Origin of Submissions

5.14 Figure 5.1 shows the geographic focus of the submissions. Where it was made clear in the submission, they have been grouped according to the fire area of principal interest:

- More than half of the submissions focused on, or came from residents of, the fire-affected areas of North East Victoria and Gippsland.
- Remaining submissions covered Victoria-wide issues, specific fire events and issues outside the Terms of Reference.
- Submissions from State agencies and business organisations covered a wide geographic area, as did the science and research-based submissions.
- A large number of the Statewide submissions came from the Melbourne Metropolitan area.

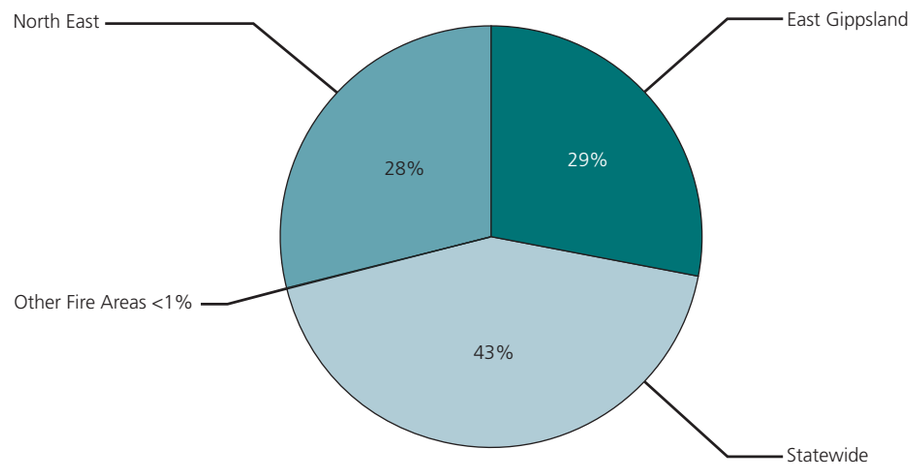
Key Themes

5.15 Figure 5.2 shows the level of comment in relation to the first two Terms of Reference.

5.16 To assist with processing and analysing the submissions, issues have been grouped under broad themes that are derived from the terms of reference. Once again, we make no comment on the validity or otherwise of the opinions and views expressed in submissions, but seek to assist the reader in understanding the breadth of issues raised. Comments were evenly dispersed across each of Terms of Reference 1 and 2, with land management preparedness and response issues receiving the most attention from respondents.

5.17 Table 5.1 summarises key thematic concerns against the first two Terms of Reference.

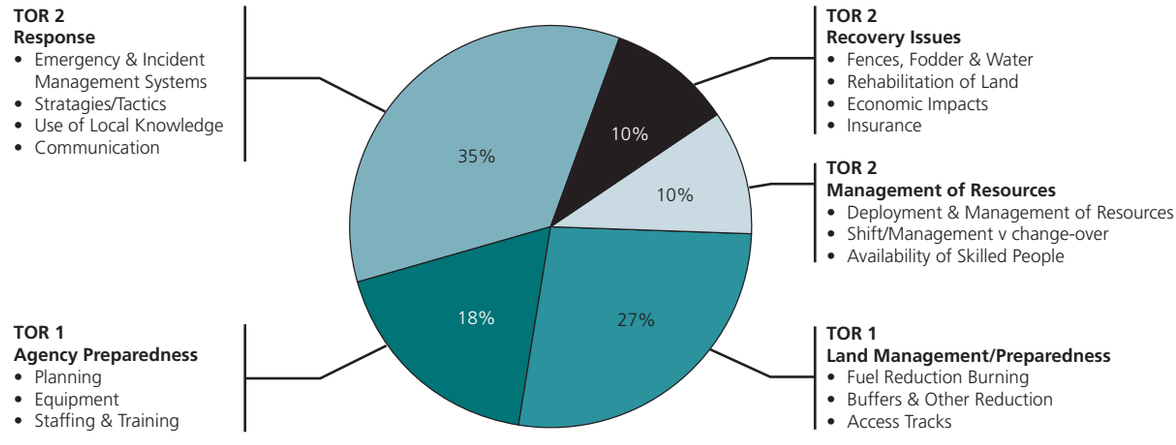
Figure 5.1: Geographic Focus of the Submissions



Source: Data compiled from 273 submissions recieved by the Inquiry into the Victorian Bushfires 2002/2003

Figure 5.2: Percentage of Comments Received by Terms of Reference 1 and 2 by Category

Chart indicating the number of comments made (positive and negative) in relation to the Terms of Reference (TOR)



Source: Data compiled from 273 submissions recieved by the Inquiry into the Victorian Bushfires 2002/2003

Table 5.1: Summary of Five Key Thematic Concerns; Terms of Reference 1 and 2.

Term of reference	Five key thematic concerns
TOR 1 Examine the effectiveness of preparedness for the 2002/2003 bushfire season, including hazard reduction and the mobilisation of resources.	1. Land management/preparedness - Fuel reduction/prescribed burning; - Access tracks; - Plantation management; - Grazing on public land; and - Land management at the interface – private/public and urban/rural. 2. Agency preparedness - Planning; - Equipment; - Training; and - Research and Development.
TOR 2 Assess the effectiveness of the response to the 2002/2003 bushfires, including emergency management procedures, multi-agency response and co-ordination and resource deployment.	3. Response issues - Strategy/tactics; - Utilising local knowledge and experience; - Emergency management arrangements; - Public information and communication; - Risk aversion; and - Asset protection. 4. Management of resources - Allocation of resources; - Availability of skilled people; - Shift changes; - Strike teams; - Use of defence force personnel; and - Firefighting at night. 5. Recovery issues - Fences; - Economic impacts; - Land rehabilitation; - Restoration of public utilities; and - Other general recovery matters.

5.18 As stated, this Chapter details the comments under the first two Terms of Reference, these group into five thematic concerns:

- Land management preparedness;
- Agency preparedness;
- Response issues;
- Management of resources; and
- Recovery issues.

5.19 For each Term of Reference, snapshots of positive and negative comments for issues identified by respondents were developed into a bar graph.

Term of Reference 1

'*Examine the effectiveness of preparedness for the 2002/2003 bushfire season, including hazard reduction and the mobilisation of resources.*'

5.20 Submissions addressing, either in part or in full, the first Term of Reference, were grouped and analysed within two broad themes; *land management preparedness* and *agency preparedness*.

Land Management/Preparedness

5.21 Land management preparedness attracted considerable comment and focused on the following issues:

- Fuel reduction/prescribed burning;
- Access tracks;
- Plantation management;
- Grazing on public land; and
- Land management at the interface – private/public and urban/rural.

5.22 Of these, fuel reduction burning and access tracks attracted the most comment.

5.23 Figure 5.3 gives a snapshot of the positive and negative comments made in respect to land management preparedness

Fuel Reduction/Prescribed Burning

5.24 The issue of fuel reduction burning to reduce the threat of fire attracted considerable comment. Comments represented a wide range of views about the role, history and process of this practice. Overall, comments were constructive and based on the experiences of individuals and organisations that have undertaken various fuel reduction activities.

5.25 Opinion was clearly divided between those who strongly advocated prescribed burning, noting its benefits and potential, and those who felt it was inappropriate or should be carefully considered and used only in particular circumstances. Submissions acknowledged that recommendations from previous Bushfire Inquiries advocated the role of fuel reduction burning to mitigate the effects of unplanned fires.

5.26 Submissions primarily focused on:

- A perception of lack of fuel reduction on public land;
- The restrictive criteria for performing fuel reduction burning;
- Resourcing constraints for fuel reduction; and
- The consequent high fuel load on public land.

5.27 Private land owners raised the possibility of undertaking fuel reduction burning in public land adjacent to their own. They also noted the restrictions in place under the Native Vegetation Framework that prevent them from clearing native vegetation.

5.28 Some comments highlighted the existence of the 1995 Code of Practice for Management of Fire on Public Land and contended that the Department of Sustainability and Environment (DSE) and Parks Victoria had not met minimum standards under this Code.

5.29 Others commented that documentation on the effectiveness or otherwise of annual fuel reduction and environmental burn programs was inadequate. Another concern was that the wider community had come to view all fires as bad and in need of immediate suppression.

Suggested Alternatives

5.30 A number of submissions suggested alternative reduction strategies. They acknowledged that the community and key fire agencies must be active partners in broader Municipal Fire Prevention Plans and that these plans should cover both public and private land.

Figure 5.3: Land Management/Preparedness

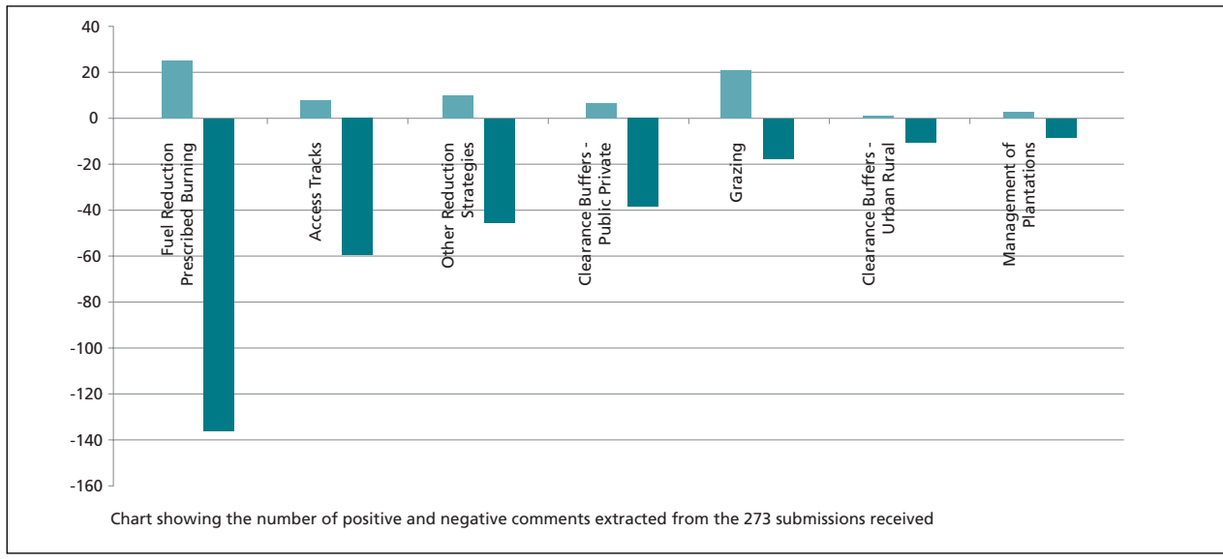


Chart showing the number of positive and negative comments extracted from the 273 submissions received

5.31 Some suggested solutions included:

- Reintroduce fire wood collection from public land;
- Increase slashing and/or controlled grazing along roadsides;
- Modify the application of the Native Vegetation Legislation;
- Include more members of the community in actual reduction operations; and
- Involve DSE 'Project Firefighters', local landowners and CFA staff and volunteers in fuel reduction activities to increase their skills and knowledge. Submissions suggested that this would provide additional opportunities for training, integrated fire management experience and succession planning.

Access Tracks

5.32 Many submissions were critical of the quality and number of access tracks on public land, in particular, in State and National Parks. Many submissions called for a review of the maintenance and closure of access tracks.

5.33 Some submissions asserted that new access tracks were created during fire suppression activities in relatively close proximity to older, established access tracks that had been allowed to fall into disrepair. Respondents preferred to see older, established tracks re-opened because:

- Older tracks were established on more appropriate gradients and in better fire control locations. This made them more stable and, therefore, safer;
- New tracks created less stable creek crossings;
- New tracks had a greater potential to introduce plant and soil disease; and
- Opening old tracks created less disruption to natural resources than creating new tracks.

5.34 Currency in access track mapping was also raised, as was the importance of up-to-date fire suppression maps, particularly in National and State Parks. Some water authorities with responsibility for water harvesting noted they already conduct an active program of access tracks maintenance for firefighting and other requirements.

5.35 Proposals in submissions included opening tracks prior to, and following, the summer fire season so that visitors could help park management keep tracks clear and report problems. Tracks could be closed off after this period.

Plantation Management

5.36 Submissions identified a number of issues regarding the planning, design and location of plantations. In particular, plantations adjacent to urban areas and isolated rural communities were identified as high risk. Most submissions on this topic suggested the pursuit of practical management solutions to minimise this risk, for example:

- Improved management of ground fuels and residue following the harvest of commercial forests; and
- The creation of appropriate buffers and access tracks between plantations and private land to ensure access to communities in the event of a fire.

5.37 Other submissions positively discussed the fire minimisation strategies undertaken by commercial forestry, including use of their own brigades and training and the development of forestry management standards.

Grazing on Public Land

5.38 The majority of submissions commenting on this issue were supportive of grazing on public land to reduce fuel loads, particularly in the Alpine and High Country.

5.39 To support this position, some submissions noted scientific findings and photographic evidence in support of grazing and suggested a 'cultural value' in alpine grazing. However, other submissions sought a reduction in grazing, also citing scientific evidence to support their case.

Land Management at the Interface

5.40 A range of issues arose regarding land management at the public/private and rural/urban interface.

5.41 The common perception was that buffers between public/private lands were inadequate and appropriate land clearance regimes were needed to inhibit the spread of fire from public to private land. Some submissions noted that fire also travelled from private land to public land and that private land management regimes should also be addressed.

5.42 Respondents said that because of inadequate buffers on public land and the perceived high fuel loads; agencies were forced to fight the fire on private land.

Proposals

5.43 Suggestions included:

- Creating buffers that could range from ten metres to two kilometres wide;
- Developing individual, co-operative planning arrangements for interfaces;
- Creating a cleared track on public land adjoining private land to allow improved access, and from which backburning or other suppression efforts could occur; and
- Developing a uniform policy on buffers between the urban and rural interface.

Agency Preparedness

5.44 When commenting on agency preparedness, four key issues were constant:

- Planning;
- Equipment;
- Training; and
- Research and Development.

5.45 The majority of comments were not detailed but did offer some suggestions for better practice. Figure 5.4 gives a snapshot of the positive and negative comments made about agency preparedness.

Planning

5.46 The issue of planning attracted considerable comment. Comments focused on the individual fire prevention planning completed by DSE and Municipal Councils, the relationship between the agencies plans and the level of community input into such plans.

5.47 There was a perception that DSE prescribed burning plans were a near-completed product by the time they were presented to the community and to the Municipal Councils for consultation. The perceived impact was that DSE planning did not adequately account for the priorities of the community, particularly those adjacent to public land.

5.48 The question of how our National and State Parks are managed was often raised. Respondents asserted that fire management planning must involve a wider cross-section of the community. Many were aggrieved that environmentalists had, in their view, exerted too great an influence in the planning processes. They believed conservation was given higher priority than fire prevention activities.

Figure 5.4: Agency Preparedness

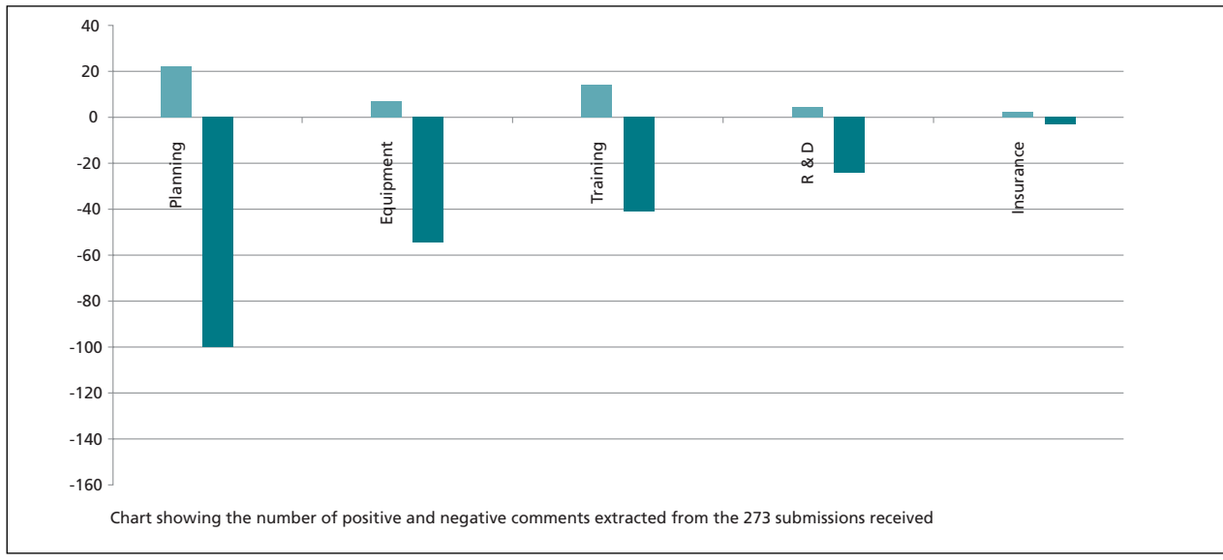


Chart showing the number of positive and negative comments extracted from the 273 submissions received

5.49 There was a perception that Local Government did not fully involve the appropriate stakeholders in developing Municipal Emergency Management Plans, Municipal Fire Prevention Plans, and local area and land management plans. This was seen to limit key firefighting agency and community input.

5.50 However, comments acknowledged that the Municipal Fire Prevention Plans were developed primarily by CFA Brigades and Local Government and contended that DSE and the community were not actively involved. This was thought to result in lack of understanding and ownership and, in some cases, failure to implement the plans. Similar comments were made regarding the input to, and ownership of, the Municipal Emergency Municipal Plans. Further to this, some comments identified the importance of using planning tools such as wildfire overlays and adopting relevant building codes in fire-prone areas.

5.51 Numerous comments identified the successes and benefits of adequate planning and involvement.

Proposals

5.52 Respondents offered specific strategies to improve the planning process:

- Adequate water storage should be planned and developed on public land, reducing reliance on private water storages when fighting fires on public land;
- Public infrastructure should be considered a resource in both response and recovery phases;
- Planning should identify the priority order of assets for protection – environmental, farming and community assets, as well as public and private assets;
- Planning should address school closures, impact on curriculum, bus services to schools and other destinations; and
- Planning should address community infrastructure concerns and their management during and following emergency events – for example, cultural heritage sites, power and roads;

5.53 Respondents also suggested that more use of photographic 'before and after' evidence would help communicate the importance of effective planning.

Equipment

5.54 Comment on the adequacy, mix and quality of equipment was a key feature of submissions, especially from those who personally fought the fires. Comments were diverse as were suggestions on how best to equip the fire services for the future.

5.55 A key issue with operational equipment was ensuring the right mix of equipment to terrain and circumstance.

5.56 Considerable comment focused on the role of aerial firefighting – in particular, the need to use aircraft earlier. Other expressed concerns were:

- Getting the mix of aircraft right;
- Ensuring adequate air strips and water supplies; and
- Having an appropriate aerial fire detection strategy.

5.57 Comment also focused on the perceived need for a better match between firefighting vehicles and terrain. The suitability of small to medium-sized tankers and slip-on units in the steep terrain of the North East and Gippsland was supported and promoted. Respondents noted that some vehicles from outside areas did not have appropriate devices such as inclinometers. Other submissions questioned whether materials used on fire trucks were appropriately fire and heat resistant.

5.58 Further comments were made about the use and selection made of earth-moving equipment. Respondents noted an inconsistency in hygiene requirements (to minimise the spread of soil and plant disease) between earth moving equipment and firefighting vehicles: earth-moving equipment was required to meet set hygiene standards; firefighting vehicles were not.

5.59 Other equipment issues raised in the submissions dealt with communication systems, the quality of maps and appropriateness of clothing for firefighters. A common suggestion was to standardise general and field communication systems. Strike teams called for better quality maps and signage for access roads and tracks – important for those deployed from outside the fire area.

5.60 Some comments highlighted the need for improved food storage and transport facilities for meals. An increase in quality and quantity of backup equipment (such as portable generators to maintain operations when power was lost) was also suggested.

5.61 The submissions also related positive experiences with equipment use, noting in particular the benefits that flow from the appropriate mix of equipment. Comments were positive regarding the use of private machinery and the versatility of slip-on units with private four-wheel drive vehicles. Telstra's assistance in providing additional telephone and mobile phones was also acknowledged.

Training

5.62 Respondents were generally supportive of the benefits of training. Various agencies and utility service providers also commented on the case for appropriate training to minimise risk. However, some comments claimed that training and accreditation for volunteer firefighting was considered too burdensome. They nominated this as a reason for not being able to participate in the fire efforts. There was also a perception across submissions that knowledge, skills and experience of firefighters was on the decline.

5.63 A large number of submissions recommended there should be more training for the broader community.

Proposals

5.64 Suggestions to improve training included:

- Increase training for CFA and DSE in regards to firefighting, strategic planning, response and training for machinery operators;
- Maintain and, in some specific cases, increase training for firefighters, plantation staff and media crews; and
- Use fuel reduction burning as a tool for increasing the training and skill level of firefighters.

Research and Development

5.65 Many submissions noted the benefits that could flow from more substantive research and development efforts. Areas identified for research and development included improved methods of fuel reduction and wildfire management and the impact of fires on flora, fauna and water quality. Suggestions also included applying research and development outcomes to provide better quality training for forest and fire management.

Term of Reference 2

'Assess the effectiveness of the response to the 2002/2003 bushfires, including emergency management procedures, cross agency response and co-ordination and resource deployment.'

5.66 Submissions addressing, either in part or in full, the second Term of Reference were grouped and analysed into three broad themes; *response, management of resources* and *recovery*. Within each of these categories, a series of issues were regularly commented on. Response concerns attracted the most comment.

Response

5.67 Land management preparedness and agency preparedness were the two key themes we identified in relation to the Inquiry's first Term of Reference. Response issues, management of resources and recovery issues are the three broad themes we identified relevant to the Inquiry's second Term of Reference.

5.68 In particular, response issues attracted considerable comment around the following:

- Strategy/tactics;
- Utilising local knowledge and experience;
- Emergency management arrangements;
- Public information and communication;
- Risk aversion; and
- Asset protection.

5.69 Figure 5.5 gives a snapshot of the positive and negative comments made about these issues.

Strategies and Tactics

5.70 Comments received were both supportive and critical of overall tactics and strategies employed by CFA and DSE but generally asserted that the agencies either collectively or individually did a good to exceptional job in relation to fire suppression.

5.71 However, five key issues were consistently raised in regards to strategies and tactics. These were (in no particular order):

- Unexplained changes in strategy by management during the campaign;
- Poor deployment decisions;
- The lack of backburning as a fire suppression strategy;
- Occupational Health and Safety issues raised by the Linton Coronial Inquest; and
- Mineral earth breaks as a firefighting tool on private rather than public land.

Unexplained Changes in Strategy by Management

5.72 A perception shared by firefighters, fire ground managers and Incident Management Team members, was that changes were made to strategy during the course of the campaign, without explanation. In some cases, this led to frustration and a lack of confidence in decisions.

Poor Development Decisions

5.73 Respondents questioned some deployment strategies and tactics, specifically the level and quality of consultation between DSE and CFA. Some submissions also asserted that decisions were not being made at the fire front, limiting the input of local knowledge. This was seen to result in poor tactical and deployment decisions.

Weather Conditions

5.74 A number of comments were made regarding weather conditions as weather plays a significant part in determining fire suppression strategies. Comments focused on two aspects; the weather conditions during the 2002-2003 fire season and a comparison of the 2002-2003 fire season weather patterns with past extreme fire events.

5.75 Some submissions asserted that benign weather conditions were not taken advantage of to aggressively suppress the fires. Other submissions noted that weather conditions were extreme, in part from the unusual lack of rainfall over the period of the fire.

5.76 Opinion was divided when weather conditions were compared to other extreme fire events. Submissions supported the need to more effectively monitor and analyse weather conditions and factor this analysis into planning strategies and tactics.

Figure 5.5: Response

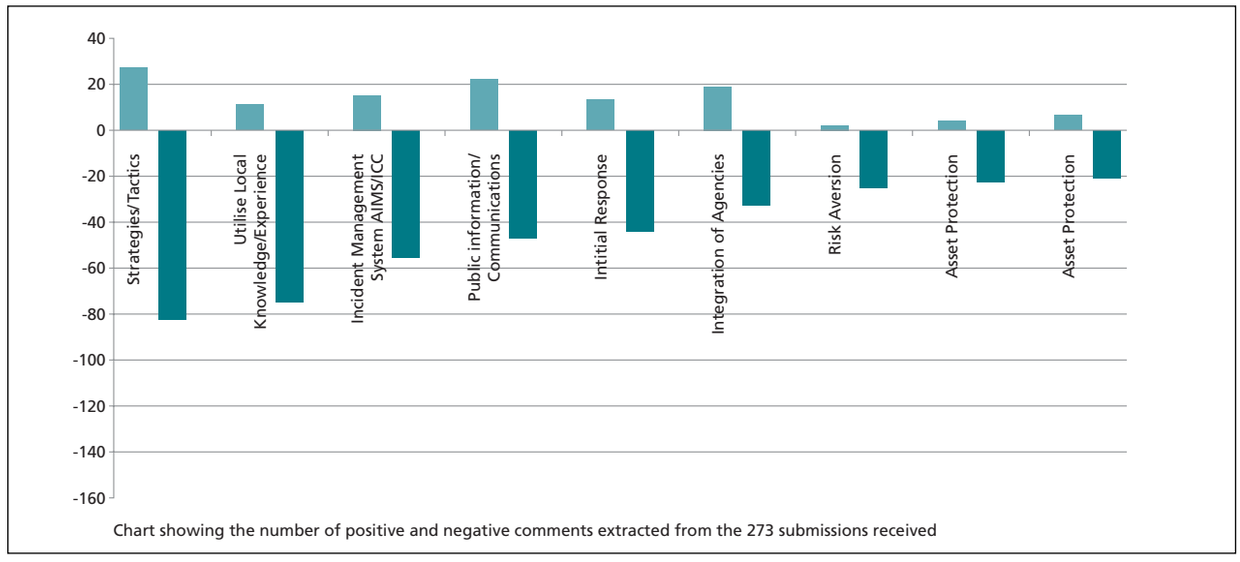


Chart showing the number of positive and negative comments extracted from the 273 submissions received

Lack of Backburning as a Fire Suppression Strategy

5.77 Dissatisfaction was expressed at the perceived lack of backburning as a fire suppression strategy. This was particularly so when Incident Controllers did not support tactics proposed by fire ground commanders when they believed weather conditions were benign and backburning was achievable. Some respondents commented that this cautious approach might be a reaction to findings from the Linton Coronial Inquiry.

Occupational Health and Safety Issues

5.78 A number of comments addressed the impact of the Linton Coronial Inquest. The common perception was that agencies had over-reacted to the Coroner's recommendations and placed too strong an emphasis on firefighter occupational health and safety, resulting in a more conservative approach to fire suppression and reduced levels of backburning.

Mineral Earth Breaks as a Tool

5.79 Submissions also commented on mineral earth breaks as a tool in firefighting on public/private land. Perceptions were that mineral earth breaks were; located wrongly, of an inappropriate size and/or constructed on private land in preference to public land.

Other Issues

5.80 Further issues and concerns relating to strategies and tactics included:

- Greater community and other key stakeholder involvement in identifying priority assets to be protected;
- Better management of fire lines at shift changeovers;
- More timely decision making;
- Better management of aircraft deployment – in particular, using aircraft when local conditions are viewed as favourable; and
- A perception that DSE prioritised conservation over private property protection.

Utilising Local Knowledge and Experience

5.81 A considerable number of respondents were critical of what they perceived as the poor use of local knowledge and a lack of confidence in information provided by local residents to Incident Management Teams. Particularly, some felt that Incident Management Teams did not use local knowledge and field observations effectively at critical times.

5.82 A large number of respondents identified times where they believed local knowledge and experience were not adequately applied:

- Instances were described where an Incident Management Team did not integrate local knowledge and experience when developing firefighting strategy/tactics.
- There was a perception that information was treated differently, in some cases, when it was provided by an individual or group in the community rather than sourced from local DSE or CFA staff.
- Some argued that local knowledge was not incorporated into strike teams from out of the area.
- There was a perception that the experience and knowledge of retired personnel was not consistently incorporated – in particular, their knowledge of terrain and fire behaviour.

Emergency Management Arrangements

5.83 Many comments on Emergency Management noted room for improvement.

5.84 Some submissions noted confused messages between key agencies on issues such as road closures and subsequent access, evacuation procedures and evacuation centres. Respondents claimed that, in some cases, established emergency management arrangements and other co-operative agreements were not followed.

5.85 However, approximately twenty five per cent of all comments in this category were positive about emergency management arrangements and related issues. These submissions noted the effective co-ordination between agencies, systems and plans.

5.86 A general feeling was that co-operation at the local level was successful, and respondents commended the use of resources such as Red Cross, State Emergency Service, Rural Ambulance Victoria and the Armed Forces.

Incident Control Centres

5.87 Concerns were noted about the operation of the Incident Management Teams at Incident Control Centres, in particular lack of consistency in strategic directions and tactics between shifts and between changes of incident controllers. Comments suggested some Incident Control Centres were too distant from the fire front and did not value or use local information and knowledge to full benefit.

5.88 During the North East and Gippsland fires, DSE and CFA established Integrated Multi-agency Co-ordination Centres to co-ordinate the work of Incident Management Teams at Incident Control Centres and the deployment of resources across them. Some submissions raised concerns that these facilities were developed with minimal planning and consultation. There was also a perception that the Integrated Multi-agency Co-ordination Centres exerted influence over the Incident Management Teams operating in the ICCs' choice of strategy and tactics.

Municipal Emergency Co-ordination Centres (MECCs)

5.89 Municipal Emergency Co-ordination Centres were activated in all affected Municipalities. While some submissions noted that MECCs should have been in operation earlier, they generally felt the MECCs worked well, once established.

5.90 Others commented that the roles and responsibilities of MECCs and Emergency Service Liaison Officers (located in MECCs) were unclear to key personnel, including those in Incident Control Centres. Many suggested more training and practice in MECCs would be beneficial.

Integration of Agencies

5.91 Respondents both praised and criticised the integration of agencies. Specific suggestions were made to:

- Improve the working relationship between responsible organisations;
- Identify areas for improvement such as arrangements around road closures; and
- Improve communication with the media.

Initial Response

5.92 Many respondents noted the importance of a quick and appropriate first response. A common criticism in relation to initial response was that resources were not used early enough, particularly the use of aerial attack. Given the total resources available and a perception of benign weather, some felt the fires could have been put out much earlier. (We consider the scientific evidence for this claim of benign weather in Chapter 6.) It was also claimed that, in some cases, there was a lack of skill and experience in directing early response activities.

5.93 Some submissions noted that the fire agencies responded well in particular circumstances – for example, at Stanley where fires were quickly contained.

Public Information and Communication

5.94 Responses were mixed on the issue of public information and communication. Submissions noted some poor information processes, including poor radio signal in some areas, and a delay in receiving information on the progress and management of the fires – in some cases, more than a day late.

5.95 Some respondents questioned the approach of commercial news services that were not seen as providing an accurate, timely and responsible alternative to the ABC. (The ABC did not have full radio coverage in far East Gippsland due to black spots.)

5.96 However, some submissions identified positive aspects of the public communication process, particularly the role played by the ABC, particularly regional radio and the support received from Telstra.

Risk Aversion

5.97 Many comments about risk aversion referred back to the Linton Coronial Inquiry.

5.98 A general sense was that the Linton Inquest had a negative impact on effective suppression techniques. As we noted earlier, some submissions asserted an increased fear of litigation and unnecessary focus on occupational, health and safety considerations as a result of the Linton Coronial recommendations. Some submissions suggested a prior mapping of areas considered 'unsafe' to improve firefighting safety and reduce the likelihood of a conservative interpretation of firefighting efforts.

Asset Protection

5.99 A number of respondents suggested that priorities for the protection of public and private assets should be developed and agreed upon before the fire season. This point was noted earlier. For example, some landowners felt firefighters did not share or even understand their view of protection priorities, especially around pasture, livestock, plantations, native vegetation reserves and against the more official assets such as vehicles, sheds and houses.

5.100 Despite these criticisms, there was some positive feedback noting, in particular, the good work of CFA and DSE in protecting assets regionally with the limited losses when compared to previous fire events.

Management of Resources

5.101 In addition to comments about the effectiveness of the firefighting response, comments on resource management were common.

5.102 Specifically, respondents commented on:

- Allocation of resources;
- Availability of skilled people;
- Shift changes;
- Strike teams management;
- Use of Defence Force personnel; and
- Firefighting at night.

5.103 Figure 5.6 gives a snapshot of the positive and negative comments made about the management of resources.

Resource Allocation

5.104 A number of submissions commented that aspects of resource management were successful, however, the overall adequacy of resource allocation was questioned. One submission asserted that, at times, Incident Control Centres were overstaffed leaving field operations short.

5.105 Submissions noted the value and importance of private units attached to the CFA, especially when resources were limited.

Availability of Skilled People

5.106 Submissions consistently stated there was a lack of skilled and experienced people to fight the fires. Respondents claimed those who were available were not always used effectively.

5.107 Further some submissions noted that some former volunteers had not completed and/or maintained accreditation and could not be used to full advantage. Other respondents asserted that increased training requirements were a barrier to their participation. The apparent decline in prescribed burning on public land was seen as disadvantaged. There was also a view that many firefighters were not fit enough for the tasks allocated. Respondents suggested greater importance should be given to the need for rest.

Figure 5.6: Management of Resources

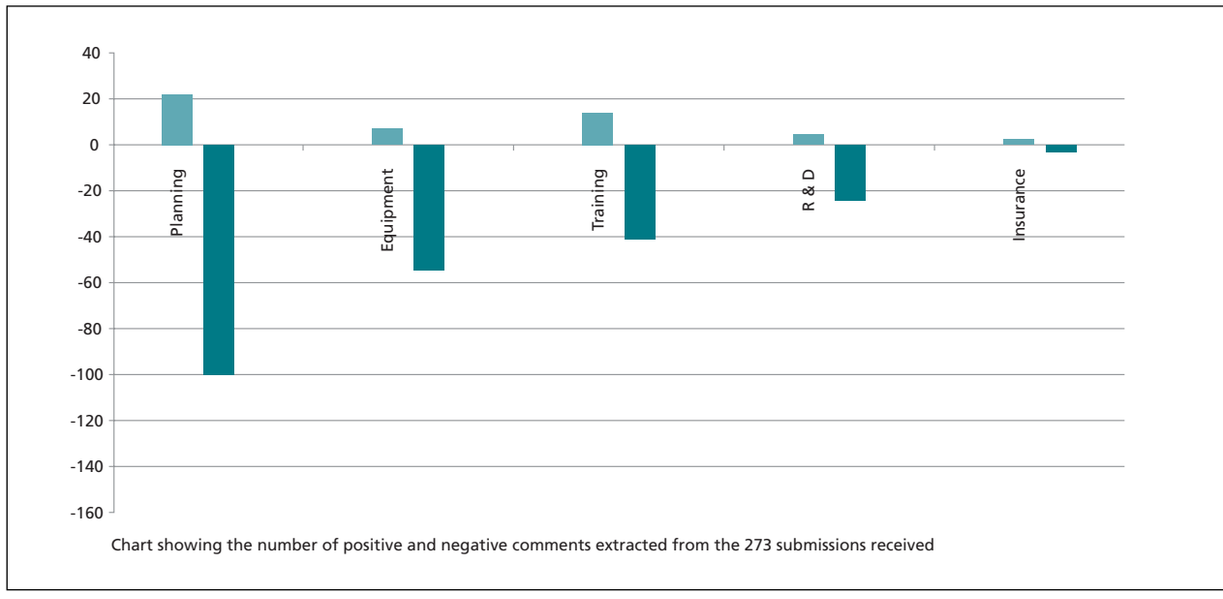


Chart showing the number of positive and negative comments extracted from the 273 submissions received

5.108 Respondents felt this situation was due to increased training requirements and a decline in prescribed burning on public land that meant DSE personnel had less firefighting experience.

5.109 Supportive comments noted the valuable roles played by counselling and therapeutic massage services for firefighters (although this was limited) and some suggested this should be expanded.

5.110 The importance of the volunteers was highlighted frequently, with some submissions mooting a skills register as a valuable tool for the future to match available skills to resource requirements.

Shift Changes

5.111 Several submissions suggested shift structures were inflexible and proposed that changes and possibly briefings should occur at the fire ground; that is 'hot' changeovers, preferably in daylight for maximum advantage. Comments also suggested that set and regular shifts made shift changeover inflexible.

Strike Teams

5.112 There was a perception that Strike Teams were sometimes poorly utilised and directed. Some respondents noted that strike teams (once in place) should have been allowed greater autonomy to make tactical decisions regarding how they would organise to fight the fire.

5.113 Respondents reported that, in some cases, crews remained out of firefighting when conditions were seen as suitable for suppression activities. Others noted that more flexibility was necessary, especially in regard to the 'length of tour' and daily hours.

Defence Force Personnel

5.114 Comments generally supported the use of Defence Force personnel in diverse areas such as co-ordinating accommodation and meals, machinery, logistics and engineering. A number of respondents were dissatisfied that Defence Force personnel were not used on the fire line.

Overnight Firefighting

5.115 Most submissions on this issue focused on the potential to fight the fires at night using a range of techniques, including backburning. Those who commented on night firefighting also felt the practice was not well utilised in some circumstances, and was a lost opportunity.

Recovery Issues

5.116 In addition to response issues and management of resources, submissions also focused on the question of recovery. Respondents identified the following major recovery issues:

- Fences;
- Economic impacts;
- Land rehabilitation;
- Restoration of public utilities; and
- Other recovery matters.

5.117 Figure 5.7 gives a snapshot of the positive and negative comments made about recovery.

Fences

5.118 The restoration of fences and Government's role in providing financial support was a significant issue in submissions. Fencing was also the focus of significant attention during consultations.

5.119 Comments principally asserted that the Government has an obligation to private landowners to replace fences when they are adjacent to public land. Specifically, respondents argued that the Government should be responsible for half of the replacement costs if the fire originated on public land and was inappropriately managed. Further to this, respondents argued that the Government should pay the full replacement cost of fences where they were lost due to backburning.

5.120 Many commented that the Government's approach in applying the fencing assistance policy was inconsistent and caused confusion and anger.

Economic Impact

5.121 Comments regarding the economic impact of the fires were diverse. Examples outlined in submissions are:

- Death and injury of livestock;
- Loss of pasture and fodder;
- Smoke impact on grape crops;
- Cancellation of major tourism events;
- Loss of wages to volunteers when fighting the fires;
- Employers not being compensated for employee hours lost when firefighting;
- Loss of normal business activities, especially when related to the outage of utility services; and
- Cost of repairs in restoring utility services.

5.122 Several submissions pointed out economic recovery would be a long process, especially for agriculture, tourism and other natural resources-based industries in fire-affected areas. Some saw an economic opportunity to recover timber from burnt areas.

Land Rehabilitation

5.123 Some constructive comments were made regarding rehabilitation after the fires. There was a perceived need for an agreement to be reached with agencies in regards to fire control activities private land such as access tracks, mineral earth breaks and creek crossings. The new opportunities to better control pest plants following the fire were also identified.

5.124 Respondents also expressed the view that rehabilitation activities were too slow and inconsistent. They identified the following possible impacts during rehabilitation:

- Impact on water quality and quantity, especially during rainfall events; and
- Probable impact on soil structure, characteristics and ecology due to high levels of heat during the fire.

Figure 5.7: Recovery

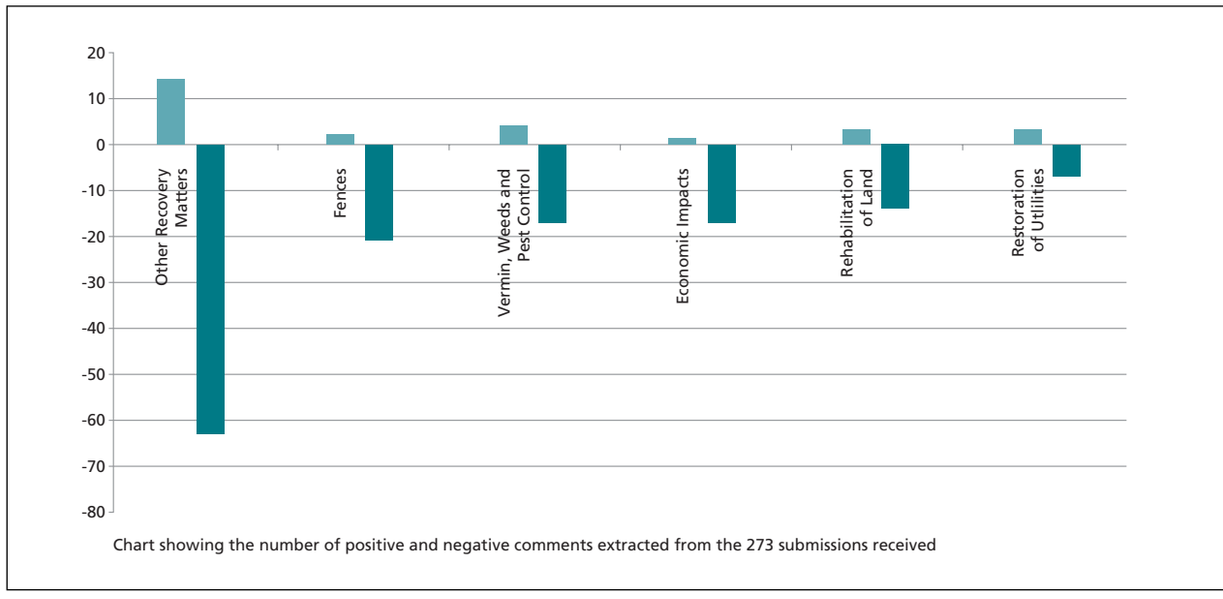


Chart showing the number of positive and negative comments extracted from the 273 submissions received

Restoration of Utility Service

5.125 Some submissions noted undue delays in restoring selected services. However, other comments indicated that some utilities brought in additional skilled crews from other areas to assist in restoration.

5.126 Some respondents recommended that utilities use fire-resistant materials in high-risk areas as flammable materials increased the likelihood of loss of utility services. Many asserted that mobile phone coverage should be improved.

Other Recovery Issues

The Importance of Preparation

5.127 The common message across submissions was that recovery appeared less traumatic when people had planned and prepared for a fire or other emergency event.

5.128 Submissions noted the impact of the ongoing drought on pasture reserves, the decline in animal health and numbers, and the loss of pasture and livestock due to fire, on their ability for pasture to recover to meet their needs.

5.129 There was a perception that recovery was more difficult due to public land managers not being 'good neighbours' as they had not prepared their boundaries to contain possible fires.

Centrelink

5.130 Further criticisms focused on the role of Federal Government support – in particular, Centrelink. Many commented that the support promised by politicians was difficult to access due to problems in the availability of documentation to register. Many claimed Centrelink was not as responsive to the needs of affected families as it should have been.

Water Replacement

5.131 Comments were made about the replacement policy for farm water used in fire suppression. A number of farmers asserted that advice on cleaning out dams after the fires and early rainfall events was inconsistent and inappropriate.

5.132 Others said there needed to be more water reserves on public land, specifically for fire suppression. Comments also indicated that water quality would be an ongoing issue for the next few years. Minimising erosion was seen as a further ongoing recovery challenge. There was some comment that the impact on flora and fauna would be significant and ongoing.

Other indentified issues

5.133 Respondents to the Inquiry also identified:

- A perceived shortage of veterinary services available for livestock assessment;
- The need for more counselling resources;
- Earlier repair and reopening of roads and bridges; and
- The continuation of education for local children.

Conclusion

5.134 Five key themes dominated the submissions and community consultations:

- Land management preparedness;
- Agency preparedness;
- Response issues;
- Management of resources; and
- Recovery issues.

5.135 Within those themes, many issues received critical comment.

5.136 In any call for public submissions, comments are likely to focus on negative events and this Inquiry was no exception. While the Inquiry received more negative comments than positive, this was balanced by the view of respondents that firefighting efforts were exemplary under extreme circumstances.

Chapter 6
Weather Conditions Before and During the Fires of 2002-2003

Overview

6.1 Submissions to the Inquiry varied markedly in their interpretations of the weather conditions surrounding the fires in North East and North West Victoria in 2002-2003.

6.2 The Commonwealth Bureau of Meteorology (Bureau of Meteorology 2003) regarded the conditions as similar to those characterising other years when large fires occurred in Victoria, including 1983 and 1939. They reported that lead-up conditions of drought, combined with higher than average temperatures, set the scene for high fire risk in the 2002-2003 fire season, with the risk of fire spread heightened by extremely dry fuel loads. The coincidence of many lightning ignitions and several to many days of Very High to Extreme fire weather[1] was conducive to rapid fire spread with a reduced likelihood of successful early suppression.

6.3 As we saw in Chapter 5, submissions from a variety of other individuals and organisations disputed this assertion. They claimed weather was *less* severe than in the lead-up to and during the 1939 and 1983 fires, and that relatively benign weather conditions during much of January and February should have been conducive to successful fire suppression.

6.4 The Inquiry investigated the relevant evidence for these varying assertions. Our expert analyses support the findings of the Bureau of Meteorology.

6.5 This Chapter also considers a second point relating to climate – the unusually low total areas burned per year by fire in Victoria from the mid-1980s to 2001.

6.6 We examined the climate evidence in relation to this issue and conclude that improved fire suppression by the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) is the most likely explanation of why so few fires in these years grew to large size, rather than either benign weather or decreased fire due to prescribed burning.

Statewide Weather Conditions

6.7 The Bureau of Meteorology (2003) reported that the drought prevailing at the time of the 2002-2003 fires was one of the most severe in the nation's history.[2] Similar lead-up conditions were experienced prior to the 1939 and 1983 bushfire seasons in which large fires affected substantial areas of Victoria. However, the higher than average temperatures through autumn, winter and spring of 2002 set this fire year apart from any other.

6.8 From as early as mid-July 2002 the Bureau had early warning that conditions in the summer of 2002-2003 would be conducive to major fire events. This was based on the predicted behaviour of the El Niño–Southern Oscillation with forecasted continued drought and early drying of forest fuels. They advised that rainfall in the Victorian alpine region for the remainder of 2002 was likely to be only 50–60 per cent of the average, and higher than average temperatures were also forecast.

6.9 Extremely dry spring and early summer conditions (20–40 per cent of normal rainfall) persisted through January, with some areas by this time recording record or near-record low levels for rainfall for the October–January period. The Bureau of Meteorology's submission notes that another unusual aspect of the 2002-2003 fire season was the long period without rain after the start of the major fires in the North East and Gippsland. The lack of significant rain (defined as more than five millimetres in one day) between 2 January and 20 February 2003 – a period of nearly 50 days – allowed the fires to remain active.

6.10 As we noted in Chapter 4, there were heatwave conditions in many parts of inland Victoria during January 2003, with temperatures of 43–46°C recorded for a number of locations on 25 January. Evaporation over the April 2002–January 2003 period was the second highest on record at Hume Weir (after 1983). In combination with drought and heatwave this may account for the substantial areas of tree death evident on north and west-facing slopes in Central and North East Victoria.[3]

6.11 Over the course of the 2002-2003 fire season, the Bureau of Meteorology issued 30 fire weather warnings (20 from October to December and a further 10 in January). This greatly exceeds the number of fire weather warning days reported for the previous three years (17, 19 and 14 respectively for 2000 to 2002).

1 Forest Fire Danger Index in the ranges 24–50 and 50–100, respectively.
2 The Bureau of Meteorology reports droughts on the basis of total rainfall received over a period relative to the proportion of years where rainfall was equal to or less than that total. Here we also report a drought index, the Keetch-Byram Drought Index (KBDI). The KBDI requires more data than the decile method of the Bureau of Meteorology and so does not cover as long a period at most stations.
3 At Corryong, for example, the KBDI had reached 160 by January.

6.12 Of course, the number of such days for any single location would be fewer than this, and we calculate that Mildura, Melbourne and Corryong had nine, seven and five Extreme fire danger weather days (Forest Fire Danger Index above 50) respectively in 2003.[4] To place these numbers in context:

- Corryong has not had more than one day per year in this range since suitable records for calculation of Forest Fire Danger Index commenced in1973;
- It is the third highest annual total for Mildura after 1983 and 1958, which were years that saw very large fires in the Grampians and Big Desert areas, respectively; and
- It is the highest number for a single year since suitable records for Melbourne airports began in 1951.

Weather Conditions in the Fire-Affected Areas

6.13 This section provides an analysis by the Inquiry of weather conditions for specific locations in or near the fire-affected areas. In particular, it identifies how conditions during the fires of 2003 compare with previously recorded fire weather extremes for these locations. The accompanying figures are in Appendix VI.

6.14 Since the fire complex in North East Victoria covered a large area, we examined weather records for a number of locations. Our analyses focused on weather conditions in the three areas affected by the large fires of 2002-2003: North West and North East Victoria and Gippsland, plus Melbourne.

6.15 For each station, daily information was obtained for 3 pm temperature and wind speed, relative humidity, 24 hour rainfall (to 9 am) and maximum temperature.[5] The Forest Fire Danger Index (FFDI) and Keetch-Byram Drought Index (KBDI) were calculated from the daily climate records and used to describe weather in relation to risk of ignition and spread of unplanned fires.[6]

The North East

6.16 At Corryong, the drought of 2002-2003 was the worst on record:

- The previous KBDI January maximum was passed on 18 January 2003, and the Index continued to climb through to 20 February (Figure 6.1).
- Only 70 millimetres of rain fell in the four months from October 2002 to January 2003, 29 per cent of average for that period.
- Until 22 February, there was no daily rainfall greater than 5 millimetres within the period of the fires.
- On five days in January 2003 the fire danger rating was Extreme (FFDI>50) and, on four days, was Very High. On 7 January the rating passed the highest value recorded for that month (45.6). On 17 January the previous record for any month (58) was passed, and it was higher again on 18 January.
- Over the two weeks from 17–30 January, there were four cycles of Extreme fire danger each followed by one to two days of lower rating (Figure 6.2).
- Above average wind speeds contributed to the elevated FFDIs. On six days, including 17 and 18 January, 3 pm wind speeds exceeded 30 kilometres per hour.

6.17 Temperature and humidity were also extreme:

- On 18 and 26 January, temperatures exceeded 40°C, two of just nine such days on record for Corryong.
- 18 January also saw relative humidity equal the record low of 9 per cent.
- All but six days in February were also above the monthly average (30.4°C) and fire danger approached the Extreme level again on 12 February, in the middle of a long period of high temperatures and low humidity (10 per cent). Wind speed on 12 February reached 26 kilometres per hour at 3 pm.

4 These numbers do not agree with higher numbers cited by Long (unpubl.) who investigated extreme fire weather in Victoria for selected locations for the period 1971 to 1999. The higher numbers documented by Long reflect the use of an assumed maximum value of 10 for the drought factor, and the calculation of Forest Fire Danger Index for four times of day: 9 am, noon, 3 pm and 6 pm. Although Forest Fire Danger Index is usually closest to its maximum value at 3 pm, it is occasionally higher at noon or 6 pm. We use the true value for the drought index (calculated from amount and time of last rainfall greater than 2 mm), and it is often lower than 10, thus reducing the estimated value of Forest Fire Danger Index.

5 Climate data were investigated for the following stations and time-periods: Melbourne airports (Essendon and Tullamarine; 1951–2003), Mildura (1939–2003), Nhill (1939–2003), Walpeup (1998–2003), Benalla (1957–2003), Wangaratta (1956–66, 1986–2003), Albury airport (1983–2003), Corryong (1973–2003), Mt Hotham (1995–2003) and Omeo (1957–2003).

6 These indexes are described in detail in Chapter 7.

Figure 6.1: The Keetch-Byram Drought Index (KBDI) and Rainfall at Corryong, July 1998–July 2003

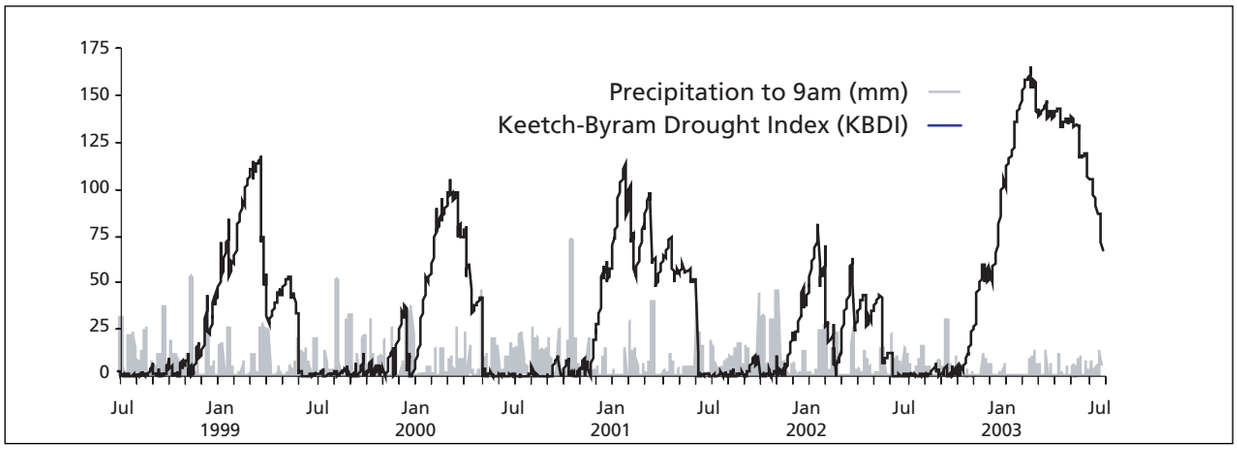
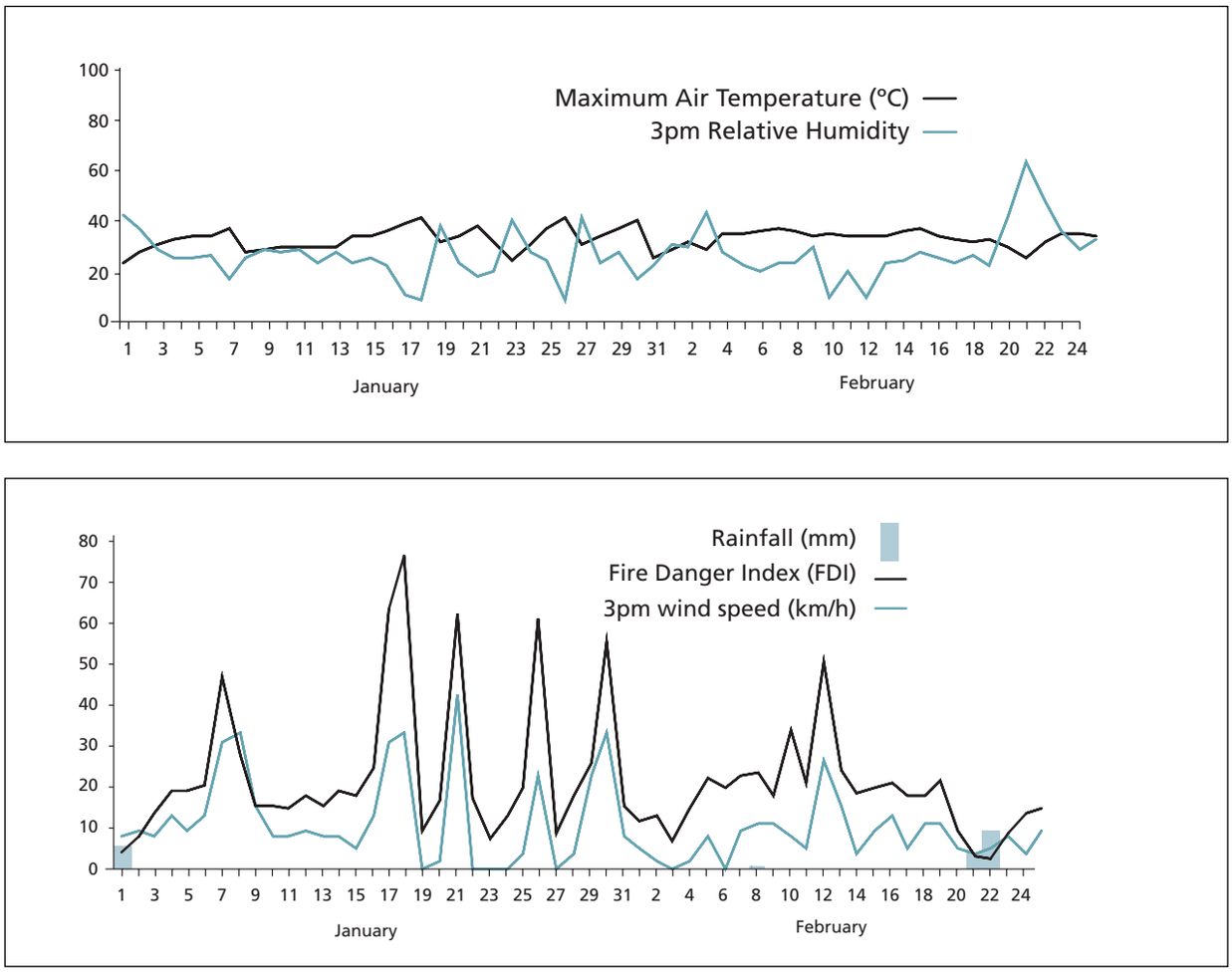


Figure 6.2: Daily Maximum Temperature, 3 pm Relative Humidity (%) and Wind Speed, Forest Fire Danger Index and Rainfall at Corryong, January–February 2003



The Alps

6.18 The climate record at Mt Hotham is short (eight years). While some indicators of fire danger weather prior to and during the fires at Mt Hotham exceeded values recorded in previous years, others did not.

6.19 To give some indication of climate at this time:

- During the drought of 2003, the KBDI exceeded previous records (Figure VI.1, Appendix VI), peaking at 39 on 20 February.[7]
- Humidity reached its lowest ever recorded value of 17 per cent on 12 January and again on 21 January.
- 3 pm wind speeds were high (approximately 50 kph) on 26, 29 and 30 January (Figure VI.2, Appendix VI).
- The highest FFDI in 2003, and the highest on record, was 22 on 21 January, when humidity was low, the wind was strong (39 kilometres per hour), and the temperature peaked at 23°C (the highest temperature recorded at Mt Hotham is just 26.7°C).
- Twenty millimetres of rain fell at the end of January and 42 millimetres had fallen earlier in the month.

Gippsland

6.20 The drought at Omeo in 2003 was comparable in depth to several others in the climate record, where values for KBDI over 95 have been reached in 1965, 1968, 1983 and 1998 (Figure VI.3, Appendix VI):

- The highest KBDI in 2003 was 99 on 21 February, while the highest ever was 127 in April 1968.
- Temperatures exceeded 30°C many times over the 2002-2003 fire season, peaking at 35.5°C on 30 January, short of the record of 38.2° C. (Figure VI.4, Appendix VI). The highest 3 pm wind speed of the summer (37 kilometres per hour) was also recorded on 30 January. These two factors contributed to a Very High fire danger rating on that day.
- Low humidity (9–17 per cent), high temperatures (27–34 degrees) and winds (15–26 kilometres per hour) contributed to Very High fire danger ratings for six other days between 13 January and 12 February (on 14, 17, 26 January, 7 February).

6.21 Missing data points (for example, for wind over the period 20–25 January) mean that some days may have had higher FFDIs than reported here.

The North West

6.22 The Big Desert fires started from lightning strikes on the afternoon of 17 December and spread rapidly up to 21 December, covering by this time 160,000 hectares of the final 181,400 hectares reported for the event. Significant areas continued to be burnt until 26 December and the fires were declared out on 31 December, when 30 millimetres of rain fell – the first significant rain for 34 days, and the highest fall since April 2000. Rainfall and streamflow for the region over the period November 2001 to October 2002 were both in the lowest 10 per cent of records.

6.23 The weather at Walpeup during the period of the Big Desert fires represented extreme conditions for fire. A prolonged and intense drought led to the drying of vegetation and fuels and there was extremely hot and dry air and moderate to high winds, conditions that persisted during this time despite wind shifts from North West to South West.

- In Walpeup, the drought was extreme, with KBDI reaching 170 of a maximum 200 in December 2002 (Figure 6.3), although KBDI was slightly higher than this in February 1983. In the 12 months prior to 16 December 2002 just 135 millimetres of rain had fallen, less than 40 per cent of the annual average.
- For 15 days during December 2002 the fire danger rating was Very High (FFDI over 24 but under 50) and for five days it was Extreme (over 50 on 2, 16, 18, 20 and 21 December). The 11 days from the 14 to the 24 December were all Very High or Extreme (Figure 6.4).
- The maximum daily temperature dropped below 30°C (the December average) just once in this period (24 December), and four days experienced maxima above 40°C, peaking on 21 December at 42.6°C. The December 3 pm relative humidity at Walpeup averages 30 per cent but, during these 11 days, it averaged 11 per cent. The lowest value ever recorded for Walpeup (six per cent) occurred on 16 December, the day before the outbreak of the fires.
- All but five days of December 2002 recorded wind speeds higher than the December 3 pm average of 15 kilometres per hour, peaking at 35 kilometres per hour on 22 December.

7 Drought index values are lower at Mt Hotham than at the other stations we examined, largely because of the lower temperatures and higher rainfall that result from its higher elevation. For example, average annual rainfall at Mt Hotham is 1,179 mm compared with Corryong's 740 mm and Omeo's 680 mm.

Figure 6.3: The Daily Keetch-Byram Drought Index (KBDI) and Rainfall Record for Walpeup, July 1998–July 2003

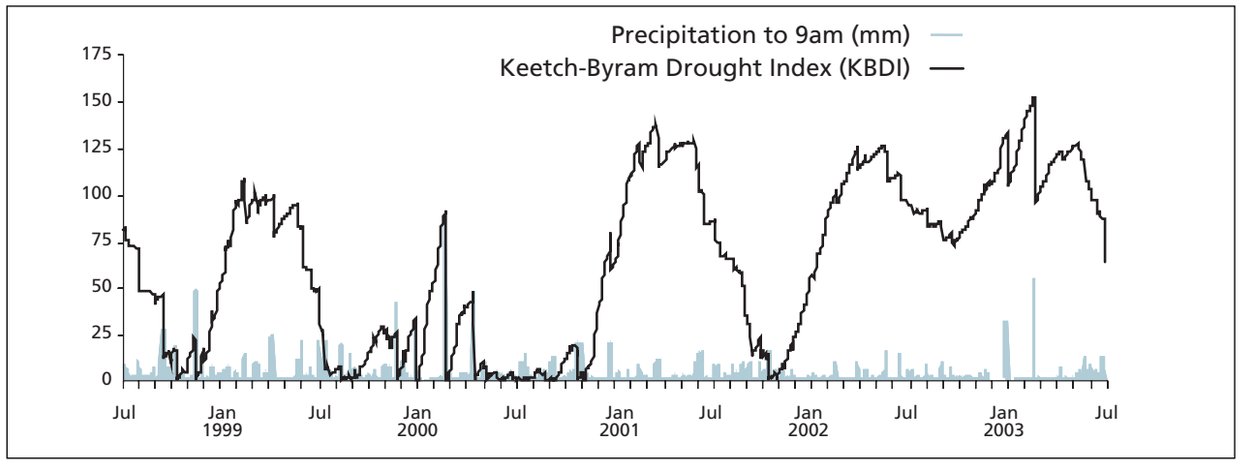
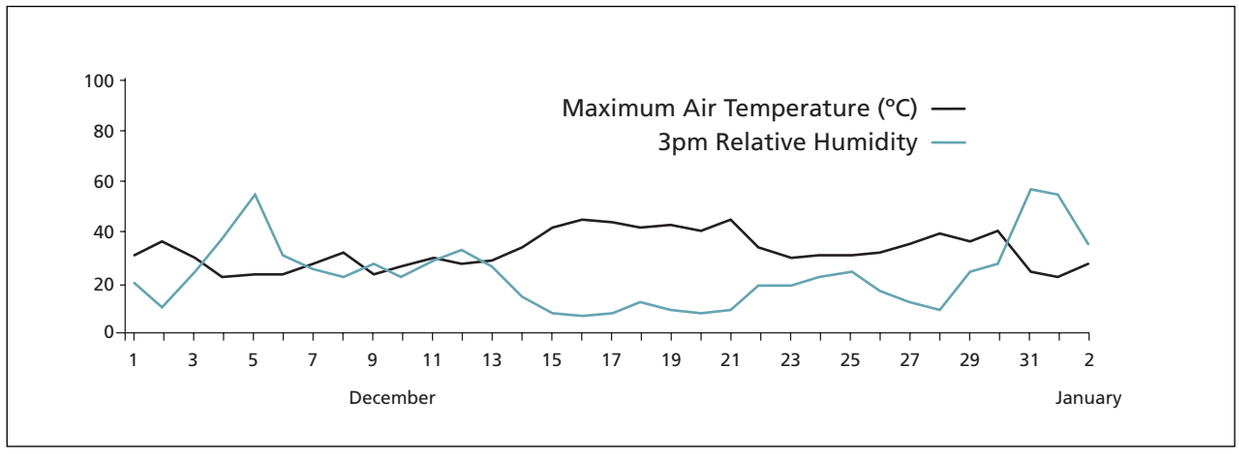
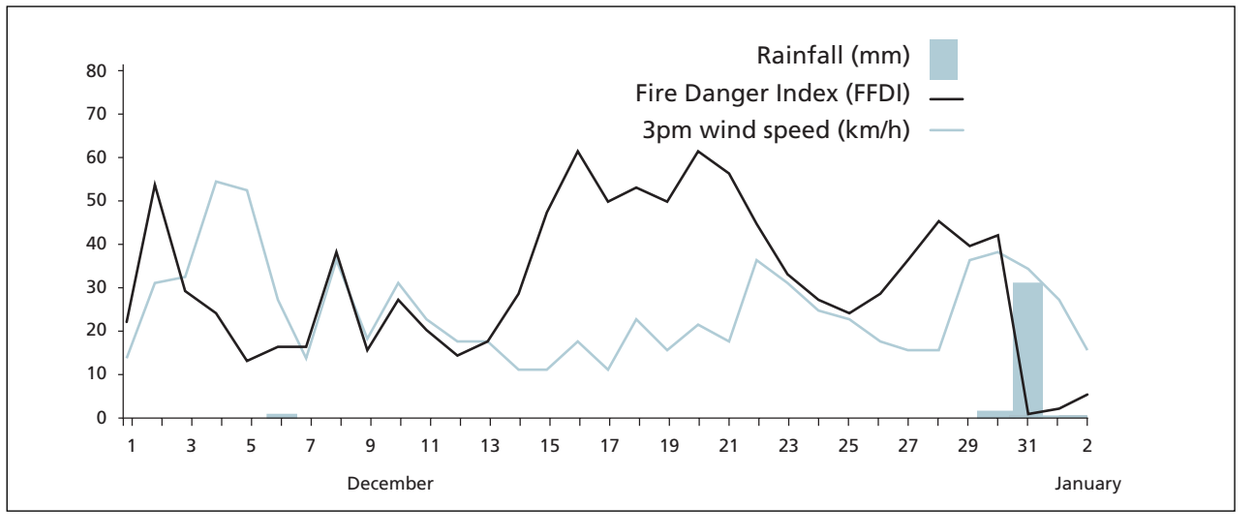


Figure 6.4: Daily Maximum Temperature, 3 pm Relative Humidity and Wind Speed, Forest Fire Danger Index and Rainfall at Walpeup, December 2002–January 2003.





Comparison of Weather Conditions Among Years of High and Low Areas Burned

6.24 The string of low-area fire years from 1986 to 2001 may have been a consequence of one or more of the following:

- Benign weather conditions;
- Higher levels of prescribed burning through the 1980s. This may have provided fewer opportunities for the ignition and spread of unplanned fires; and/or
- More successful fire suppression.

6.25 This section examines the nature of fire weather from the mid-1970s to the present so that some comparison can be made between conditions prior to the 1983 fires and the 2002-2003 fires. Again, Figures 6.5, 6.6, and 6.7 below (and Figures VI.5-6, Appendix VI) offer a graphic representation of the following discussion.

6.26 The large area of Victoria burned by unplanned fires in the early 1980s was followed by low-area fire years between 1986 and 2002 – from 1988 to 1998, unplanned fires burned an average of just 26,500 hectares of public land per year compared with a long-term average of about 120,000 hectares.

6.27 For Melbourne, fire danger was below average during the early 1990s, but was nearly as high in 1997 and 1998 as in the big fire years of 1983 and 2003 (Figure 6.5). Fire danger, on average, has been high in four of the seven years from 1996 to 2003, and the drought index has been high throughout this period. Based on historical patterns of relationship between fire danger statistics and area burned, we would have expected much larger areas burned in the 1997, 1998 and 2001 fire years. Although not large in area, 1997 was the year of the most recent, serious Dandenong Ranges fire and 1998 of the Caledonia fire. Conditions prior to the early 1980s fires were similar to conditions in the early 1990s.

6.28 Omeo had fewer high fire danger years than Melbourne, and very low levels of fire danger through the early 1990s (Figure VI.5, Appendix VI). Again, the data showed 1998 as a year of high fire danger that was not accompanied by large areas of unplanned fire.

6.29 Data for two locations in the North East region, Corryong and Benalla (Figure VI.6, Appendix VI), show that fire danger was low in the early 1990s and high in 1998, without being accompanied by large unplanned fires. This is similar to records shown for Melbourne and Omeo. Several years of high fire danger weather also occurred in Corryong in 1978 and in Benalla in 1979 and 1980 without accompanying large unplanned fires. On the other hand, large fires occurred in parts of Victoria in three years in close proximity shortly thereafter – 1981, 1983 and 1985.

6.30 In the North West region, fire danger was consistently high with only a few years characterised by low fire danger in the mid 1970s and again in the early 1990s (Figure 6.6). Both of these periods were followed by sustained periods of high fire danger. While the late 1970s to mid-1980s saw a strong relationship between high fire danger years and area burned by unplanned fires, the late 1990s through early 2000s (excepting the 2000 fire year) saw no large fires, despite high fire risk, until the Big Desert fire of December 2002.

6.31 In general, years characterised by high values for the sum of daily forest fire danger index, drought index, and numbers of Very High and Extreme fire danger days, are also characterised by large areas of public land burned by unplanned fires.[8] Evidence suggests that weather was mild in the early 1990s for from two to five years in different parts of the State, and there may have been a lessened risk of fire in those years. However, several years in the late 1990s were high FFDI years, yet saw only small areas burned by unplanned fires.

6.32 Comparing the very similar string of fire weather years for Melbourne in the early 1980s with the years from the late 1990s to the present (Figure 6.5), shows that unplanned fires in 1981, 1983 and 1985 burned more than 1.5 million hectares, while about the same total area was burned in a single year (2003) in the latter period.

6.33 Taking a long-term view, there may be little to distinguish these two periods of time and their fire records, except that ignitions leading to large fires didn't occur in several years in the late 1990s when they might have been expected – or fires were successfully suppressed at an early stage.

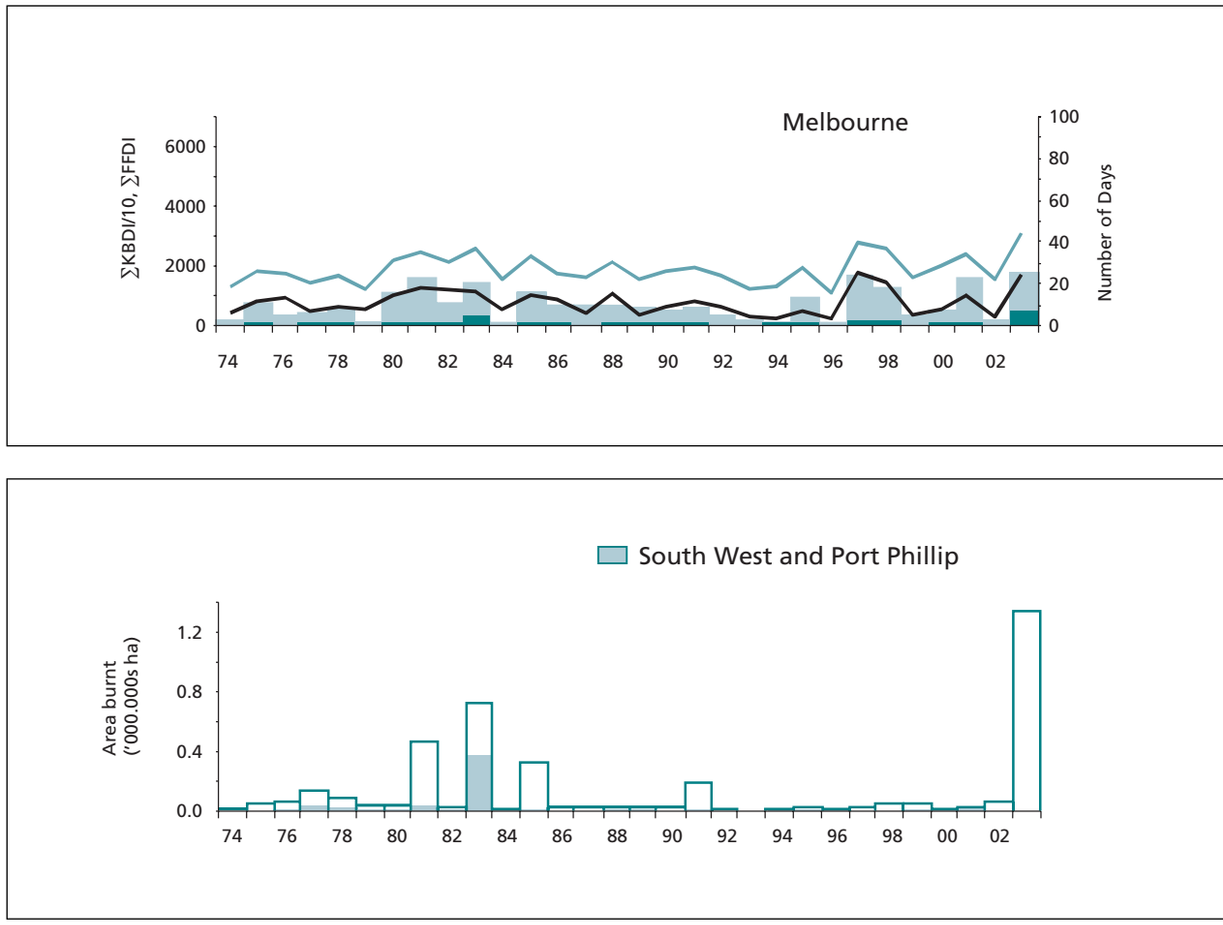
8 Mackey et al. (2002) describe theoretical reasons for a statistical relationship between number of unplanned fires per year and sum of daily FFDI per year, and between area burned by unplanned fires per year and $\sum FFDI^3$.

6.34 Examining the *number* rather than the area of unplanned fires per year on public land shows that there were more fires, as expected, in the high fire risk years of 1997, 1998 and 2001, but that they did not burn large areas (Figure 6.7). This suggests that successful fire suppression by DSE and CFA may have been the main cause of small-area years through the 1986–2002 period, rather than either a lower number of ignitions, or variations in the effectiveness of prescribed burning programs through time.[9] Appendix IV, Fires on Public Land – Historical Data, provides data for the number of fires on public land and area burnt per annum for the period 1921 – 2003.

Figure 6.5: Indices of Fire Weather for Melbourne and Area Burned by Unplanned Fires Per Year

Top Graph:
- Annual Sum of Daily FFDI (Black Line), Annual Sum of Daily KBDI (Grey Line*)
- Number of Extreme (Blue Histogram Bars) and Very High (Grey Histogram Bars) Forest Fire Danger Days Per Year

Bottom Graph:
Area Burned Per Year by Unplanned Fires in the Local DSE Fire Region (Grey Histogram Bars) and in Total for Victoria (Grey Plus Open Histogram Bars).



* Note: This value is expressed as ΣKBDI divided by 10 so that Y-axis values are scaled to allow comparison among all the variables graphed.

9 Appendix IV 'Fires on Public Land – Historical Data' documents the number of fires on public land 1921-2003 and the area burnt per annum.

Figure 6.6: Indices of Fire Weather for Mildura (North West Region) and Area Burned by Unplanned Fires Per Year

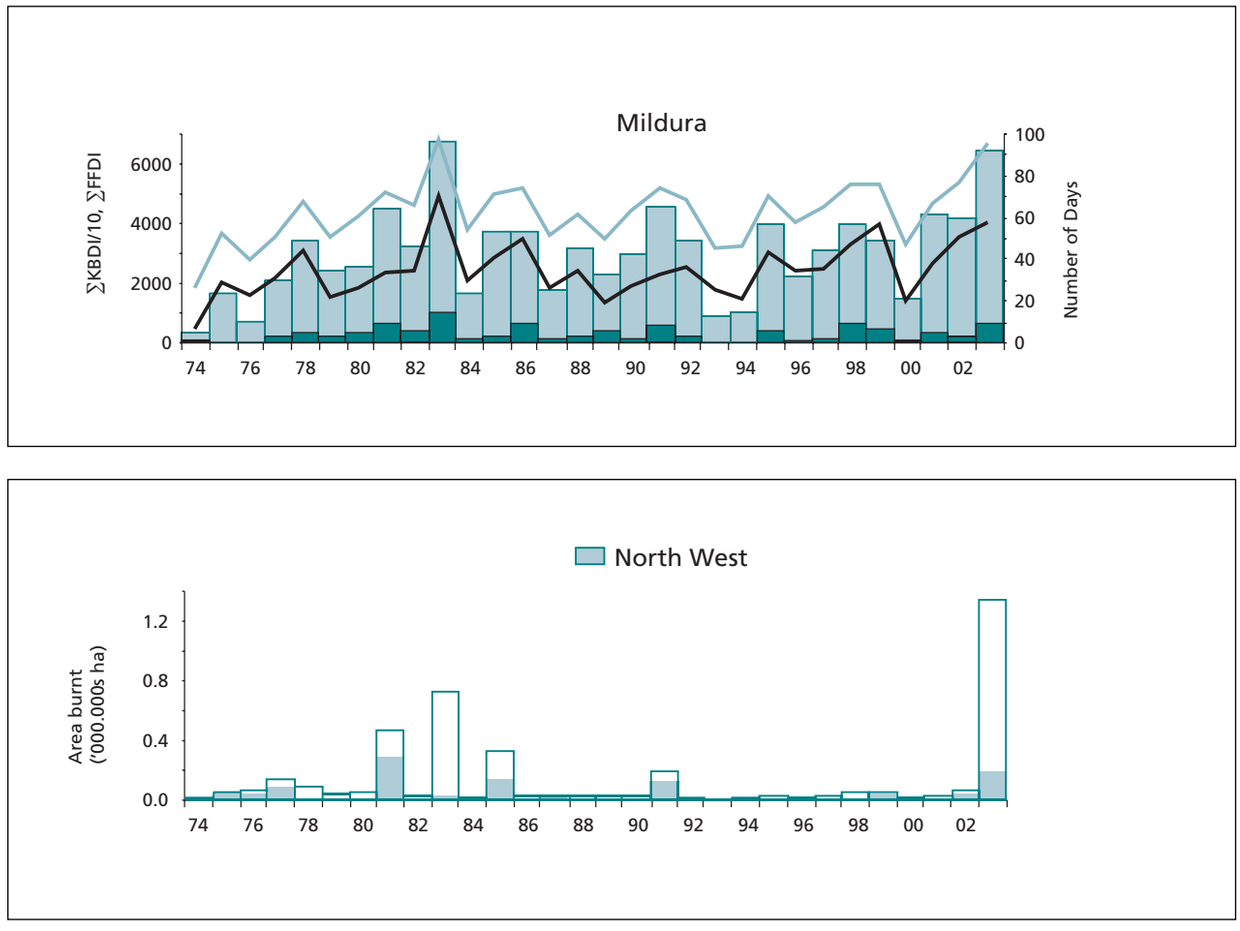
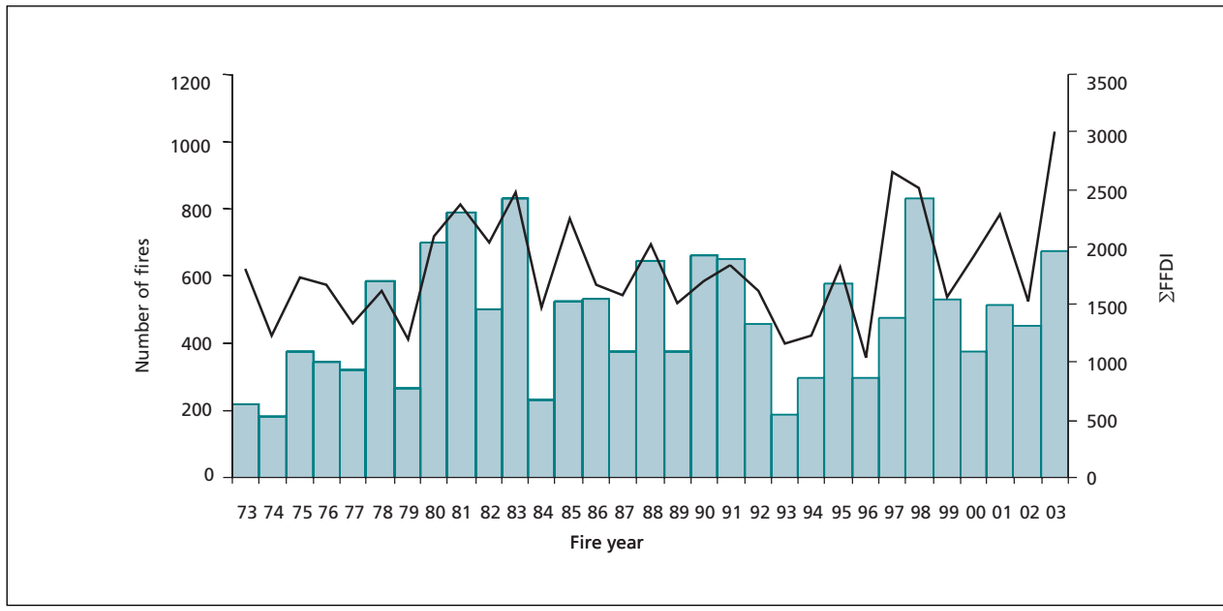


Figure 6.7: Annual Sum of Daily FFDI for Melbourne (black line), and Number of Fires Per Year on public land (green bars) in the State of Victoria, 1972–73 to 2002–03.



Conclusions

6.35 The 2002-2003 fires in Victoria reflect the coincidence of two predisposing factors: El Niño drought and a long string of low fire-area years. Ultimately, high lightning activity and extreme fire weather days led to the ignition and rapid spread of a number of large unplanned fires. Overall, the severity of weather in 2003 was of a similar level to that in 1983.

6.36 The long string of years (1988–2002) leading up to 2003 with low areas burned by unplanned fires included years of high fire danger weather (e.g. 1997 and 1998) accompanied by a large number of ignitions. Improved fire suppression by DSE and CFA, rather than either benign weather or decreased fire due to prescribed burning is the most likely explanation of why so few fires in these years grew to large size.

6.37 Estimating fire weather parameters and storing that information is important to the ongoing scientific investigation of relationships between climate and fire. It supports advances in our understanding of how fires occur and behave and gives us the capacity to improve the managed use of fire. This last point is taken up in Part B.

Recommendations

6.38 That DSE institute additional routine data storage and analysis to supplement current climate records with at least daily 3 pm values for the Grassland and Forest Fire Danger Index, and Keetch-Byram Drought Index, for selected high quality stations representing a cross-section of environments throughout Victoria.

6.39 That DSE and CFA, recognising that the Bureau of Meteorology does not routinely store all variables required to produce the calculations and indices necessary for research and planning into fire occurrence and behaviour, develop appropriate systems to ensure that such current and historical information is readily available and accessible.

References

Commonwealth Bureau of Meteorology submission to the Victorian Emergency Services Commissioner's Inquiry into the 2002/03 bushfires. June 2003.

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Part B

Term of Reference One: Fire and Public Land

Fuel Reduction Burn
Horsham fire District
April 2002 – DSE

Overview of Part B

DSE firefighter lighting fuel reduction burn - DSE

Part B explains and analyses some key technical issues regarding approaches to land and fire management. It demonstrates the complexity of fire and land management concerns and, in a limited sense, informs readers of the scientific basis for choices made in the past, our present system and recommendations for the future.

Chapters 7 through 12 cover six areas:

- Background to prescribed burning in forests (Chapter 7);
- Fuel management and grazing in the 'High Country' (Chapter 8);
- Fuel management in the 'Mallee' (Chapter 9);
- Constraints on prescribed burning in forests (Chapter 10);
- Measures of the effectiveness of prescribed burning (Chapter 11); and
- The traditional burning practices of the Aboriginal people and their relevance to modern land management practices in Victoria (Chapter 12).

All six Chapters fit together to provide a crucial framework for understanding fire on public land. These chapters cover diverse areas and complex topics. We include them in the belief that clarification and discussion of difficult issues is necessary to continuously improve land management over a diverse range of objectives.

Prescribed burning in forests is both controversial and complex.

The rationale, though, appears simple and persuasive: if the amount of fuel is less, then the potential heat released in a fire from the remnant fuel is less. If this heat is less, then the chance of controlling any unplanned fire is greater. If the chance of fire control is greater, then the chance of loss of human life and property is smaller.

However, to quantify the argument we need to know what forest 'fuel' is comprised of, how fuels change with time, how fires are measured and what the limits are to fire control in forests and other vegetation types. Because fire control is a function of weather and fuels (assuming a well-equipped and efficient firefighting force) we must also define 'fire weather'.

In Chapter 7 we investigate these factors and establish a knowledge base from which to discuss the positives and negatives of this controversial practice. At the end of Chapter 7 we discuss tracks and their importance to firefighting and preparedness. Chapter 7 makes no recommendation.

Chapters 8 and 9 are concerned with the vegetation types dominated by, or associated with, shrubby eucalypts. In Victoria these are found in contrasting environments – the alpine and subalpine regions or 'High Country', and the semi-arid to arid landscapes of North West Victoria, or 'Mallee'.

Chapter 8 discusses the issues of fuel management in the High Country focusing, in particular, on the scientific evidence behind the claim that 'grazing prevents blazing'. Among other issues, we address whether or not cattle grazing affects fire occurrence or behaviour in the mountains of North East Victoria. We conclude that there is currently no scientific support for the view that 'grazing prevents blazing' in the High Country.

Chapter 9 addresses fuel management issues in the Mallee, the locale of the Big Desert Wilderness Park fire in December 2002. The nature of fuel distribution and accumulation in the Mallee has resulted in substantially different approaches to prescribed burning from those in the forested areas of the State. One relatively new strategy is the chaining of strips of vegetation followed by burning the felled material once it has dried out. This system has the potential to be a safer and more cost efficient way to construct buffers, but its effectiveness will need to be monitored.

In Chapter 10, the focus shifts back to the forested landscapes of North East Victoria (including the northern reaches of the Gippsland Region) and the use of fire there. This Chapter investigates the constraints on prescribed burning in forests, describes some key issues behind the scheduling of prescribed fires in forests and reviews data on prescribed fires in North East Victoria and Gippsland over the past decade. This Chapter includes new analyses undertaken for this report entitled 'Prescribed Burning Realities'.

Chapter 11 discusses how we can measure the effectiveness of prescribed burning. It deals with technical matters that require a sound understanding of fire ecology and related management issues. Although the technical nature of this Chapter may cause difficulties for some readers, it is important to examine these issues carefully as they are at the core of how we can adapt our land management practices over time.

Chapter 11 is based on the premise that if Victoria is to have an accountable, safe and effective system for the modification of fuels, there must be some reliable way of evaluating the costs and benefits of its programs. The Inquiry suggests a number of measures that may assist in dealing with this difficult issue. We go on to stress the importance of building a targeted and comprehensive system of data acquisition, storage, retrieval, analysis and review to help in this process.

Chapter 12 addresses the traditional burning practices of Aboriginal people and the prescribed burning debate in Victoria. The Inquiry concludes that we do not know enough about traditional burning strategies and objectives in southern Australia to be able to implement an Aboriginal burning regime. Knowledge has been lost, or is fragmentary. Any use of a 'traditional Aboriginal burning regime' within a park or State Forest in southern Australia would be an experiment in land management, rather than a program based on a sound understanding of traditional Aboriginal practice, and should be recognised as such.

Chapter 7
Background to Prescribed Burning in Forests

Overview

7.1 'Prescribed burning' is the term applied to deliberately lighting fires for a variety of management purposes. Its application is governed by a number of sometimes conflicting factors, depending on the particular purpose and the place of application. These factors must be understood before any informed debate is possible on what has been and still is a controversial issue.

7.2 Twenty-seven percent of the comments in the written submissions to this Inquiry noted land management as a matter of concern, with prescribed burning a major theme. Such concerns can only be addressed when all stakeholders know and understand the relevant details. This Chapter provides the background information to enable an understanding of the complex prescribed burning debate.

7.3 In Victoria the most common management objectives for prescribed burning in forests are regeneration of forests following logging, fuel reduction to aid in the control of unplanned fires, and species conservation. Fire crews attached to DSE carry out planned burning programs appropriate to the region and at intervals and patterns specific to vegetation type. Five fuel management zones are currently recognised in relation to management objectives.

7.4 The topic and issues reviewed in this Chapter relate to forest fire in general, and prescribed burning in particular. They include forest types, fuel types and loads, fire behaviour, fire weather, the interval between burns, and the estimation of fire risk.

7.5 We also consider tracks an important issue in firefighting preparedness. While it is easy to submit that there should be more, or fewer, tracks we note it is not as easy to provide an adequate justification for change.

Background

7.6 The essence of a fuel modification program is to minimise any adverse effects that unplanned fire might have on management objectives such as timber production, water quality, conserving biodiversity, promoting tourism and protecting cultural remains. It also promotes the main fire management objective, 'the protection of human life and property'.

7.7 Minimising the adverse effects of fires is usually seen as reducing fire intensity (the rate of heat release), flame height and the chance of burning embers or burning brands being produced and setting fires downwind. Appropriate fuel modification aims to improve the conditions for firefighters in an unplanned fire and to raise the chances of a fire being put out, and assets protected.

7.8 In Victoria, the most common management objectives for prescribed burning in forests are:

- Regeneration of forests following logging;
- Fuel reduction to aid in the control of unplanned fires; and
- Species conservation.

Who Does Prescribed Burning? Where?

7.9 One of the main ways to modify fuels in forests is to burn them under mild weather, reducing fuel loads at a time when not all fuel is likely to burn. This limits the risk of intense fire and reduces the risk of fire escape.

7.10 For example, a forester may burn post-logging debris ('slash' as 'slash fires', 'regeneration burns' or 'silvicultural burns') to clear land in preparation for another crop. A manager of a Radiata Pine plantation will not usually burn the litter under the pines as the fire is likely to kill the crop but, when the pines have been harvested, the slash may be burned. Also, plantation edges may be regularly burnt for fuel reduction.

7.11 Managers of eucalypt plantations may choose to prescribe burn them, as might those who manage indigenous forests. National Park managers may burn for ecological reasons related to flora and fauna management (Fire Ecology Working Group 1999) as well as fuel reduction. Also, burning may take place, across large areas, to reduce the load of forest litter (twigs, grass, small branches, bark). This is classical 'prescribed burning', conducted under prescribed weather and fuel conditions in a specified area to safely achieve an explicit objective at a particular time.[1]

1 We use 'prescribed burning' as a term for reduction of litter in woody vegetation types by burning unless it is qualified as 'slash' '—for management fires set in logging debris for regeneration of tree crops, or 'ecological burns'.Other terms for litter burning by managers are 'fuel-reduction burning', 'control burning', 'planned burning' and 'hazard-reduction burning'. All burning involves fuel reduction so 'fuel-reduction burning' is a tautology but is very commonly used. 'Hazard-reduction' begs the question as to what the 'hazard' might be.

7.12 Fire crews attached to the Department of Sustainability and Environment (DSE) carry out prescribed burning programs appropriate to particular regions, and at intervals and patterns specific to vegetation type.

The Prescribed Burning Debate

7.13 In any society there is a range of held values that determine what constitutes an asset and for whom. Any evaluation of a fuel-reduction program using prescribed burning (or any other technique) will often depend on the assessors own values.

7.14 Most of the submissions that addressed prescribed burn considered that current prescribed burning programs were inadequate to meet the asset protection needs of Victorians. A smaller number of comments took the view that prescribed burning had little effect on the likelihood of ignition and spread of fires, and was counter-productive to ecological objectives of species conservation, especially in National Parks.

7.15 Broad-area[2] prescribed burning in forests is controversial in terms of smoke production (health, aesthetic and business implications), its perceived effects on biodiversity (the variety of native organisms from tall tree species to microbes; from genes to ecosystems), risks to lives and property, and its perceived efficacy in mitigating unplanned fire.

7.16 The extent of burning appropriate to Victorian forests is not a new issue and is likely to remain controversial for some time. In 1939 the practice of deliberately burning the forests caused the Royal Commission to remark that the amount of "strip and patch burning" carried out was "ridiculously inadequate" (Stretton 1939). After the Ash Wednesday fires of 1983, the Bushfire Review Committee noted that the then current standards of mitigation and preparedness were "too low" (Bushfire Review Committee 1984, p. 158). As we shall see, determining the value and appropriate extent of prescribed burning is not an easy task.

7.17 That the prescribed burning debate has been with us for decades[3] suggests immediately that the issue is complex. It involves held values, limitations on the implementation of prescribed burns, incomplete scientific knowledge, incomplete records and a lack of unequivocal ways of evaluating burning programs.

7.18 The rationale, however, is persuasive. Prescribed burning, for whatever purpose, will reduce the amount of fuel present. If the amount of fuel is less, then the potential heat released in a fire from the remnant fuel is less. If this heat is less, then the chance of controlling any unplanned fire is greater. If the chance of fire control is greater, then the chance of loss of human life and property is smaller.

7.19 Most prescribed burning in forests takes place in public land set aside for conservation, wood products and water catchment. While it is neither desirable nor feasible to burn all of rural Victoria to reduce fuel loads, there are substantial areas, especially of public land, that will be suitable for this form of fuel management. Prescribed burning may be the only cost-effective means of fuel reduction in such areas.

7.20 To quantify the prescribed-burning rationale we must know what constitutes 'fuel' in the forest, how fuels change with time, how fires are measured and what are the limits to fire control in forests. Because fire control is a function of weather and fuels (assuming a well-equipped and efficient fire fighting force) we must also define 'fire weather'.

Forest Types

7.21 Victorian forests vary in stature, density, productivity and fuel accumulation characteristics. At one end of the spectrum are the tall Ash forests of wetter locations and cooler aspects while at the dry end of the spectrum are forests such as 'Box-Ironbark'. Each forest type or part thereof must be treated differently. Because this is the case and because management aims vary, DSE has created five Fuel Management Zones which we discuss later in this Chapter.

Fuel Types and Loads

7.22 Fuel refers to any plant tissue, dead or alive, that is available to burn during a fire. 'Live fuels' are shrubs, tree crowns, grasses, herbs and vines, and much of the aboveground biodiversity may constitute fuel at some stage. 'Dead fuels' are mostly comprised of the leaves, bark, branches and stems that accumulate at the forest floor, and are considered as either 'fine' or 'coarse'. It is the fine, dead fuel component that is the main target of fuel reduction burns in forests. The different forest fuel types are described in detail in Box 7.1.

2 'Broad-area' is sometimes used to qualify and distinguish 'prescribed burning' for litter reduction from other forms of the practice.
3 Prescribed burning' has developed from the practice of 'burning off' and may be considered in Australia to have officially begun with the publication of McArthur.1962.

Box 7.1 Fuel Types

'Fine fuels' are organic materials less than 6 mm in diameter on the forest floor. In eucalypt forests the fine fuel, largely 'litter', consists of leaves, twigs, woody fruits and bark. Added to this may be grasses, herbs and bracken, which are considered as 'near-surface fuels'(Cheney et al. 1992).

'Peat or duff fuels' are greatly decomposed organic matter, like extremely fine compost, and are found most commonly in higher altitude plant communities or swamps.

'Coarse fuels' include standing dead trees, fallen branches and logs in various stages of decomposition.

Fine fuels are distinguished from coarse fuels because they are more continuous, respond to the atmosphere quickly (i.e. wet and dry) and are more readily ignited. Their ignition creates the fire front. The coarse fuels are left in the fire-front's wake to smoulder or flame in isolated pockets.

'Live fuels' have higher moisture content and greater resistance to ignition.

'Ladder fuels' are fuels capable of carrying fire to the tree crowns. They include tall shrubs, sub-canopy trees and dead bark attached to, or hanging from, trees.

A major fire burning at the end of a long drought under extreme weather conditions can consume the entire fuel array: the crowns of the trees and shrubs; any stringy bark or 'streamers' of loose bark on the trunks of living trees (sometimes called 'candlebark'); the litter and small plants on the forest floor; some large logs and fallen branches; and some dead, standing, tree boles. At night when intensities are usually lower, the consumption of live fuels may be less, but smaller-diameter dead fuels can still be completely removed. Despite extended drought and dry conditions some large fallen logs persist through a fire event.

7.23 The leaves and smooth detaching bark of eucalypts in southern Australia tend to fall to the ground mainly in summer, but twigs fall all year round. After a particularly productive growth year accessions of bark and twigs may be higher than usual. Similarly there will be years when accessions are lower. During a severe drought losses from the tree canopy may increase but occur mainly as leaf litter. Seasonal patterns of decomposition can also vary so that the amounts of litter on the forest floor vary throughout the year.[4]

7.24 Varying seasonal conditions are ignored by authorities because the time scale of variation is too fine for them to be able to afford repeated measurement. Authorities are mainly concerned with the gross year-to-year changes or those associated with different vegetation communities.

7.25 During and shortly after a major fire large tree limbs will break and add to the coarse fuel component of the fuel array on the forest floor. The fire can create dead, standing shrubs and trees. Later, twigs, dead leaves and small branches will be lost from fire-killed crowns of trees and shrubs.

7.26 Soon after a fire, tree crowns of fire-tolerant eucalypts will begin to recover and bark begin to replenish. Leaves and twigs will be shed as crowns resume normal seasonal patterns of growth. Litter will begin to build up on the forest floor again. At the same time the organisms that decompose litter will be active. Eventually the annual amount of litter falling to the ground and the amount of litter that is decomposed annually will become more or less equal. The fuel loading then may be said to have reached a quasi-equilibrium[5] condition and the litter fuel will be at its most continuous across the surface. Different forest types reach quasi-equilibrium at different fuel loads, and at different times, thereby creating potential for different fire behaviours that must be assessed.

7.27 The amounts of dead, outer bark on the trunks of stringybarks may take many years longer to reach quasi-equilibrium than the litter (Tolhurst 2003). It is important to note that fuels do not accumulate by the same amount each year, nor forever (see Box 7.2).

Overall Fuel Hazard Guide

7.28 For operational purposes DSE has devised an 'Overall Fuel Hazard Guide' (OFHG) (McCarthy et al.1999).[6] The Guide's strength lies in the extent of its coverage of the fuel array and the categorical assessment, by experts, of the contributions to fire behaviour made by each of its components, such as 'elevated fuel' (see Box 7.3).

4 The litter model of *Mercer et al. 1995* specifically refers to twig and leaf litter and to seasonal and annual variation in litter accumulation.

5 The curves of Olson (1963) are generally applicable in Australia to the build up of eucalypt litter fuels as a function of time after fire (e.g. Walker 1981). These have the form $W = A/k[1 - e^{-kt}]$ where W is the fuel load and A is the annual accession of material in t/ha, k is the decomposition constant and t is time in years. $A/k = W_{max}$ where W_{max} is the quasi-equilibrium fuel load in t/ha. These curves rise quickly soon after fire, then more slowly, gradually approaching the maximum fuel load.

6 A pedantic view is that "fuel hazard" is somewhat of a misnomer because 'fuel' per se is not a 'hazard' unless: (i) it is ignited, and (ii) this threatens specified assets.

Box 7.2 Examples Of Quasi-Equilibrium Fine-Fuel Loads

Some quasi-equilibrium fine-fuel loads in Victorian forests, listed for drier to wetter forests, are:

- Red Ironbark (Eucalyptus sideroxylon) and Grey Box (E. microcarpa), **7t/ha** (Chatto 1996);
- Mixed Messmate (E. obliqua) and Narrowleaf-Peppermint (E. radiata) forests, **15t/ha** (Tolhurst & Cheney 1999);
- Mountain Ash (E. regnans), **25 t/ha** (Polglase & Attiwill 1992).[7]

Overall Fuel Hazard Guide

7.29 The OFHG also demonstrates the difficulties of quantifying fuel-array by noting the many variables contributing to each fuel-array component. Despite this difficulty, the OFHG offers estimates of 'equivalent fuel loads' for given 'hazard ratings' as can be seen in Table 7.1.

Fire Behaviour and Fire Weather

7.30 Fires can spread uphill, downhill, with the wind or against it. 'Fire behaviour' refers to the rate of spread and other properties of fires spreading in the open. Rate of spread is important if we need an estimate of the location of the fire perimeter at a given time in order to establish the most appropriate fire suppression strategy.

7.31 It is also important to know what the fire intensity will be, because there are limits to the range of intensities that can be controlled. 'Fire intensity', by definition, is equal to the fuel-load multiplied by the rate of spread of the fire multiplied by the heat yield of the fuel (regarded as a constant and measured in 'kilojoules per kilogram', kj/kg, as for food). 'Fire intensity' is expressed in kilowatts per metre of fire perimeter.

7.32 It is perhaps obvious that fires will spread fastest uphill with the wind under dry and windy conditions. To quantify the weather effect on rate of spread with the wind, A.G. McArthur (1967) developed a "Forest Fire Danger Index" (FFDI—see Box 7.4).

7.33 Under the worst possible weather and terrain conditions maximum fire intensity may conceivably reach the order of 100,000 kilowatts per metre (Gill & Moore 1990). The maximum intensity of forest fires that can be controlled is about 4000 kilowatts per metre (Luke & McArthur 1978; McCarthy & Tolhurst 1998).

7.34 Under the 'worst possible' weather conditions, a fire burning in a fuel load of about 8 t/ha *on level ground* will reach an intensity near to that set as the upper threshold for control (Gill et al. 1987). This upper limit is set by the general trend for fires over this intensity to produce lofted burning brands or embers. These can set fires downwind of the fire front and over fuel breaks where firefighters are deployed (see Box 7.5).

7.35 A fire-control strategist may argue that trying to achieve such threshold fuel loads everywhere in mountainous terrain is inappropriate on both economic and practical grounds. Some parts of the landscape -such as windward ridge tops and certain types of vegetation that include species with bark types particularly prone to the production of burning brands-may be more important than others in spreading the fire by spotting. The fuels within the burning block may be suited to prescribed burning but those in an adjacent block or holding-private or public-may be such as to preclude safe burning in it, especially in spring (McCarthy & Tolhurst 1998).

Rationale for Prescribed Burning

7.36 With the brief introduction to forest fuels, fire weather and fire behaviour above, we have in place all the information needed to provide a technical rationale for the importance of fuel reduction by prescribed burning.

7.37 When the fuel load is reduced, by definition the potential intensity of the fire is reduced; if the fuel is reduced *below the threshold level* and kept there by repeated prescribed burning or other means, then successful suppression within that area is likely, given adequate resources.

7 These authors used 10 mm as the upper limit for fine fuels unlike the usual 6 mm in most studies.

7.38 However, we should not expect that prescribed fires will remove all fuel, even all the fine dead fuel, from a burning block. Prescribed burning will not greatly reduce the potential bark fuel nor will it remove the canopies of the trees which can burn in a high intensity fire. Managers often aim for a certain percentage of the fine fuel to be burnt, say 80% (see the Box 7.6 on Fuel Management Zones), although the reasons for the percentage have never been spelled out. Some managers aim for a 'mosaic' but this needs definition as well as a rational basis (Gill 1986).

7.39 In forests, managers seek to remove the litter but leave the crowns of the trees without scorch (turning brown because they are heat killed). Presumably this is to avoid having a pulse of dead leaves falling to the ground, to retain aesthetic values, and to avoid temporary loss of canopy habitat (for example, for canopy-nesting birds or leaf-feeding insects).

Intervals Between Prescribed Fires

7.40 In the description below of Fuel Management Zones (FMZs), the fuel-array limits that would trigger a prescribed burning response are listed for FMZs 1 to 3. The time to reach these limits is a matter of the fuel accumulation curve, either as a fuel loading, Overall Fuel Hazard or a component thereof, as discussed above. Complications can arise in determining interval when plant or animal species, or other environmental criteria, are involved. These could apply to any Zone.

7.41 For the stated objectives of Zone 1, Tolhurst (2003) considered that, "in many cases", burning would have to take place on a four to six year cycle in lower-altitude eucalypt forests while the cycle for Zone 2 would be six to 12 years.

7.42 The appropriate intervals between fires for species conservation can depend on the seasonality of the fires and their intensity. Peat or duff fires are a complication, but we assume here that prescribed fires will not take place when the soils are so dry that peat fires could eventuate. There is little known about the effects of fire seasonality on the biota (animal and plant species), but it is known that certain plant species, apparently relatively few in number, can be strongly affected.

7.43 In this section, we talk only of intervals while recognising the importance of other components of the fire regime: intensity, seasonality and fire type. The spatial arrangement of forest blocks of different age since last burn may also be important to the persistence of plant and animal species (Gill 1998).

7.44 Fires can be too rare or too common either for the existence of a plant species or for the persistence of dependent animals. If the trees are sensitive as are, for example, those of Mountain Ash *(Eucalyptus regnans)* then this fact has to be taken into account in acknowledging what a suitable interval for species' persistence might be.

7.45 Understorey shrubs provide other examples of the importance of between-fire intervals. DSE has used expert opinion and all available data (but this is limited) to determine the interval limits and a suitable average interval for the persistence of native vascular flora in all Victorian vegetation types (Fire Ecology Working Group 2002). Generally the average interval considered ideal for forests is about 30 years. Using this figure, the average proportion of land burnt per year by the combination of prescribed and unplanned fire should be 3.3%.

7.46 Prior to the late 1980s unplanned fires burned about 120,000 hectares per year, and during the 1980s a similar amount was treated by prescribed fires (Morgan & Roche 1998). Considering the whole DSE estate, this would amount to 240,000 of 7,700,000 hectares or 3.1% per year. However, in the decade prior to 30 June 1998, the annual figure for unplanned fires averaged just 26,600 ha.

7.47 DSE and Parks Victoria recognise that current levels of burning, from whatever source, are inadequate for ecological requirements per year (Dept Treasury and Finance, Victoria, and the Department of Natural Resources and Environment, 1998).

Box 7.3 Overall Fuel Hazard Guide

The 'overall fuel hazard', or OFH, is defined as "(the sum of the influences of) Bark Hazard + Elevated Fuel Hazard + Surface Fine Fuel Hazard".

This, then, provides a much more comprehensive guide to the fuel array than one based on fine-fuels alone.

'Bark Hazard' depends on the 'amount of loose fibrous bark, particularly 'stringybark', the "amount of bark burnt off in any previous wildfire or fuel reduction burn, both at the base of the tree and up the bole" and the "amount of long loose 'ribbony' bark"; burning bark can "defeat control in wildfire or prescribed burn situations… by producing short and long distance spotting, and… acting as a link between ground and crown fuels to produce crown fires."

'Elevated fuel' comprises shrub, heath, and suspended material; its influence on fire behaviour "depends on the fuel continuity (horizontal and vertical), height, amount (weight), proportion of dead material, thickness of the foliage and twigs, and flammability of the live foliage".

'Surface Fine Fuel Hazard' is measured as the depth of the litter layer; less than 25 mm depth corresponds to <8t/ha, 25–35 mm depth corresponds to 8–12 t/ha, and 35–50 mm depth corresponds to 12–20t/ha.

A photo guide is provided to help assess fuel arrays in the forest.

Each component has five levels of 'hazard' (Table 7.1). Taking an amount from the appropriate box for each component, the total OFH can be calculated by addition, and that amount used for estimating fire rate of spread, or other properties, from a forest-fire behaviour guide.

Based on McCarthy et al. 1999

Box 7.4 Forest Fire Danger Index

The Forest Fire Danger Index, or FFDI, is based on drought condition, air temperature, and relative humidity and wind velocity in the open at 10 metres height.

The perceived 'worst possible' weather condition is given a maximum score of 100 while groupings of indices called 'fire danger ratings'-familiar to anyone who follows summer and autumn weather forecasts-are named either 'Low', 'Moderate', 'High', 'Very High' or 'Extreme'. Rate of fire spread with the wind is given as doubling for every 10 degrees of upward slope.

Box 7.5 Threshold Fuel Loads

The 'threshold fuel load' gives us a guide to the maximum tolerable fuel load if we are going to be able to control fires under any circumstance at any place, assuming the best possible resources for firefighting are available. Theoretically, the fuel threshold will change with slope, because each increase of 10 degrees doubles fire rate of spread and halves the threshold fuel load giving the same intensity. This reduces the threshold from 8 t/ha on level ground to 4 t/ha then 2 t/ha as a slope goes to 10 degrees, then 20 degrees.[8]

Upper threshold fuel levels are set for expected worst possible conditions but these 'worst conditions' may be at an FFDI much less than 100 at higher altitudes (see Gill & Moore 1990).[9] If the maximum FFDI reached was 81, then the critical fine-fuel fuel load would be 9 t/ha; if 64, then 10; if 49, then 11- based on the McArthur system.[10]

The threshold figures given are useful as a guide but should not be taken as definitive. Fuel loads of 2 t/ha or more can form in the first year after a fire but the lack of fuel continuity may be such that the area cannot be burnt under prescribed weather conditions anyway.

8 Mathematically, the critical fuel load on a slope, W_s, is given by: $W_s = W0/[e^{0.0693S}]$ where W_0 is the critical fuel load on level ground and S is the slope in degrees.

9 For Thredbo, New South Wales with a limited run of data.

10 For equations to McArthur's meters see: Noble et al (1980).

Table 7.1: Equivalent Fuel Loads (t/ha) for given Hazard Ratings

	Hazard Rating				
Fuel Component	**Low**	**Moderate**	**High**	**Very high**	**Extreme**
Bark	0	0	2	5	7
Surface fine	2	5	10	16	20
Elevated	0	0	2	6	10

Source: DSE, OFHG 1999

7.48 The same average percentage of the landscape can be burnt in two different regions, say, but the pattern of burning in one may be entirely different from the pattern in the other. Burning can be randomised (McCarthy et al. 2001) to give a wide variety of intervals and times since the last fire, or it can be at regular intervals in the same portions time after time. The former idea is probably behind calls for 'mosaic burning' although it may be obvious that the same parts of a mosaic can be burnt at regular intervals. Some form of randomisation of intervals would provide more resilience than regular intervals, but the average interval also needs to be appropriate.

7.49 The assumption about intervals made for ecological purposes in the Report of the Fire Ecology Working Group (2002) is that if the plant species are conserved then the animals and other organisms will be also. This is not necessarily true. If we are to manage conservation estates effectively it is important to have feedback on the effects of fire intervals and other fire regime characteristics on animals as well as plants.

DSE's Fuel Management Zones

7.50 All the factors described above will have varying effects on management planning, according to its particular aims. Fuel management is designed to protect assets of a variety of types. Where a high density of assets is found, effort in fuel reduction in adjacent areas is going to be maximal but elsewhere a cost-effective risk management plan may dictate less intense measures while achieving other aims, not just built-asset protection.

7.51 Accordingly, DSE has created five fuel-management zones (Auditor-General's Office 1992; Department of Natural Resources and Environment 1995)[11] (see Box 7.6) to facilitate a strategic approach to fuel management.

7.52 The areas zoned in these ways for the North East and Gippsland Regions of the DSE are listed in Table 7.2. Note that the collective area of Zone 1 parcels is relatively small, but particularly important in terms of asset protection, while that of Zone 3 parcels is the largest Zone in both areas.

Tracks

7.53 Tracks are an important issue in both firefighting and preparedness as shown by submissions to this Inquiry (Chapter 5). Tracks provide access by ground crews to unplanned fires; they define blocks for prescribed burning; they form the edge against which ignition can take place during firefighting, for burning out areas of fuel or for initiating prescribed fires.

7.54 Tracks have a range of attributes. They can be wide or narrow, have passing areas and turnaround points (for trucks and other machinery), have shallow or steep gradients, be rough or smooth, vegetated or clear, follow ridges or contours, be straight or winding. They may include water crossings, and may have separate entrances and exits.

7.55 Tracks can be temporary or permanent. Temporary tracks can be maintained regularly, created at the time of the fire or readied at such times only. Tracks created during unplanned fires may be rehabilitated or become part of the track network requiring maintenance and repair. Tracks can be always open or gated. Tracks may be trafficable by two-wheel and four-wheel drives, vehicles of particular weight classes, or tracked vehicles only.

7.56 Tracks can create adverse environmental effects, attract unauthorised use and provide suitable conditions for weed invasion and establishments. They may become sites for unplanned ignitions.

11 Zoning appears to have originated in 1988–89 when four zones were created with the same maximum fuel loads as the first three of the present 5-part system.

Box 7.6 DSE Fuel Management Zones

Zone 1: Asset protection zone:

Here the aim is to "provide the highest level of strategic protection to human life, property and highly valued public land assets and values" *(Code of Practice for Fire Management on Public Land – [or Code] p. 16)*.

The Gippsland Fire Protection Plan describes the aims for prescribed burning. In each operation,

- 'Treat up to 90%' of the burning block;
- Keep fuels at or below a litter-bed height of 15-25 mm (4-8 t/ha, see OFHG);
- Bark fuels should be 'high' or less (2 t/ha, see OFHG) unless surface fine fuel is 'low'.
- OFH should always be 'moderate' or 'low'.

It has been predicted that there is less than a 10% chance of failure of first suppression attack if OFZ is less than moderate, even at a FFDI of 100.

Zone 2: Strategic fuel-reduced corridor zone

These are 'strategic corridors of sufficient width and continuity to provide a substantial barrier to the spread of wildfire by reducing its speed, intensity and the potential for spot fire development'. They 'provide areas which assist in making fire suppression safer and more effective' *(Code, p.16)*.

The Gippsland Fire Protection Plan sets aims for prescribed burning. In each operation:

- Treat up to 80% of the area;
- Surface fuels should be less than 25 mm in depth (8-12 t/ha, see OFHG);
- Bark fuels should be 'high' or less (unless surface fine fuels are 'low');
- Elevated fuels should be less than 'high' (2 t/ha, see OFHG); and
- OFH should be 'high' or less.

Zone 3: Broad-area fuel reduced mosaic zone

This Zone aims to 'provide an irregular mosaic of areas of fuel reduction which will complement works in Zones 1 and 2 in reducing the severity of wildfires' *(Code, pp. 16-17)*.

The Gippsland Fire Protection Plan sets aims for prescribed burning. In each operation:

- Treat approximately 50% of the area in each prescribed-burning operation;
- Surface fine fuels should be at or below a depth of 25–35 mm (8-12 t/ha, see OFHG) on 50% of the area;
- Bark fuels should be less than 'high' (2 t/ha, see OFHG) on 50% of the area (unless the surface fine fuels are 'low');
- Elevated fuels should be 'high' (2 t/ha, see OFHG) or less on 50% of the area; and
- OFH should be less than or equal to 'high' on 50% of the area.

Zone 4. Specific flora and fauna management zone: "provide[s] for the use of prescribed burning for the active management of specific flora and/or fauna, particularly for species and/or communities which have critical fire regime requirements that are not adequately catered for by broadly defined fuel or ecological management objectives" *(Code p. 17)*

Zone 5. Prescribed fire exclusion zone: in "areas of vegetation in which there would be a high potential for economic, ecological or cultural loss if they were subjected to prescribed burning" *(Code, p. 17)*.

Table 7.2: Areas (ha) of Fuel Management Zones 1 to 5 (see Box 7.6) for the Gippsland Region (GR) and the North East Region (NER)

Region	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Total
GR	89,345 (3.5%)	408, 437 (15.9%)	1,115,830 (43.3%)	468, 593 (18.2%)	494,630 (19.2%)	2,576,835
NER	23,396 (1.6%)	205,202 (13.7%)	660,169 (44.2%)	142,126 (9.5%)	463,925 (31.0%)	1,494,818

Source: Data supplied by DSE; areas for the North East Region are from a Draft Plan and are approximate.

7.57 Tracks and roads are maintained for forestry operations, water catchment management, recreational use and fire management purposes on public land. DSE and the Department of Primary Industries manage over 25,000 kilometres of roads and tracks across the State.[12] DSE advised the Inquiry that each year prior to the fire season approximately 16,000 kilometres of fire tracks are prepared.

7.58 Tracks and roads form a network of various densities. What the optimum density (or size of 'cells' within the network) should be, is not answerable in an operational sense because any answer depends on the overall aims of land use, the cost of establishment and maintenance, the nature of the terrain, how much use the tracks would have outside of severe fire events, the extent and types of ground and air firefighting resources and methods, and the fuel types present. It is easy to say that there should be more, or fewer, tracks but not easy to provide an adequate justification for any change.

7.59 The Inquiry is unaware of any form of analysis that sets an appropriate density for a track network even in relation to firefighting alone.

7.60 However, it may be possible to do so for prescribed burning, larger areas (a lower density of tracks) being suitable when aerial ignition is used, smaller areas (a higher density of tracks) when only ground-based ignition is suitable.

Conclusion

7.61 This Chapter has set the scene for informed discussion of the controversial prescribed burning issue and we take up the discussion in the following five Chapters.

7.62 We make no recommendations here about prescribed burning.

Fuel reduction burning.

12 Auditor-General Victoria, *Fire Prevention and Preparedness*, May 2003 pp 136.

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Chapter 8
Fuel Management in the 'High Country'

Overview

8.1 Whether or not cattle grazing affects fire occurrence or behaviour in the mountains of North East Victoria is part of the wider cultural issue concerning the presence of cattle in Alpine National Parks.

8.2 This Chapter looks at the science behind claims that 'grazing prevents blazing'. To do this, we must understand more about the vegetation types dominated by, or associated with, shrubby eucalypts. In Victoria, these are to be found in contrasting environments – the alpine and subalpine regions or 'High Country', and the semi-arid to arid landscapes of North West Victoria, or 'Mallee' (although this region contains shrublands without Eucalyptus also).

8.3 As in Chapter 7, our broad focus here is on fuel modification and its place in preparing for unplanned fire.

8.4 We conclude that there is currently no scientific support for the view that 'grazing prevents blazing' in the High Country.

Burning and Grazing in the High Country

8.5 The High Country is land above the tree line in the mountains of North East Victoria or in areas of cold air drainage at high altitude where grasslands, herbfields and heathlands are to be found. Also, there are bogs, dominated by Sphagnum moss, which are an important resource in water catchment areas because they store and moderate the flow of water. Snow is common in winter, while summers are generally mild (see Ashton & Williams 1989 for a short description of climate). Fire weather is also relatively mild in the High Country (see Chapters 6 and 10, and Gill & Moore 1990).

8.6 The extent to which grazing modifies fuel in the High Country has been an issue in this Inquiry. It is part of a wider, long running issue about the grazing of cattle in National Parks (Clark 1992, Anon. 1992, Mosely 1988). It is beyond the scope of this study to comment on the wider issue; what is pertinent is whether or not grazing by cattle reduces the incidence or intensity of fires in High Plains systems.

8.7 Any effect of grazing on the proneness to fire of the High Country depends on what cattle do to the vegetation in the short and long term. Animals have an effect through what they eat or through trampling, soil disturbance, urinating and defecating. The impact of animals in any given area will depend on the types of animal, their stocking rates, the season of their presence and how often they revisit the same spot.

Grazing History

8.8 The High Country of Victoria consists of a number of isolated plateaux and mountain tops carrying subalpine communities of Snow Gum (Eucalyptus pauciflora) woodland, herbfield, grassland and bogs. Lower in altitude these communities merge with forests of various eucalypt species including Snow Gum and Alpine Ash (E. delegatensis). Cattle will frequent all of these communities, but non-forested areas are now the prime grazing lands in summer and autumn.

8.9 The history of grazing and burning in the High Country is associated with that in the adjacent forest country. Banks (1989) noted that a strong folklore was developed by the early pastoralists: 'Stockmen burnt the forest as often as they could and always in the heat of summer to ensure a 'clean' burn to keep the forest visually open and accessible, to provide a green pick and to reduce the risk of destructive bushfires.' In the higher altitude landscapes around 1820 'pastoralists were … discovering the value of … high mountain summer pastures to tide them over the long hot summers on the surrounding plains. This was the beginning of a long tradition of high country summer grazing with its associated burning off.'

8.10 Studies of growth rings and fire scars on Snow Gum, mainly in the Australian Capital Territory and New South Wales, indicated 'a general pattern showing a marked increase in fire frequencies with the arrival of European pastoralists and prospectors and recent decline with the ascendancy of the conservationist and recreationalist period.'

8.11 Originally, the mountain forests of Alpine Ash (or Woolybutt) in the vicinity of the Bogong High Plains in Victoria supported an understorey of grass, but repeated firing for improved grazing led, ironically, to an understorey of shrubs (Carr & Turner 1959). This was at the expense of the grasses to such an extent that grazing became heavily concentrated on the High Plains.

8.12 Historically, the heaviest grazing of the High Country has been in times of drought such as in 1901, 1914, 1926 and 1939 (pre-1959 at least).[1] Overgrazing occurred in some years (Holth 1980); horses, cattle and sheep were involved. These large vertebrate animals appear to have been a new evolutionary feature of the High Country, large native vertebrate herbivores being virtually absent from it previously. On these Plains the graziers apparently did not set landscape fires but in 1939 the Plains were 'undoubtedly… swept by [unplanned] fire'

Modern Grazing Impacts

8.13 Today, the High Country in Victoria is largely grazed by cattle. Fifty-six licences to graze stock are presently held by 'mountain cattlemen' and paid for at about $5 per head per year. Up to 8,000 stock travel to and from the mountains each year and graze there for about 16 weeks (Mountain Cattlemen's Association).

8.14 In a short study of the behaviour of free-ranging cattle on the Bogong High Plains, Van Rees and Hutson (1983) found that, for feeding, cattle preferred grassland and heathland rather than open-heath, wet grassland or mossbed, but for resting they overwhelmingly preferred grassland. They drank largely from mossbeds.

8.15 Carr and Turner (1959a) noted that cattle and sheep do not eat the regrowth shoots of Snow Gum after fire but eat the flower heads of Snow Grasses (Poa spp.) and a sedge called Ledge Grass (Carex hebes). Animals attempting to eat some varieties of Snow Grass early in the season actually pulled out parts of the grass tussocks, which then died. At the peak of the Snow Grass flowering there was little grazing of the grass or herb foliage. In poor seasons for the flowering of the grasses, foliage was heavily grazed in the experience of Carr and Turner (1959a).

8.16 Our observations on the Bogong High Plains, after the 2003 fires, indicated that while the woody vegetation (often copses of Snow Gums with heathy shrubs) was burnt, the grass and herbs adjacent to it often were not. This is because litter fuels of Snow Gum woodland merely have to lose water by evaporation to become flammable – and can do so after only a short time of desiccation. However, alpine grasses require seasonal periods of soil and atmospheric dryness for their leaves to die and become flammable.

8.17 Shrubs are most likely to burn when fire spreads in litter or dry grass near or underneath them. If the grass is green, the fire will not spread. If the grass is only partially dead, any fire in it spreads more slowly than if it consists of completely dead foliage. If the grass is grazed, the rate of spread of a fire may be up to 20 per cent slower than in an ungrazed pasture; in an eaten-out pasture a fire may still spread at about 40 per cent of the ungrazed rate (Cheney & Sullivan 1997). This means that even if grasses are eaten down, which is unlikely, they will carry fire if desiccated. Woody fuels will burn when the grass is green but the reverse is unlikely.

8.18 Grazing would have a negative effect on fires in the High Country if it was intense enough to do any of the following:

- Alter the grass curing ('proportion of dead matter') significantly;
- Significantly reduce biomass (fuel load);
- Create large proportions of bare ground; or
- Reduce shrub abundance.

8.19 However, grazing animals are more likely to remove the green material from a pasture leaving the brown material if they can. On the other hand, if they graze the pasture right down and it resprouts, then all the new shoots will, of course, be green.

8.20 Grazing animals will affect grassy biomass according to their stocking density and the seasonal availability of palatable herbs and flower stalks; they will mostly ignore shrubs. After a small fire in 1984 at Mt Fainter on the Bogong High Plains, it took more than 15 years to re-establish complete vegetation cover on grazed sites and only 10 years on ungrazed sites. This was because of differences in the rates of grass re-establishment; reduced cover allows erosion to occur and may lead to shrub invasion (Wahren et al. 1999).

8.21 In other words, free-range cattle grazing, associated with firing in forests in the past, appears to have changed the fuel array in forests to one dominated by shrubs rather than grass, a change likely to have increased fire proneness and the chance of intense fires. As a result, grazing has moved to the more open higher-altitude country. There, cattle grazing has changed the composition of the vegetation in some places by reducing the quantity of succulent herbage in the form of Snow Daisy (Celmisia sp.) and increasing the grass component (Carr & Turner 1959b).

1 This paragraph, unless otherwise noted, is based on the study by Carr, S.G.M. and Turner, J.S. (1959a).

8.22 The presence of fires across the High Country in 1939 when grazing was heavy, the shift from grassy to woody understoreys in the forest, the shift away from succulent herbs to grass in some places, and the fire-proneness of even eaten-out pastures, all suggest that 'grazing does not prevent blazing'.

Conclusion

8.23 There is currently no scientific support for the view that 'grazing prevents blazing' in the High Country.

8.24 The Inquiry notes that High Country grazing has a long tradition in Victoria with strong community, cultural and heritage values. The Inquiry believes that the issues of High Country grazing, other than how it relates to the mitigation or otherwise of unplanned fires, is outside the scope of the Inquiry. The Inquiry notes however that opinions are diverse and passionate. Given this, we commend constructive debate by all parties and stakeholders in this issue to provide a common way forward.

Recommendation

8.25 **That, according to available scientific evidence, a decision regarding cattle grazing in the High Country should not be based on the argument that 'grazing prevents blazing.'**

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Chapter 9
Fuel Management in the 'Mallee': Techniques and Approaches

Overview

9.1 Mallee is both a vegetation type and a district named after the vegetation. The 'Mallee' is a large region of mainly shrubby vegetation in the semi-arid and arid North West of Victoria. Prescribed fires there may consume all the foliage and litter and look like unplanned fires.

9.2 The nature of fuel distribution and accumulation in the mallee and shrubland vegetation of other types in North West Victoria has resulted in substantially different approaches to prescribed burning from those in the forested areas of the State.

9.3 Various attempts to establish buffers and breaks in the vegetation have been made, including 'link burns'. One relatively new strategy is the chaining of strips of vegetation followed by burning the felled material once it has dried out. This system has the potential to be a safer and more cost efficient way to construct buffers, but safety, effectiveness and environmental effects will need to be monitored.

What is Mallee?

9.4 The large fire in the Mallee region in December 2002 was primarily in the Big Desert Wilderness Park. Ecologically, the 'Big Desert' is part of a large area (866,000 hectares) of public land comprising Ngarkat Conservation Park (208,000 hectares) in South Australia and the Big Desert Wilderness Park (142,000 hectares), Big Desert State Forest (159,000 hectares) and Wyperfeld National Park (357,000 hectares) in Victoria (Creswell & Thomas 1997). A few much smaller reserves could be added to this list. Not really a 'desert', the Big Desert is clothed in vegetation, typically mallee and heathlands.

9.5 Mallee vegetation comprises shrubby eucalypts usually up to about four or five metres tall in discrete clumps underlain by a shallow litter bed and associated with shrubs or prickly hummock grasses (Spinifex). This vegetation is common on stabilised sand dunes from the geological past in the North West of the State where the climate is arid or semi-arid with hot summers and cool winters (see Cheal & Parkes 1989 and Conn 1993 for descriptions).[1]

9.6 The vegetation varies widely in terms of its ability to carry fire. Mallee eucalypts may occur with the highly flammable Spinifex grasses or with relatively low flammability succulent shrubs. In the area of the Big Desert fire of December 2002, the vegetation was of typical mallee mixed with non-succulent shrublands.

Fire and Fuel Management in the Mallee

Comparison of 2002–2003 Fires to Earlier Fires

9.7 The cultural baseline for contemporary fire history in the Mallee Region is the 1959 fire, which burnt approximately two thirds of the Big Desert.[2] During the 2003 season,[3] 187,569 hectares were burnt. In 1985, the area burnt was relatively large at 87,306 hectares. In 1991, 1999 and 2001, relatively large aggregate areas were burnt (all less than 50,000 hectares) but these areas are small compared to the recent fire season. The area burnt in 1981, at 282,593 hectares, exceeded the area burnt in the recent fires (Land Conservation Council 1987).

Conserving the Malleefowl

Long periods without fire are advocated for the conservation of this species.

The Malleefowl requires large amounts of litter to build its nest mound and, given the slow litter accumulation rates in this environment, fire-free intervals of up to 60 years or more are estimated as optimal for this purpose (Benshemesh 1990).

On the other hand, the favoured food resources for the species may be most available in vegetation no more than 20–30 years old, while fires more frequent than every 10 years would be likely to lead to local extinction.

The long periods needed to reach maximum use of the habitat may be due to the times needed for the breeding up of Malleefowl numbers rather than litter build-up.

1 For a brief climatology based on Mildura see Maher 1973. Fire weather is briefly treated in Gill & Moore 1990.
2 This paragraph uses information from the DSE/CFA Inquiry Tour to the area unless otherwise noted. The Tour and purpose is discussed in Chapter 1.
3 This and similar shorthand refers to the fire year ending June 30 of the stated year.

Fuel Management in the Mallee

9.8 There are a number of aims for the management of Mallee Parks and State Forests. The management difficulty is how to contain fire within the system, thereby avoiding damage to assets on private land, while achieving conservation objectives, such as protection of the famous Malleefowl *(Leipoa ocellata)*.

9.9 In mallee vegetation , the twigs, leaves and bark of the shrubby eucalypts may accumulate around the bases of the plants. In the fuel 'shadow' beneath the mallee plants themselves, the litter fuel load – typically reaching 5 to15 tonnes per hectare (t/ha) – is generally low in comparison with moist eucalypt-forest types (see Chapter 7). Because the plants are often separate from each other, the litter patches beneath them are often somewhat isolated from each other by bare ground (i.e. the surface fuels are discontinuous).

9.10 On the tops of dunes, the highly flammable Spinifex clumps and shrubs are sometimes common, while in the swales with their heavier soils, fuel may be litter or shrubs. In very wet years the heavier soils may carry grassy fuels that join up the discrete litter patches and enable fires to spread more readily; these grassy fuels may grow at any time after a previous fire. Without these ephemeral grassy fuels, it may be up to 20 years before another fire can spread through the area. However, circumstances vary widely from place to place (Bradstock & Cohn 2002).

Prescribed Burning to Internally Limit Fire Spread

9.11 In areas where grassy fuels are rare, as in shrubby parts of Ngarkat Conservation Park, fires can provide a break in the fuel for, say, 10 years. If the ignition frequency was high enough then it is theoretically possible that a system of patches of vegetation could be created in which fires always encountered a break created by other fires in the previous decade. This may be one of the ideas behind 'mosaic' or 'patch' burning.

9.12 If it were possible to engender sufficient fire activity to create such a system there would always be the problem of what to do where the public land abuts private land, usually in crops and pasture. Conservation issues and the practical considerations of carrying out the burning, add to the problems.

Prescribed Burning to Create 'Unbounded Buffers'

9.13 An alternate but related system would be to create strips across the landscape, which, while allowing fuel to gradually build up after treatment, would affect the spread of fires for some years. Ideally, this temporary barrier (i.e. a buffer strip rather than a fuel break) would stem, or stop, the flow of an unplanned fire.

9.14 A number of ideas aimed at creating such coarse-scale discontinuity to limit fire spread were considered by Billing (1981). He found that burning under mild conditions (as is done in forests) was unsatisfactory because the fine-scale discontinuity in the fuels prevented fire spread. For similar reasons, backburning is often ineffective in mallee vegetation since fire will not spread against the wind in the discontinuous fuels. However, by prescribed burning 'unbounded buffers' – igniting a 50-metre edge under windy, high fire danger conditions and then depending on gradually moderating conditions during the evening to put the resultant fire out – strips up to 30 kilometres long and 2.5 kilometres wide were created.

9.15 Spring, especially October, was advocated as the time to create buffers because the surrounding country was green and grassy and unlikely to allow the fire to extend into farmland. Billing set a lower limit for Forest Fire Danger Index (FFDI) at 20; the current prescription puts the upper limit at 20 (Table 9.1). The value for the Index under the perceived worst possible weather is 100.

9.16 When the FFDI is in the 'Very High' range (25–50), mallee fuels can burn 10–15 years after the last fire while heaths (non eucalypt shrubs) can burn after 5–10 years. For prescribed fires, the respective intervals are 20–30 years and 10–20 years (DSE/CFA Inquiry Tour).

9.17 Under some circumstances, fires in the Mallee can have the same appearance, whether they are ignited as a fuel-management treatment or by lightning. This is because, for the fire to carry, the winds must be sufficient for flames to span the gaps between fuel patches. When this occurs the crowns of the vegetation also ignite. Either way, a crown fire results and all dry fuel is consumed. The rate of spread of the fire does, however, vary with FFDI (Billing 1981).

Table 9.1: Prescribed Burning Prescription Applicable to Mallee Areas

Vegetation	FFDI[4] (max.)	Temp. (°C)	Relative humidity (%)(mm)	Wind at 10m height in the open (km/hr)	Keetch-Byram Drought Index[5]
Mallee Desert heaths Hummock grasslands	20	12–28	25–60	<25, no change in direction expected	<150

Source: DSE

Problems with Unbounded Buffers in Burning Zones

9.18 The 1991 Draft Mildura Fire Protection Plan (Edgar 1991)[6] covers the Mallee Region of the Department of Sustainability and Environment (DSE).

9.19 It advocates two Priority Burning Zones.[7] Zone 2 would 'provide a strategic corridor of sufficient width and continuity to provide a substantial barrier to the spread of unplanned fire, reduce fire intensity and damage, and provide a base for suppression'. In Zone 4, burning would be limited to 'link burns', in part to 'protect and conserve natural and cultural values'.[8] Essentially, these 'link burns' are unbounded buffers; linking areas that have been fuel reduced by (i) unplanned fires or (ii) prescribed fires for ecological purposes.

9.20 The difficulties in prescribed burning mallee vegetation using unbounded buffers was exemplified by the Waggon Flat Fire of April 2002.

Fuel Breaks, Buffers and 'Spotting'

9.21 If a fuel break or buffer is to be effective in stopping a fire it must be wide enough to prevent burning brands passing over it to start other fires in a process called 'spotting'. In a Workshop held in Mildura in 1981, Rawson reported spotting up to 800 metres from the fire front in Victorian mallee while Condon, for southwest New South Wales, noted that spotting occurred up to 11 kilometres (written discussion following Rawson 1982).

It is likely that most spotting will occur close to the fire front with the chance of longer-distance spotting being less – but still possible and significant for firefighting. Indeed, the Inquiry was informed (DSE/CFA Inquiry Tour[9]) that 'mass short distance spotting (usually occurred) within 100 metres of the head fire'. Any width advocated for treated areas needs to be assessed on the basis of probabilities and costs, not certainties.

Alternative Fuel Management Techniques

9.22 Currently there is over 900 kilometres of boundary with private property in the Mallee Region (DSE/CFA Inquiry Tour). The breaks and buffers adjacent to the edge of private land were to be managed on a 'twin-strip' system, with a total width of 100 to 200 metres – the strips being burnt alternately. The 'internal corridors' within public land were also 'twin strips' but, in this case, each strip was to be approximately one kilometre wide.

9.23 The implicit idea of internal corridors is that when a fire breaks out, it will be confined to the area defined by them. While this idea has some merit, there is a difficulty about what sizes the blocks would be in a 'wilderness area' (or elsewhere), and under what weather and fuel conditions the strategy would be effective.

9.24 The Draft Mildura Fire Protection Plan also identifies suppression techniques being used in the Mallee, including aerial suppression and direct attack with heavy machinery. Water is scarce in most of the Mallee, so fire suppression often depends on dry techniques such as creating bare-earth breaks, rolling heathy areas or chaining (DSE/CFA Inquiry Tour).

4 'FDI' or 'FFDI', is the Forest Fire Danger Index of McArthur, 1967. For more detail, see Chapter 7.
5 The Keetch-Byram Drought index is a value for soil dryness based on moisture gains and losses in a modelled soil profile.
6 The Plan is due for renewal.
7 In some DSE Regions, including the North West, not all of the Fuel Management Zones defined in Chapter 7 have been applied to vegetation.
8 An account of the full system of Fuel Management Zones is given in Chapter 7.
9 As noted in the Introduction, the Inquiry toured Victoria following the path of the fires.

Chaining

9.25 The Inquiry was introduced to a relatively new system in which 100 to 200 metre-wide swaths of mallee are chained (flattened by a heavy chain dragged along between two very large, rubber-tyred tractors) and subsequently burnt. The flattened, chained vegetation dries out, establishing a more-or-less continuous fuel bed that can be burnt in late autumn or winter (DSE/CFA Inquiry Tour).

9.26 As a treatment for preparedness and for fire suppression, this system has the potential to be a safer and more cost efficient way to construct buffers. However, it needs to be monitored for safety, effectiveness and environmental effects.

DSE Concern

9.27 Given that most public land in the Mallee is conservation reserve, a key concern of DSE managers is preventing weeds from getting into and becoming established on fire access tracks and control lines. Open tracks can also act as a passage for the movement of vermin carnivore species. Recreational four-wheel drive vehicles and motorbikes can take advantage of newly opened up areas and can reduce the rehabilitation of areas if allowed to go unchecked. Also, dune destabilisation can pose a local rehabilitation problem (DSE/CFA Inquiry Tour).[10]

Conclusions

9.28 The nature of fuel distribution and accumulation properties in mallee and shrubland vegetation of North West Victoria results in substantially different approaches to prescribed burning from those in the forested areas of the State.

9.29 The Inquiry noted the opportunistic nature of 'link burns', the apparent chequered history of unbounded buffer burning in general, and recent developments in the use of the chaining technique to create buffers in mallee vegetation. We suggest that chained and burnt buffer strips might replace 'link burns' if found to be safe, effective and consistent with general management aims.

Recommendations

9.30 That if 'link' burns continue to be used, then on-site weather sequences and fuel conditions marking successful ('within explicit prescription') and unsuccessful burns be documented.

9.31 That the success of current buffers in terms of assisting suppression operations be continually reviewed, evaluated and documented.

9.32 That the creation of buffers by chaining and then burning swaths of mallee be explicitly monitored for:

- The risk of fire escapes during their establishment;
- Their effectiveness as a barrier to unplanned fire under various weather and fuel conditions; and
- Any adverse environmental effects such as soil mobilisation and loss of biodiversity.

9.33 That, as a result of this monitoring, weather conditions for the safe conduct of burning in such operations should be defined.

Buffers and the Waggon Flat Fire

A strip 150 m wide and 60 km long was to be burnt using aerial incendiaries from a helicopter to the east of a relatively secure edge. A day after ignition was complete, three fires broke out from the treated area despite crews being in the area to deal with 'hot spots'. The combined fires burned an area of public land of approximately 28,000 ha stretching across mallee country for 34 km. Thus, a dependence on the weather to improve sufficiently to put out the fire was misplaced.

A reliance on the weather to stop fires ignited as part of a fuel management program has also been misplaced in other vegetation types and States.

Information supplied by DSE

10 For further discussion see Gill 1990, pp. 202–5.

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The lignotuber is the new growth coming from the base of the Mallee trees.

Chapter 10
Constraints on Prescribed Burning in Forests

Overview

10.1 This Chapter turns to the realities and practicalities of prescribed burning.

10.2 We describe some key issues behind the scheduling of prescribed fires in forests and review data on prescribed fires in the North East of Victoria and Gippsland over the past decade. Our review focuses on the numbers and types of prescribed fires ignited per year, the areas burned, any trends through time in these data, and the resource implications of these practices. We include an analysis of the weather envelope within which prescribed fires can be lit, and the number of days it implies are available for prescribed burning.

10.3 We conclude that there are few days on which prescribed burning can take place in eucalypt forests in the North East Region of Victoria and northern parts of Gippsland. Constraints and inhibitors include weather, social impacts, vegetation type and aspect, and resources. Given this, everything should be done to maximise the opportunities those days represent. Our recommendations include a review of the existing five Fuel Management Zones.

Constraints on Prescribed Burning

10.4 The areas burnt by prescription in each Fuel Management Zone will be a function of the numbers of days suitable for burning and the resources available to carry it out. The geographical spread of areas approved for burning, the fuel management zones in which they occur, and the sizes of blocks to be treated are also all relevant in relation to potential bushfire mitigation.

10.5 This section outlines several difficulties inherent in scheduling prescribed fires:

- Planning and approval processes;
- Weather and related factors;
- Ignition patterns;
- Smoke;
- Biophysical Factors;
- Threat of Censure or Litigation; and
- Resourcing.

Planning and Approval Processes

10.6 The areas in which prescribed burning is scheduled are selected three years in advance and, once established, are made available for public comment. The appropriateness of this model is discussed in Part C.

10.7 In any particular year, only some of the areas identified are likely to be available for prescribed burning due to constraints on resources, weather and the occurrence of unplanned fire. Having more blocks available for burning than is possible in any one year allows choices to be made according to circumstances. For example, if a particular block within a district is found to be outside the weather prescription for prescribed burning, it is possible that another – for example, at a higher altitude, or in an area that has had a different rainfall – might be suitable. This means that not all blocks identified in the plan are likely to be burnt in any one year.

10.8 Close to the time of burning the prescriptions are checked in the regional office and resources (personnel and equipment) allocated. Forecasts are scrutinised and spot forecasts for the proposed location of the fire may be requested from the Bureau of Meteorology. If the forecasts are suitable on the morning of the proposed burn, then local approval may be given. However, under some circumstances (for example, when blocks are close to major populations and/or assets), approval at Regional and Head-office levels may be deemed necessary.

10.9 There were suggestions to the Inquiry that restrictions to burning have occurred because of this hierarchical process and we recommended an immediate review of the prescriptions and approval process in our Interim Report that is at Appendix III.

Weather and Related Factors

10.10 The weather is a major factor in determining whether or not prescribed burning will take place and to what extent it is likely to meet its objectives.

10.11 Cheney (1978) considered that prescribed burning should be conducted within the fire intensity limits of 60 to 250 kilowatts per metre. This implies that the number of days for prescribed burning will depend on the fine-fuel load in the forest. A high fuel load presents risk of fire escape, while a low fuel load may not allow the fire to spread sufficiently. The weather prescriptions (or envelope) that Cheney considered compatible with burning, given appropriate fuel load, were:

- Air temperature between 10 and 20 degrees Celsius;
- Relative humidity from 50 to 80 per cent; and
- Wind in the forest from two to five kilometres per hour.

10.12 Gill et al. (1987) analysed the relationship between fuel load and modelled days available for prescribed burning based on Melbourne weather data, finding that number of days was not sensitive to fine-fuel load above a certain level. From about 8 tonnes per hectare (t/ha) to about 15 t/ha, the average number of days per year rose rapidly from very few to 14, then dropped to about 10 when the fine-fuel load was very high (40 t/ha). When the summer fire season was excluded because of risk of escape, this maximum dropped to 11 days per year on average.[1] If weekends were excluded on the grounds of work practices then the number would drop to about eight. Numbers of days available varied widely from year to year.

10.13 In general, the number of days available for burning in Victoria may be truncated in practice by deleting summer, spring and winter days, leaving only autumn. In summer there is the likelihood of fire escape creating unplanned fires of high intensity. In spring there is the chance of a carryover of undetected smouldering materials to ignite unplanned fires in summer, while windy days beyond the prescription may be too hard to predict following 'good' days for burning. In winter, the chance of smoke accumulating in valleys is high, and there may simply be too few days above the minimum prescription to maintain a high level of staff and equipment readiness. Other days, including holidays and weekends, may be omitted for economic reasons.[2]

Ignition Patterns

10.14 Tolhurst and Cheney (1999) point out the effects that ignition pattern may have on fire intensity and how the range of weather conditions suited to prescribed burning may change, depending on choice of ignition.

10.15 For example, fire can be ignited using aerially applied incendiary capsules or jellied petrol, or by drip torches at ground level. The pattern of application can be along ridges or along the lower parts of burning blocks or on a grid pattern, among many others. The fire behaviour that eventuates can be affected by the density and time of day that ignition occurs. Variation in ignition pattern may result in a five-fold variation in fire intensity. Terrain and microclimate can be important. Astute managers will vary all these factors, sometimes during the conduct of the burn, to achieve suitable outcomes. Ignition can, therefore, change the range of weather conditions suited to prescribed burning.

10.16 Another way to achieve a high percentage of an area being burnt is to apply fire to the chosen area more than once within a short return period (i.e. within one to two years). After the first fire, the aim is to burn the residual unburned fuel in the block. This can be achieved without serious biodiversity consequences (which can be a problem when intervals are short) if the initially treated area does not carry a fire the second time ignition is attempted.

10.17 Suitable weather conditions for prescribed burning are described in various ways, as Table 10.1 shows. Prescriptions used by others include those of McArthur (1962), Cheney (1978) and Tolhurst (2003).[3]

10.18 Tolhurst found that an average of only 12 days per year were available for prescribed burning in the Wombat State Forest, a mixed species eucalypt forest area about 80 kilometres north west of Melbourne. Over the period analysed, from 1993 to 1999, the number of days available varied from a low of only four in 1995 to a high of 20 in 1999. This was after eliminating days in summer, on weekends, and in November (since there is increased risk of re-ignition and escape of fires in the following summer months). The remaining days were mostly in March and April. These results are similar to those of Gill et al. (1987) who used Melbourne weather data.

1 These results are similar to those of a more recent study using a shorter weather record for a different station, Blakeville, and different criteria for days suited to prescribed burning (Tolhurst 2003).
2 In combination, this prescription of conditions for prescribed burning virtually precludes such burning for blocks with fuel loads beneath the maximum fine-fuel load limit of 8 t/ha for Zone 1, assuming level ground (see Chapter 7).
3 Tolhurst's criteria for burning were: FFDI<10; FFDI next day <15; maximum windspeed in the open <20km/hr; air temperature >14°C and <25°C; relative humidity <70% and >35%; Fine Fuel Flammability Index (FFFI) between 6 and 10 (Williams & Dexter 1976); no rain on the day; no rain >2 mm for the previous two days.

Table 10.1: Standard Prescribed Burn Prescriptions for Forest Litter

Burn class	FFDI (max)	Temp. (°C)	Relative Humidity (%)	Wind at 1.5 m height in the forest (km/hr)	Keetch-Byram Drought Index[4]	Fine Fuel Moisture Content (%)[5]
Dry sclerophyll forest ('Open Forest') **Regrowth, without Wiregrass** *(Tetrarrhena juncea)*	8	<25	35–70	<10	<50	9–16 (surface)
Dry sclerophyll forest **Mature, without Wiregrass**	10 (on day 2, <12)	18–27	35–70	<10 (or <20 km/hr at 10m in the open)	<50, or <120 if it has fallen 30 mm or more from summer max.	9–16 (surface)
Regrowth forest with Wiregrass	5	<23	>59	<5	<80 in autumn <30 spring	• Fine fuel above the ground >13 • Fine fuel at the litter surface, >16 • Whole depth of fine-fuel litter, >60
Mature forest with Wiregrass	8	<25	>45	<10	<80 in autumn <30 in spring	• Fine fuel above the ground >13 • Fine fuel at the litter surface, >16 • Whole depth of fine-fuel litter, >60

Source: DSE

Smoke

10.19 Smoke has various negative effects on individuals and communities. These include adverse effects on people's respiratory health, aesthetics, tourism, and business – even on washing hanging on the clothesline. In the course of this Inquiry, a deleterious effect of smoke from the north eastern fires on commercial wine-grape quality near harvest time was documented (Alpine Valleys Winemakers & Grapegrower Association, 2003). Wind direction alone may cause a burn to be cancelled if the resulting smoke will seriously impact on a neighbouring land use activity. These effects are important social inhibitors on prescribed burning programs.

10.20 Adverse social effects engender the following question: 'does the amount of smoke emitted from prescribed fires equal, exceed or fall short of that from unplanned fires in the same area?' Perhaps the negative effects are greater if there is no prescribed fire?

10.21 The amount of smoke emitted from a fire depends on the fuel quantities burned and the amount of smoke per unit of fuel (emission rate). If the headfire has a high intensity then large quantities of fuel are burned, often from a large area, and large volumes of smoke are emitted, probably at a high emission rate. The amount of smoke emitted from prescribed fires depends on the area and the fuel load but, assuming that fuel is reduced regularly by prescribed burning, the amounts per unit area will be relatively small and at a low emission rate.

10.22 However, if the fuel-reduction program is successful, the frequency of prescribed fires will be greater than that of high-intensity fires. It is therefore possible that the amounts of smoke emitted from a prescribed burning program over an extended period will be the same as those from occasional unplanned fires; the actual relativities will depend on the chance of unplanned fires of various intensities and the frequency and extent of prescribed fires.

4 This is an index of drought. It is the water deficit of a model soil profile holding a maximum of 200 mm water. It is calculated on the basis of daily weather and the estimated soil water storage present on the previous day.

5 Moisture content is expressed as the amount of water in the fuel as a percentage of its oven-dry weight.

Biophysical Factors

10.23 The weather criteria for effective prescribed burning listed in Table 10.1 cannot take into account the effects of aspect in steep country where south eastern slopes, for example, are likely to be moister and cooler than others and therefore less fire prone. Moisture content will be higher on protected slopes because they are likely to support taller, denser, forests that lessen the drying effects of wind and reduce the amount of sunlight reaching the fine fuel at ground level. Thus, wetter forests – often within burning blocks with forest appropriate to burning – are generally excluded from prescribed burning programs. Second, and of equal importance, if the surface fuels in certain areas never reach the load levels that trigger prescribed fires there is no point in considering them for a prescribed burning program. This may apply to some of the native conifer forests of the State, for example.

10.24 Taking into account these two exclusions based on 'broad forest types', Tolhurst (2003) estimated that 21 per cent of public land would be removed from any prescribed burning program on these grounds. This reduces the land appropriate to prescribed burning to about 6.2 million hectares.

10.25 At a more detailed level, there may be issues that restrict the area suited to burning. These include the risk of fire escape associated with neighbouring blocks (public or private) because of high fuel accumulations or steep slopes, and the chances of arterial roads being closed because rocks and other debris are released from the steep slopes above following the removal of stabilising vegetation.

Threat of Censure or Litigation

10.26 It would be understandable if prescribed burning was entered into with a great deal of caution by field staff given the protracted deliberations and critical outcomes of the long-running Linton Coronial Inquest, the deaths of New South Wales officers during prescribed burning at Ku-Ring-Gai Chase National Park in June 2000, public censure when prescribed burns escape (McDonald 1999, p. 58; McCarthy & Tolhurst 1998), the Victorian Auditor-General's 2003 Report, and the present Inquiry.

10.27 Litigation potential is a further inhibitor to conducting burns.

Resourcing

10.28 The amount of burning that can take place in a year is proportional to the number of available, well-resourced crews multiplied by the number of days available.

Available Crews

10.29 The number of crews available and their resources to do the job is a budget matter not considered here. However, the Inquiry noted reports suggesting that there has been a loss of staff with skills in fire management due to DSE's 'downsizing' and the 'lack of availability of experienced personnel in fire behaviour to oversee the [ecological burning] programs' (Fire Ecology Working Group, 1999). The Inquiry was informed that numbers of DSE staff had dropped from about 1500 to 2000 in the mid 1980s to about 250 permanent field-based staff in 2003.

Social Factors

10.30 Social factors also impact on resourcing. After a busy and tiring fire season in which officers often give up the chance to spend time with their families because of actual fires or the threat of fire, the autumn period (encompassing Easter) would seem an obvious time for scheduling vacations. This period is also a prime time for prescribed burning so there may be shortages of experienced staff to conduct prescribed burns. Further, Project Fire Fighters, employed and trained for the summer fire season, have mostly completed their short-term employment contracts and are not available to assist with the autumn prescribed burning programs.

Budgets

10.31 Whether or not current crews are available depends on the work practices and social factors mentioned above, but also on budget considerations. Without restrictions on public holidays and weekends, the number of burning days could be expected to increase substantially. Presently, burns are only scheduled on weekdays (Auditor-General 2003, p. 54; but see Figure 10.8 in this Chapter).

10.32 Budget is also important with respect to the Fuel Management Zone in which burning is conducted. The Auditor-General (2003) quoted figures from DSE for the costs of burning per hectare according to Fuel Management Zone:

- Zone 1: $50–500;
- Zone 2: $30–300;
- Zone 3: <$10–50; and
- Zone 4: $30–300.

10.33 In particular, fuel management is more expensive in Zone 1 where fires are burned on the boundary between public and private land. Thus, there are trade-offs between the cost of burning and the distribution of areas burned across the public land estate.

Prescribed Burning Realities: Analyses Undertaken for this Report

10.34 This section examines DSE data for the number of days on which prescribed fires actually took place each year, the number and area of burns by zone and type (ecological, regeneration or 'slash', or broad-area 'prescribed fire' for fuel reduction), and trends through time.

10.35 Data for the North East and Gippsland DSE management Regions of Victoria were provided to the Inquiry in raw form. Data covers the period from 1991 to 2003 and includes a total of 4,295 management fires.

Summary of Patterns and Trends Revealed by the Data Analyses

10.36 **(1)** A very large number of fires in most districts of the North East and Gippsland Regions are regeneration burns and so do not address fuel reduction issues across broad areas. The requirement to undertake regeneration burns in logging coupes as a priority may limit the time (and remaining suitable weather days) available to complete planned burns for fuel reduction. Such a limitation could be overcome if there were more crews and equipment, or if the requirement for regeneration burns decreased significantly (for example, through a reduction in annual area logged).

(2) The number and area of burns for fuel reduction has declined more markedly through the 1990s than has that for regeneration burns. This implies either:

- A reduction in resources available for delivery of burn programs (for example, reduction in staff numbers and budget); and/or
- A strategic diversion of resources to other activities deemed to be more important. The Inquiry understands that privatisation of the plantation forestry and water supply sectors – and cuts to budgets – have been accompanied by a reduction in staff employed to manage fire (as noted earlier in this Chapter).

(3) The seasonal window of time for management burning is narrow: nearly all management burning occurs in autumn (mostly in March and April).

(4) The inability to regularly use Saturdays and Sundays for management burns within the narrow windows of time available eliminates some suitable fire days from use. This is a resourcing issue that might profitably be reviewed.

10.37 These points, along with those concerning the 'weather envelope' described in the previous section, are pertinent in determining how the level of prescribed burning delivery might be changed.

Data and Analyses

10.38 Only data for 'complete' (target percentage of planned burn area has been met) and 'partially complete' (less than the target area has been met in the first instance) burns were analysed. Data for years prior to 1991 are incomplete and could not be used. Separate data sets describe numbers and areas of burns and these sources do not necessarily match. One reason for this is that, for practical reasons, DSE does not incorporate fires of less than four hectares into their database system.

Figure 10.1: Numbers of Prescribed Fires Primarily for Fuel Reduction, Ecological and Regeneration Purposes by DSE District for the North East and Gippsland Regions; 1991 to 2003

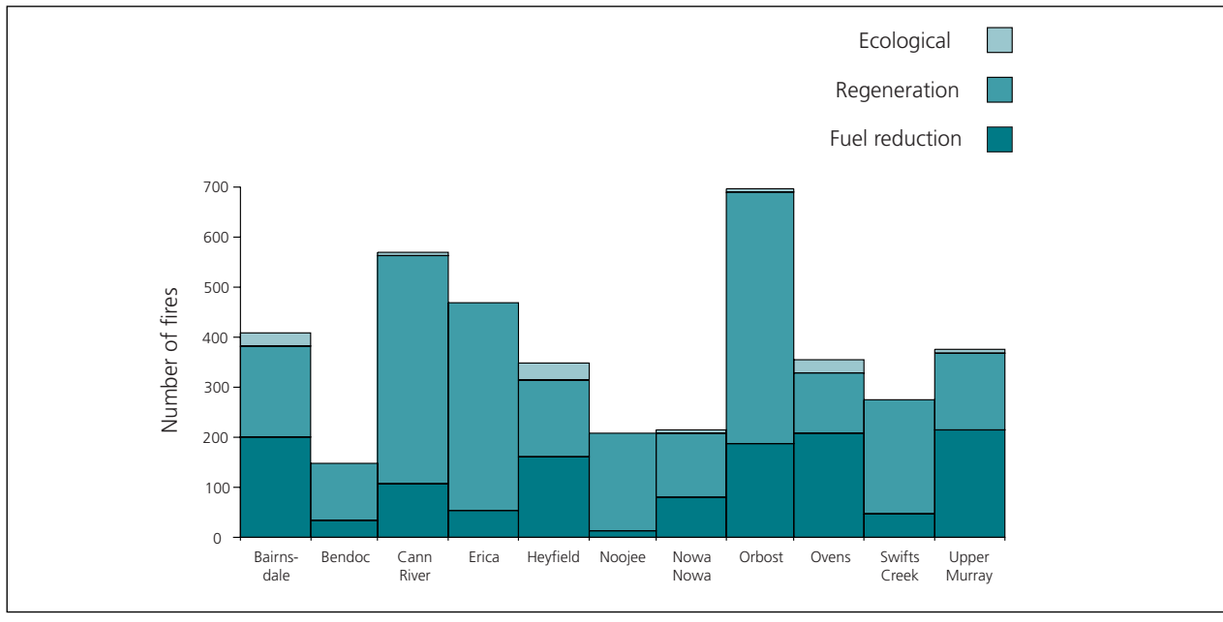
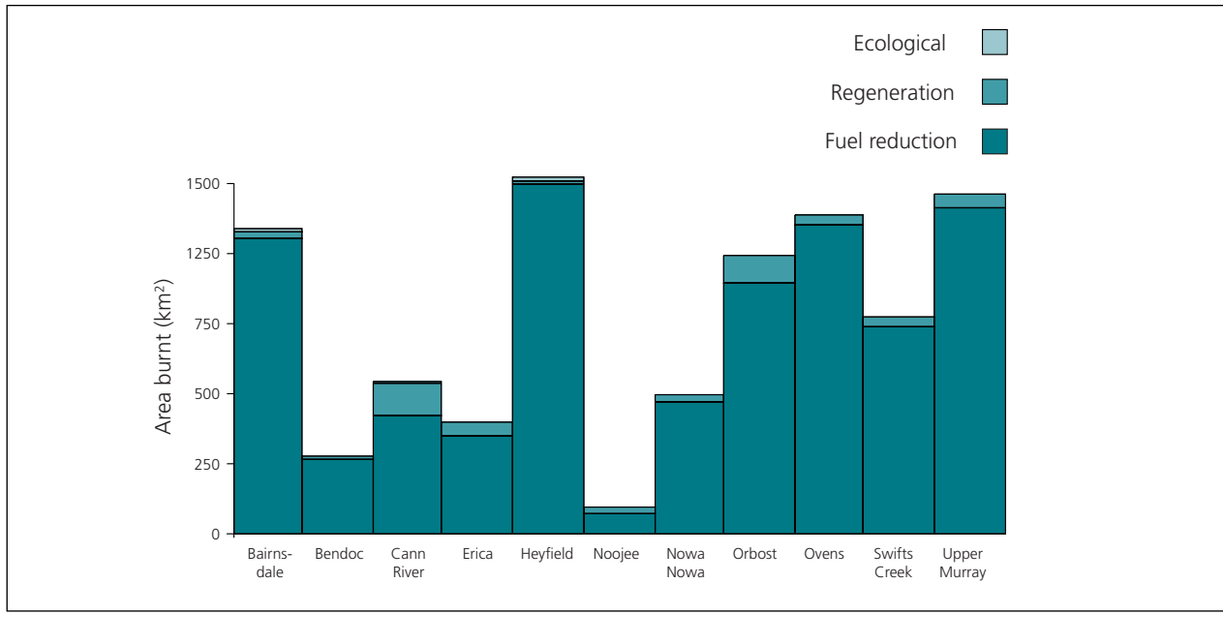


Figure 10.2: Aggregate area (km2; for Hectares Multiply by 100) of Prescribed Fires for Fuel Reduction, Ecological Purposes and Regeneration Conducted by each DSE District for the North East and Gippsland Regions; 1991–2003



10.39 Fire is managed in the Gippsland and North East Regions of Victoria for more than fuel reduction and ecological purposes. Regeneration burns are required for current-year logging coupes of Mountain and Alpine Ash to ensure recruitment of these species in the following spring. These burns are done prior to the first winter after logging where-ever possible and take precedence over other burn types. Ecological burns fall within the ambit of prescribed burns generally, since they are defined in relation to the five Fuel Management Zones (FMZs) now used for fire management planning in these regions (see Chapter 7 for a definition and discussion of the FMZs).

10.40 For most districts, especially the Gippsland Region, 'slash fires' or 'regeneration burns' are by far the most common prescribed-fire type, representing 63 per cent of all planned fires. Prescribed fires for fuel reduction account for 33 per cent of fires and ecological burns for three per cent (Figure 10.1). Variations in the number of regeneration burns reflect the distribution of native timber resources across the regions. However, the area burned by prescribed fire type (Figure 10.2) shows a very different pattern, with regeneration and ecological burns representing only a small percentage and prescribed fires for fuel reduction accounting for more than ninety per cent of total area burned. This indicates that there are a large number of very small area regeneration burns, and a smaller number of much larger area burns for fuel reduction.

Figure 10.3: Numbers of Prescribed Fires Per Year, by Purpose, for the North East and Gippsland Regions; 1992–2003

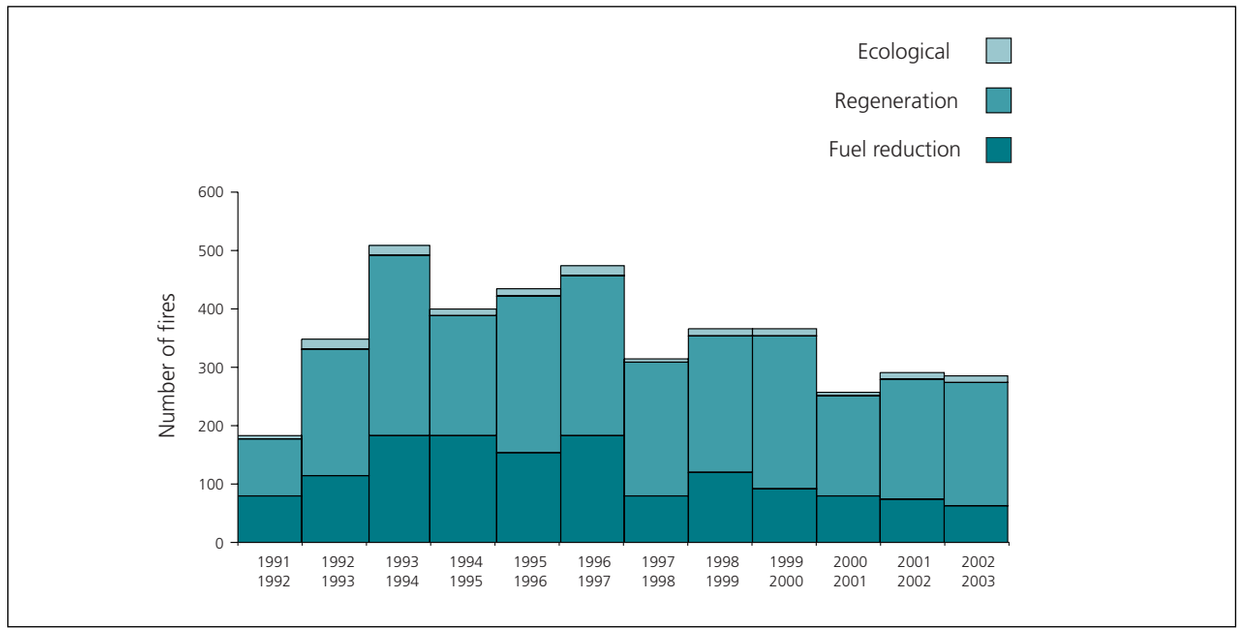


Figure 10.4: Aggregate Area (km2) of Prescribed Fires Per Year, by Type, for the North East and Gippsland Regions; 1992–2003

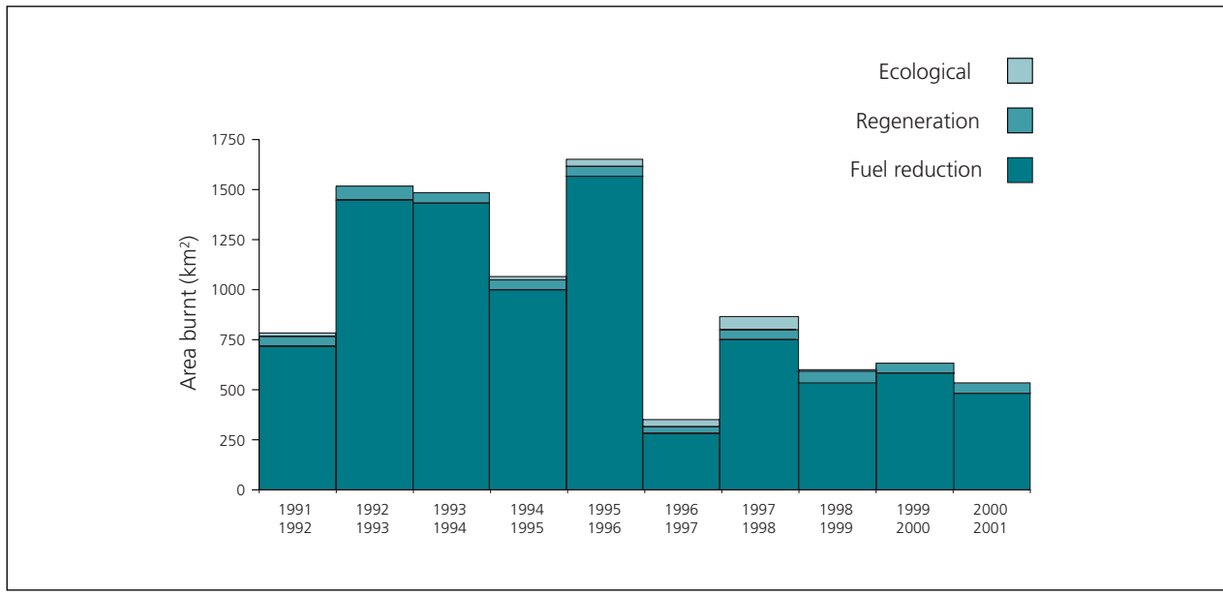


Figure 10.5: Number of Prescribed Fires by Type and Fuel Management Zone (FMZ) in the North East and Gippsland Regions; 2000–2002

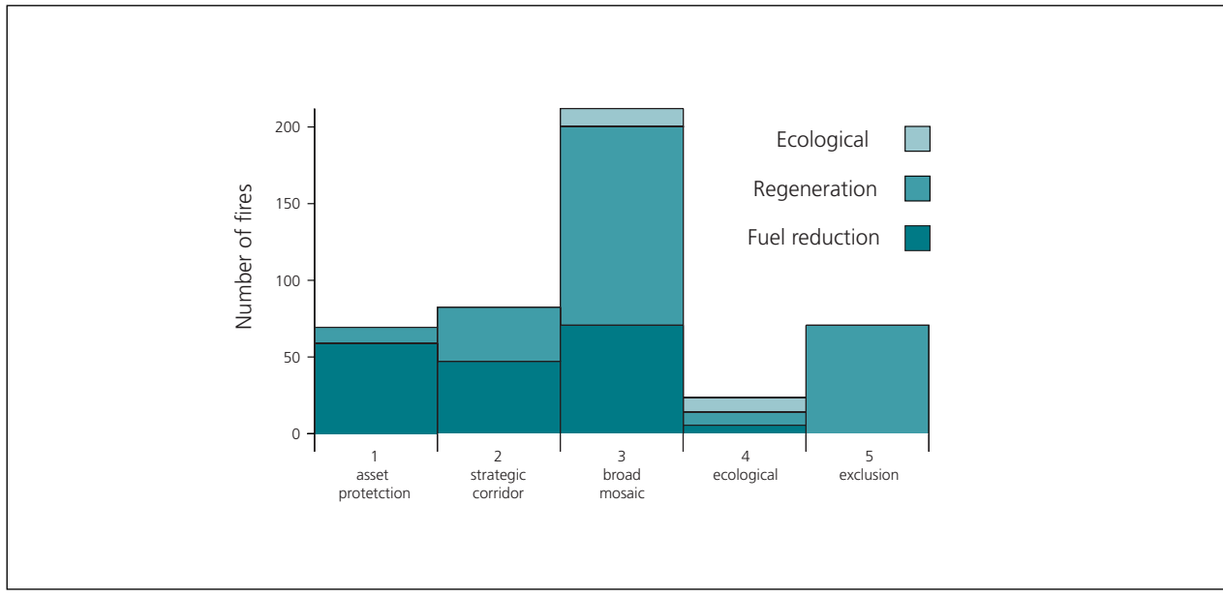


Figure 10.6: Area of Prescribed Fires by Type and Fuel Management Zone (FMZ) in the North East and Gippsland Regions; 2000–2002

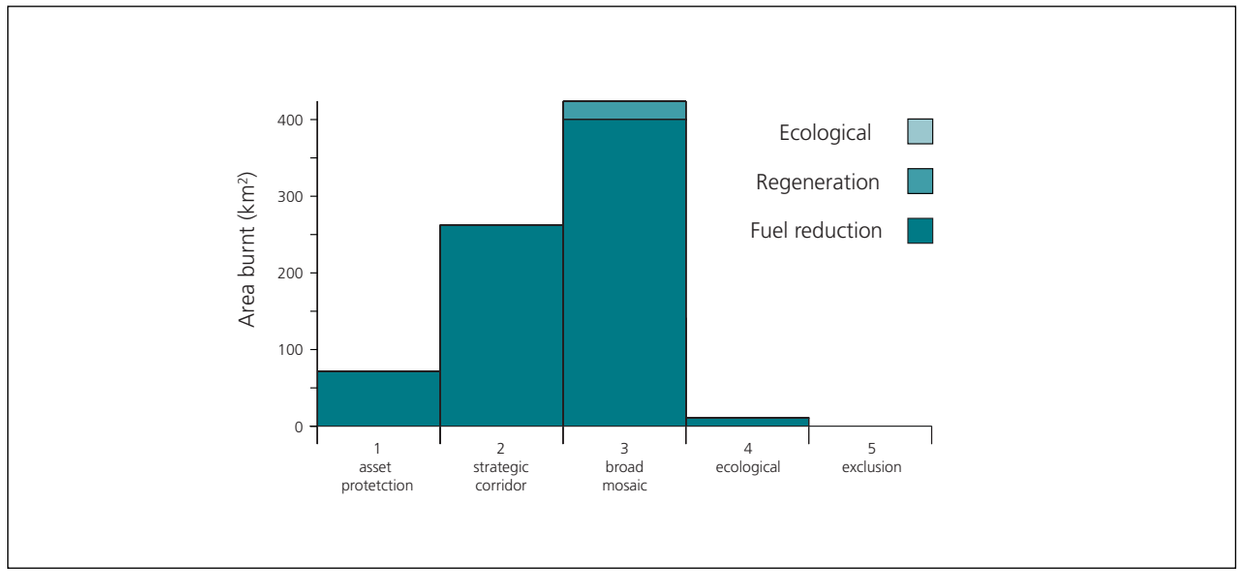


Table 10.2: Average Area (ha) of Management Fires in the North East and Gippsland Regions by (A) Fuel Management Zone and (B) Burn Type. Data are for the Two-Year Period 2000–2002

A.

Fuel Management Zone	Gippsland	North East
1 Asset Protection	272.4	139.6
2 Strategic Fuel-Reduced Corridor	900.3	790.1
3 Broad Acre Fuel-Reduced Mosaic	244.3	725.3
4 Specific Flora & Fauna Management	370.8	
5 Exclusion of Prescribed Burning	12.2	28.0
Not Allocated to a Fmz		270.5

B.

Management Fire Type	Gippsland	North East
Ecological	67.3	14.0
Fuel Reduction	702.3	676.9
Regeneration	23.8	27.9

10.41 The number of burns per year for fuel-reduction peaked in the early to mid 1990s in the study area then declined slightly to the present (Figure 10.3). We do not have an unassailable explanation for this, but it probably reflects changed data collection and management practices and so says nothing about trends prior to 1992. The area burned also declined in a parallel fashion (Figure 10.4). Although the ways in which 'area' has been reported over time may have varied (Tolhurst 2003), the association of numbers and areas suggests that the decline has been real.

10.42 Since 2000-2001, prescribed-fire statistics have been recorded in relation to the fuel management zones (FMZs). Sixty percent of fires were for regeneration and did not have FMZ recorded, and 69 per cent of all fires (33 per cent of area burnt) did not have FMZ recorded.

10.43 Although based on a smaller sample size than that used for other data, a clear pattern is apparent in the remaining data, with by far the largest number of fires and total area being in FMZ 3, the broadacre fuel reduction zone (Figures 10.5 and 10.6). Many of the fires in this, and other zones, and the only prescribed fires in FMZ 5 (fire exclusion zone), are regeneration burns.

10.44 Burns for fuel reduction dominate in Zone 1 (asset protection zone) and Zone 2 (strategic corridor zone), with area burnt increasing from Zones 1 to 3 (Figure 10.6). The mean size of burns for fuel reduction reflects the cost (risk and resource allocation) of burning in the different zones; fuel reduction burns in Zone 1 average 244 hectares and cost most per hectare, while those in Zones 2 and 3 average about 870 and 800 hectares respectively. Regeneration burns are all small, averaging about 24 hectares (Table 10.2).

10.45 Given the total area of each Fuel Management Zone for the North East and Gippsland regions (Table 10.3), the proportion of each FMZ burned for management purposes for the years 2001 and 2002 can be calculated. This shows that, over those two years the following percentages were burned for the purposes specified for those zones:

- FMZ 1: 2.9–3.2
- FMZ 2: 1.7–2.8
- FMZ 3: 0.8–1.5
- FMZ 4: 0–0.2

Table 10.3: Areas (ha) of Public Land in Fuel Management Zones 1 to 5 for the Gippsland Region and the North East Region

Region	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Total
Gippsland	89,345 (3.5%)	408, 437 (15.9%)	1,115,830 (43.3%)	468, 593 (18.2%)	494,630(19.2%)	2,576,835
North East	23,396 (1.6%)	205,202 (13.7%)	660,169(44.2%)	142,126(9.5%)	463,925 (31.0%)	1,494,818

Source: Data for Gippsland supplied by DSE; areas for the North East Region are from a Draft Plan and are approximate

Table 10.4: Annual Area (ha) of Management Burns by Fuel Management Zone (FMZ) for the Gippsland Region of DSE; 1994–2002

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Zone 1	12,610	5,781	5,150	12,202	8,942	2,550	3,625	4,326	1,052
Zone 2	35,258	45,078	18,428	37,918	8,062	17,066	17,242	15,887	7,989
Zone 3	40,873	33,624	4,085	35,812	6,837	20,975	25,276	21,259	9,377
Zone 4	3,375	250	750	1,662	380	6,382	2,734	1,388	98
Total	92,116	84,733	28,413	87,594	24,221	46,973	48,877	42,860	18,516

Source: DSE, Gippsland Region

Figure 10.7: Number of Prescribed Fires Per Month by Type in the North East and Gippsland Regions; 1991–2003

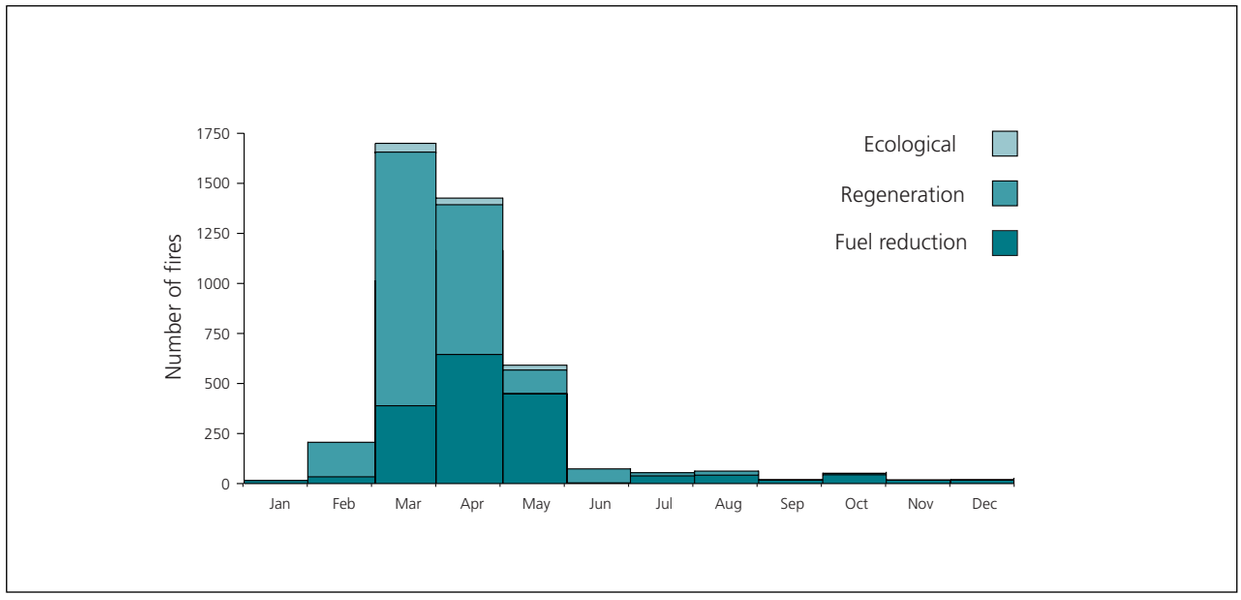
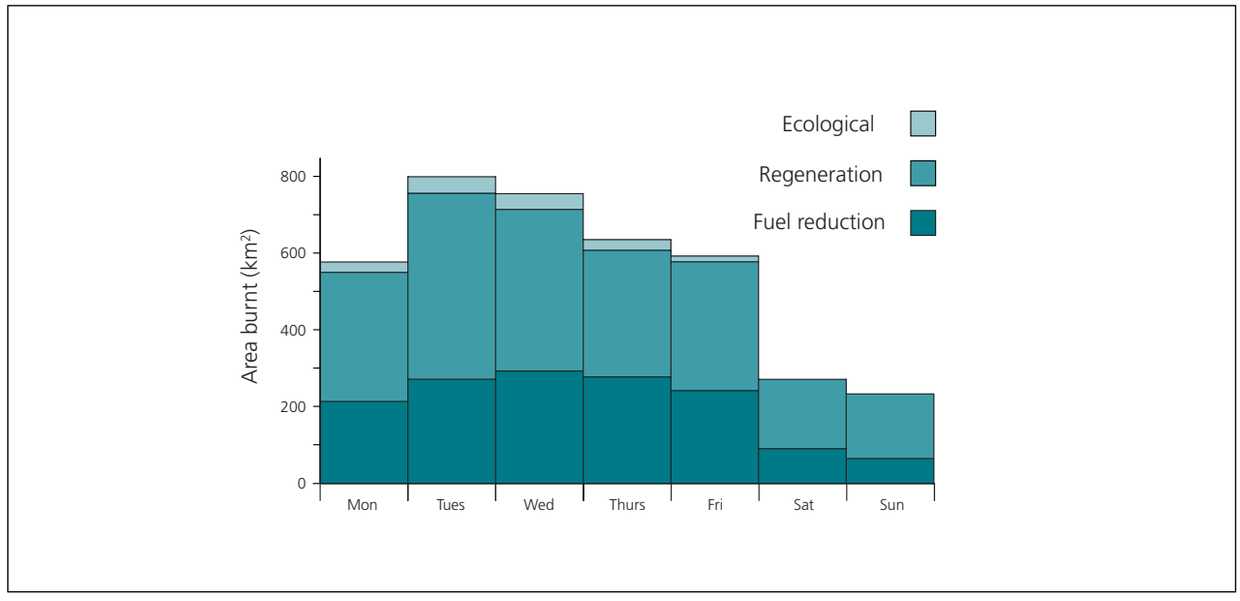


Figure 10.8: Days of the Week when Prescribed Fires (by Type) were Conducted in the North East and Gippsland Regions; 1991–2003



10.46 Data supplied by DSE for prescribed fires in the Gippsland region over the nine years (1994 to 2002) shows that substantial variation in area burned per year is a feature of the longer-term data (Table 10.4). These data show that much larger areas were burned annually in the early to mid-1990s than have subsequently been burned. In the years of highest areas burned, 1994 and 1997, about 13 per cent of FMZ 1, and nine per cent of FMZ 2 were treated. Over the whole period, the average area of Zone 1 burned was eight per cent.

10.47 Data for the last few years of management burning (2000–2002), show that the average time lapsed before an area of FMZ 1 would be re-burned (if every part of the zone were burned before re-burning commenced) is not less than 30 years (3.3 per cent of area burned per year), and is progressively longer for each of the other zones in turn. (Unplanned fires will also burn parts of the area and so reduce the average time since fire for each zone to some extent). If data for Gippsland for the whole period from 1994 to present is used, then a re-burn interval of about 12 years is estimated (8 per cent of area burned per year).

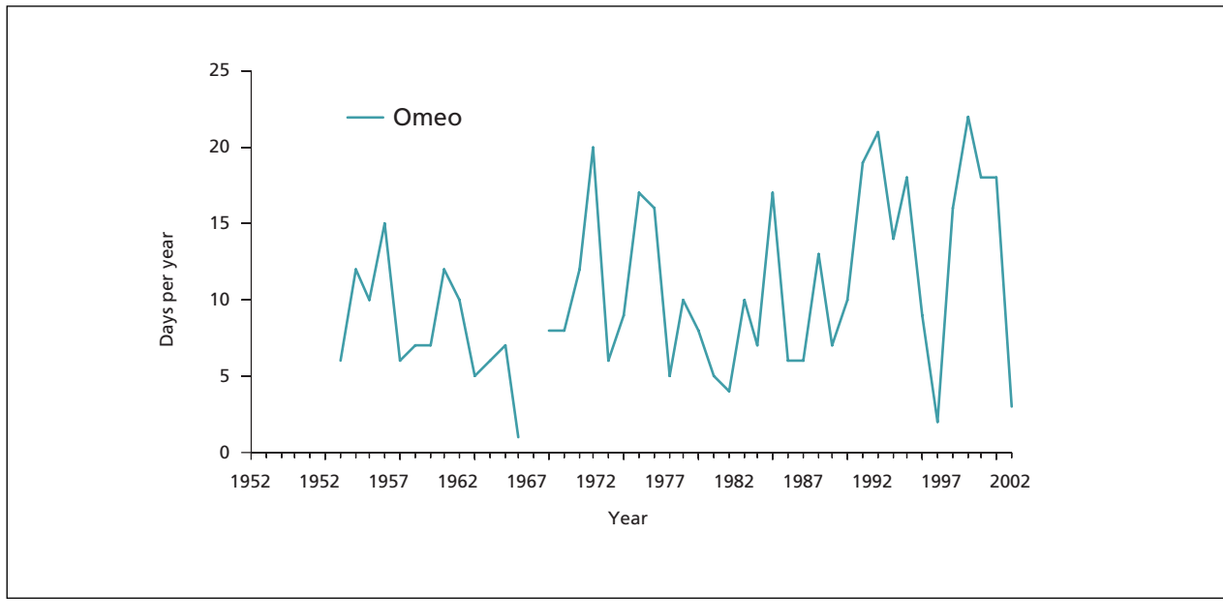
10.48 In their study of the effectiveness of fuel reduction burning in assisting with wildfire control, McCarthy and Tolhurst (2001) reported an average fire interval of 5.8 years for vegetation in FMZ 1 and 11.5 years for FMZ 2 – values much lower than those from our data, but based on their own sample.

10.49 As we discussed earlier, the seasonal distribution of management fires confirms that the bulk of fires are conducted in the autumn, with little burning undertaken at other times of the year (Figure 10.7). Most fires for fuel reduction take place on weekdays, with a minimum number on Sundays (Figure 10.8).

The Weather Envelope for Prescribed Burning

10.50 As we have seen, several authors have made estimates for specific locations that calculate the available days for prescribed burning – assuming the weather is forecast perfectly. There were few days available as a rule.

Figure 10.9: Estimated Number of Days Per Year Suitable for Burns for Fuel Reduction for Omeo (Gippsland Region)
Breaks in the Graph Indicate Years of Missing Data



10.51 To further investigate the nature of weather constraints on prescribed burning, we estimated the number of days available per year for prescribed burning for selected Victorian locations based on daily weather records. These analyses use the prescription detailed in Table 10.1.[6] On advice from Dr K. Tolhurst, a minimum Drought Factor of 5 is used in place of fine fuel moisture content (via the Fine Fuel Flammability Index) to define fuel moisture levels compatible with prescribed burning.

10.52 If any of the list of parameters is outside the allowable range, the fire cannot be lit since there is too great a risk that the fire might escape, or that it will not burn well enough to reduce the fuel load to the target level.

10.53 To perform this analysis, we chose a series of stations in Gippsland and the North East. While duration and comprehensiveness of the meteorological data varied, we analysed as many years of climate data as possible, using standard 3 pm information for:

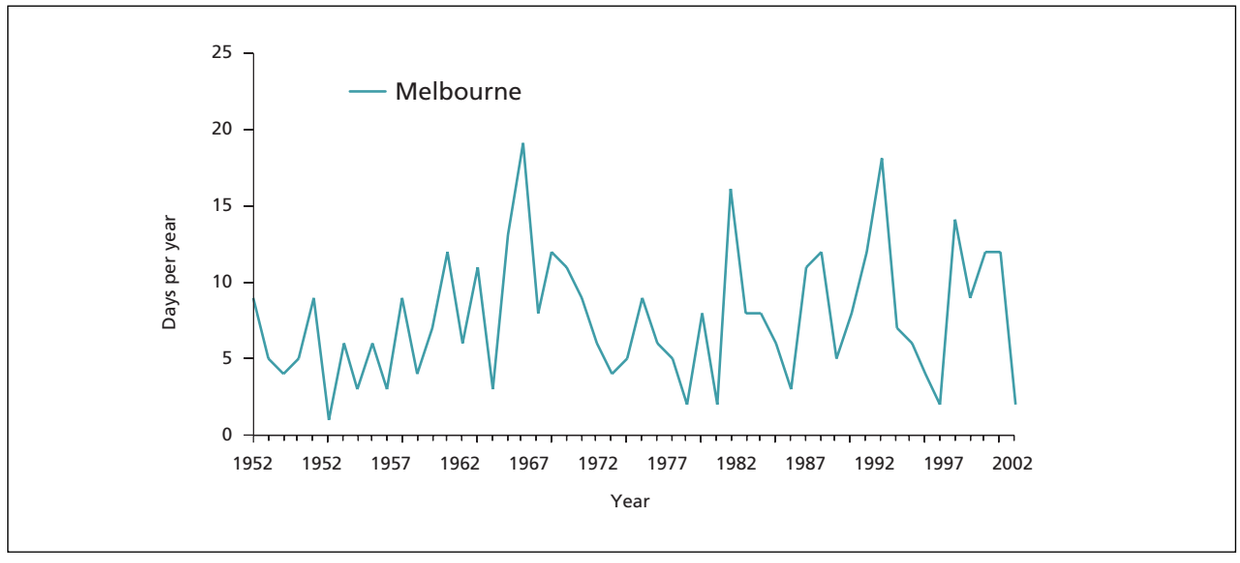
- Temperature;
- Relative humidity;
- Wind speed; and
- Daily rainfall to 9 am.

10.54 Each of these variables is necessary to allow calculation of the Keetch-Byram Drought Index (KBDI)[7] and the Forest Fire Danger Index (FFDI). All of these variables and indices are required in order to specify the weather envelope in relation to burning.

10.55 Areas prescribed burnt in several years during the early- and mid-1990s were relatively high for FMZs 1 and 2 in the Gippsland Region but not in any subsequent year, from 1998 inclusive (see Table 10.4 above). For a stable resource level (personnel, equipment and operating budget), area burned per year should remain constant apart from the direct impacts of adverse weather conditions for burning, extensive unplanned fires or change in burn policy. Data for the Gippsland Region can act as a test case of weather limitation, while analyses for other locations will provide a broad overview of the extent to which weather might influence total area burned per year.

10.56 Data for Omeo from 1958 to present shows an average of just 10 days per year available for prescribed burns, with a range of one to 22 days between years (Figure 10.9).

Figure 10.10: Estimated Number of Days Per Year Suitable for Burns for Fuel Reduction in the Melbourne Area for the Period 1952–2003



6 To our knowledge, these parameters have not been used in analyses of this sort elsewhere.

7 The KBDI was not used for the first two years of records for each location since estimated daily values for this index take some time to stabilise (see Chapter 7 for more details).

Figure 10.11: Estimated Number of Days Per Year Suitable for Burns for Fuel Reduction for Benalla and Corryong
Breaks in the Graph for Benalla Indicate Years of Missing Data

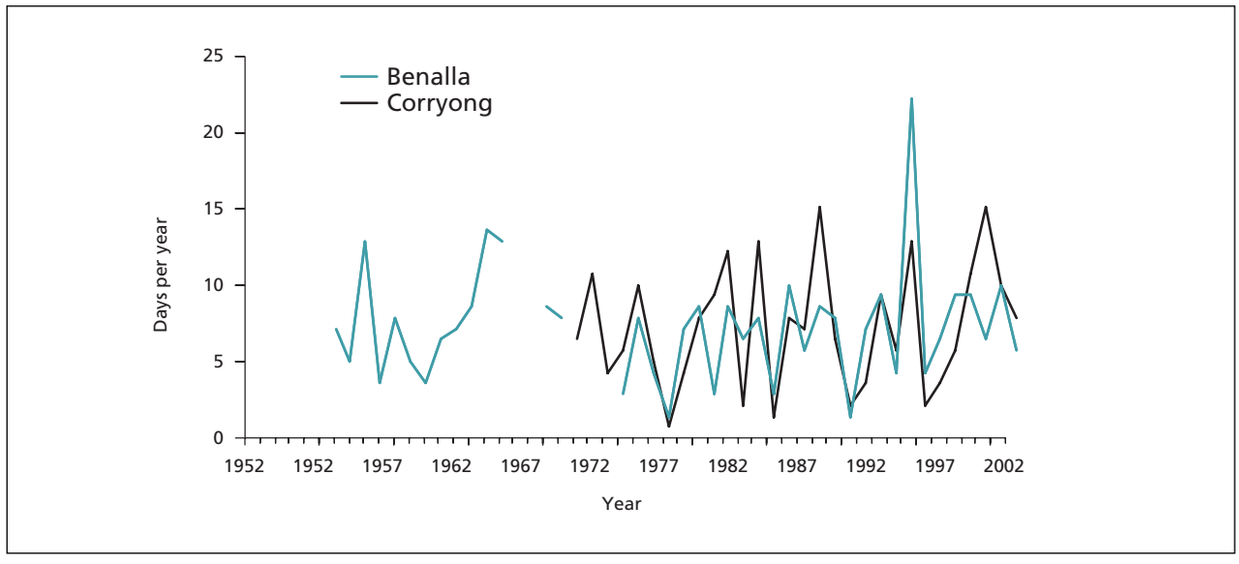


Figure 10.12: Estimated Number of Days Per Year Suitable for Burns for Fuel Reduction for Mt Hotham, Wangaratta and Albury, Respectively

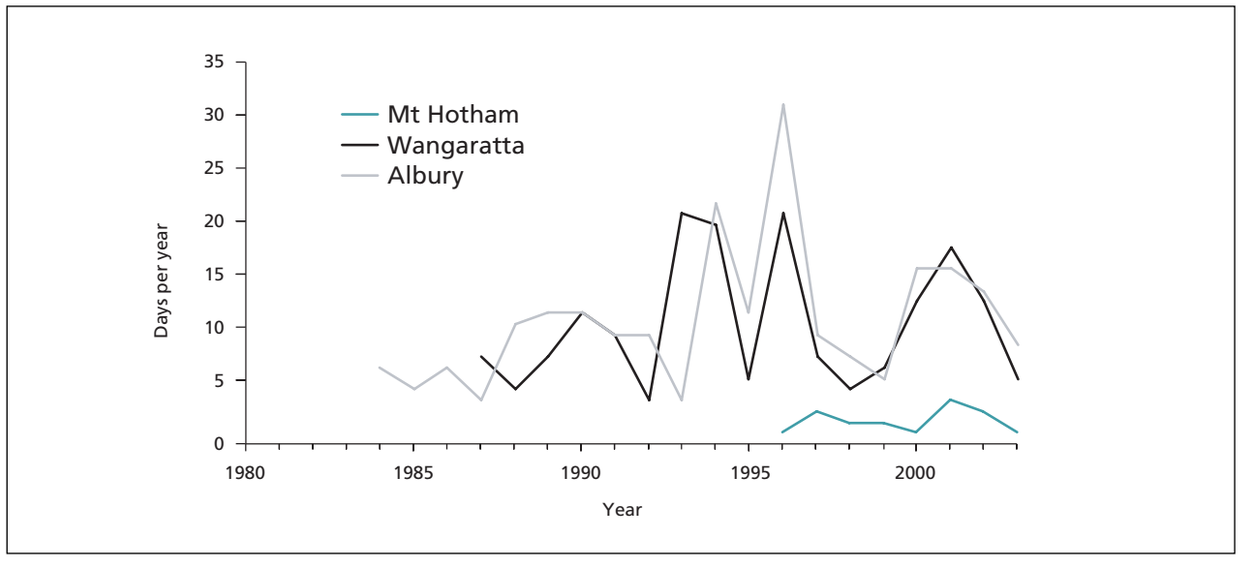


Table 10.5: Estimated Average Number of Days Per Season and Per Fire Year (July–June) that Fall Within the Weather Prescriptions for Burns Suited to Fuel Reduction, and Range for All Years Analysed, for Selected Locations in Victoria
Number of Years of Climate Data Analysed is shown in Parentheses Below Each Location.

Region	Station		Summer	Autumn	Winter	Spring	Annual
Melbourne	Melbourne	Average	1.2	1.4	0.5	4.5	7.6
	(52 years)	Range	0–8	0–8	0–5	1–11	1–19
North East	Corryong	Average	0.3	1.0	1.3	7.5	10.2
	(30 years)	Range	0–2	0–9	0–9	1–20	1–21
	Wangaratta	Average	0.2	1.2	1.5	8.0	10.9
	(17 years)	Range	0–2	0–10	0–7	2–16	4–21
	Albury	Average	0.2	0.5	2.3	8.5	11.3
	(20 years)	Range	0–2	0–6	0–11	2–17	4–31
	Benalla	Average	0.1	0.9	1.9	7.3	10.2
	(41 years)	Range	0–1	0–14	0–10	0–19	4–31
	Mt Hotham	Average	2.0	0.1	0.0	0.0	2.1
	(8 years)	Range	0–4	0–1	0	0	1–4
Gippsland	Omeo	Average	1.9	3.6	0.3	4.6	10.4
	(45 years)	Range	0–8	0–13	0–4	0–15	1–22

10.57 Results for Melbourne (Figure 10.10) and other locations in the North East (Figures 10.11 and 10.12) show a similar pattern with an average of around 10 days per year suitable for burning under current prescriptions including our modification (see Table 10.5 for details).

10.58 In the case of high altitude sites (for example, Mt Hotham) the number of days is extremely low and prescribed fires are not expected at such an altitude because any fire is likely to cause the death of Snow Gum tops. The data suggests that the number of available days declines with altitude, a significant fact for fuel managers working in the mountains.

Conclusions

10.59 In relation to the issue of resourcing any prescribed burning strategy, the Inquiry notes that DSE's five fuel management zones may not be practicable in terms of delivering management targets specific to each zone.

10.60 Vegetation types at present in Zone 5 – in which there is no prescribed burning – could be 'managed' within the context of ecological burns (current Zone 4), while the increased fire needs of many Victorian vegetation types for ecological purposes may adequately cover the fuel reduction objectives previously identified for Zones 2 (protection corridor) and 3 (broad-scale fuel reduction). A focus on asset protection in Zone 1 on the one hand, and ecological burning in Zones 2 to 5 on the other, might provide a framework within which management could be more effectively delivered.

10.61 All the analyses conducted on the number of days available for prescribed burning, using a variety of weather prescriptions, indicate that there are few days per year suitable for the practice. Therefore, everything should be done to maximise the opportunities those days represent. In Chapter 11 we recommend the use of further field people to assist.

10.62 Weather is not the only factor affecting the appropriateness or otherwise of a decision to carry out prescribed burning. Terrain, fuel load and arrangement, and ignition pattern and density, are also important. These variables do not appear in the prescriptions for burning seen for this Inquiry. The importance of these, and the ways in which these variables may be used to advantage, need to be spelled out to make explicit to a wider audience when burning could safely take place, perhaps under a wider range of weather conditions than suggested by guidelines based solely on weather.

10.63 Substantial numbers of days available for burning in spring are currently ignored because of the risk of long-smouldering materials later rekindling a fire under weather conditions conducive to outbreak and rapid spread. We respect this view and recognise that our analyses are for days considered as if they existed in isolation of subsequent and previous days.

10.64 Substantial numbers of days available for burning in spring are currently ignored because of the risk of long-smouldering materials later rekindling a fire under weather conditions conducive to outbreak and rapid spread. We respect this view and recognise that our analyses are for days considered as if they existed in isolation of subsequent and previous days. Nevertheless, potential may exist for some spring days to be utilised for prescribed burning, especially in Zone 1, if appropriate safeguards can be established.

Recommendations

10.65 That a review of the fuel management zones be implemented with a view to reducing the number of zones so as to focus clearly on (i) asset protection (especially at the Public/Private land interface), and (ii) ecological burns.

10.66 That an explicit formulation of the interactions between terrain, fuel, ignition pattern, time of day and weather be created to better define those days suited to prescribed burning.

10.67 That evidence of the rekindling or otherwise of spring prescribed burns in forests be assembled and a model constructed and tested to see whether or not some days in spring could be used for prescribed burning in certain circumstances and places, especially in Zone 1.

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Chapter 11
Measuring the Effectiveness of Prescribed Burning

Overview

11.1 In Chapter 11 we suggest thirteen measures that may assist in answering our title question: How can we measure the effectiveness of prescribed burning?

11.2 This Chapter deals with technical matters that require a sound understanding of fire ecology and related management issues. This technical focus may cause difficulties for some readers. However, it is important to examine these issues carefully as they are at the core of how land management practices can adapt over time. If the effectiveness of prescribed burning operations can be measured, managers will have a tool to enable the level of burning to be constantly adjusted.

11.3 We need, also, to consider the adequacy of these various measures. This requires a targeted and comprehensive system of data acquisition, storage, retrieval, analysis and review. As programs of fuel modification evolve, such a system will enable stronger evaluations of the risk associated with unplanned fires.

Introduction

11.4 If Victoria is to have an accountable, safe and effective system for the modification of fuels, there must be some reliable way of evaluating the costs and benefits of its programs.

11.5 The current way is to establish targets for prescribed burning and assess results against them. To be effective in guiding managers, those targets need to be practical and appropriate. Do they represent the appropriate level of prescribed burning in each zone, or help in determining such? Are current levels, or any future levels, the most cost-efficient in achieving overall objectives?

11.6 There is no current body of opinion that allows unequivocal and immediate choice of an appropriate measure for the effectiveness of prescribed burning. As climates, landscapes, technology and social conditions change, the most appropriate levels and types of fuel modification in different environments are also likely to change. A series of measures will be needed as indicators if managers are going to adjust to continuously changing circumstances.

11.7 Some of the measures advanced here may be useful; others may prove not to be so. The intention is to stimulate the search for the best suite of measures to help managers evaluate the effectiveness of their practices.

Measuring the Effectiveness of Prescribed Burning

11.8 For a system to be seen to be effective, there must be an appropriate measurement or measurements. These should be practical, accurate and comprehensive, and the results reported.

11.9 For prescribed burning, there are numerous possible measurements, with a range of costs, various time lags and varying effectiveness. The effect of prescribed burning can be considered at a point scale, 'burning block' scale, or in relation to the patchwork of blocks that make up the regional picture.

11.10 For example, we can measure the outcomes of a prescribed burning program in terms of losses of human life and property or other assets from unplanned fires but, because of the erratic nature of unplanned fires, an effective assessment requires very many years.

11.11 A more immediate measure is the reduction of potential fire intensity following prescribed burning, but this appears to be a 'given' because of the definition of 'intensity'[1]. In fact, the potential reduction in intensity under the worst possible conditions embracing all forest fuels is rarely considered; the potential reduction using the fine-fuel load only, being the normal method.

11.12 An indirect measure can be to note the effectiveness of procedures – such as the reduction of fuel load, or changes in the fuel array – in an area compared with no fire, planned or unplanned. Reduction of fuel load due to treatment (for example, an area within a burning block that is actually fuel-reduced in any operation), or changes in the fuel array, can be measured at points in individual burning blocks. And, reduction due to a program (for example, average region or zone's fuel load) can be measured in a given region or zone.

1 See Chapter 7 for a fuller explanation.

11.13 Even more indirect are measures such as the areas of unplanned fires, because these are affected by suppression operations as well as by fuel. In practice, we might make assessments on as many measures as possible in the hope that they will all indicate a management change in the same direction. We investigate a number of possible measures in the next section.

Effectiveness Measures

Using Threshold Level

11.14 Because fuel accumulates at a point in a mathematical fashion, the curve of accumulation[2] can be used as the basis for defining fuel condition and its consequences to fire behaviour, provided the quasi-equilibrium load is greater than a management threshold. Two measures are described below.

Measure 1

The time in years during which a fuel threshold is exceeded using given intervals between prescribed fires. (Gill & Bradstock 1994, pp. 703–12).[3]

11.15 The idea here is that the threshold sets an upper level of acceptable fuel load. The length of time above this is the length of time during which control is perceived to be compromised.

11.16 If it can be assumed that burning within a block is spatially random – an assumption that is unlikely to hold in mountain country – then the fuel accumulation figures can take burn incompleteness into account. If the assumption of randomness does not hold, then detailed fire and fuel mapping is necessary for an accurate estimate of fuel-array condition at any time.

11.17 An alternative measure is the length of time the fuel array is above a certain level of 'Overall Fuel Hazard'[4] such as 'moderate'.

Measure 2

The time-integrated amount of fuel above a threshold level, in tonne-years.

11.18 Measure 1 only partly covers the consequences of a fuel array being above a threshold. Fire intensity in forests is proportional to the fuel load squared (implied in the McArthur system because rate of spread is proportional to fuel load), so small increases in fuel load above the threshold can substantially increase the potential intensity. The 'spotting' potential of the fire is likely to be related to its intensity, among other things.

Mapping

11.19 In practice, it is difficult to burn a particular target percentage of a designated burning block. Thus, the area burned needs to be mapped. It is sometimes assumed that the proportion burned represents the proportion of the fine fuel consumed. But the proportion of area burned and the proportion of fuel consumed are rarely equal because not all the fuel profile at any one point necessarily burns. Nor is the fuel necessarily distributed evenly over the block.[5]

11.20 Department of Sustainability and Environment (DSE) mapping is patchy in scope and accuracy. Some prescribed burn areas remain unmapped, some are mapped as blocks rather than the area burned within them; some are mapped for part of a large treated area then extrapolated (using a simple model) to the remainder of the treated area.

11.21 The more sophisticated method would be to map the extent of fire accurately and also take point measures of fuel-array changes.

2 These have the form $W = A/k[1 - e^{-kt}]$ where W is the fuel load and A is the annual accession of material in t/ha, k is the decomposition constant and t is time in years. $A/k = W_{max}$ where W_{max} is the quasi-equilibrium fuel load in t/ha. These curves rise quickly at first after fire, then more slowly, gradually approaching the maximum fuel load. (See Chapter 7)

3 The measure was the fraction of time the fuel load was in the desired range, F, and given as: $\ln(W_{max}/(W_{max}-W_c))$ divided by $\ln(W_{max}/(W_{max}-W_b))$ where W_{max} is the quasi-equilibrium fuel load, W_c is the desired threshold for fuel load, and W_b is the fuel load at time of burning. A yearly time step in values of W is assumed.

4 See Chapter 7 for an account of Overall Fuel Hazard.

5 For example, an estimate from NSW forests was that 'burning generally reduces the fine fuel weight by up to 75 per cent over 30 to 60 per cent of the gross area being treated' (Moore & Shields 1994).

Measure 3

Histograms of the proportions of blocks burned.

11.22 These could be drawn for Zones 1 to 4 if areas burnt were mapped. This measure enables any area inadvertently burned beyond the treated block, as well as that within it, to be quantified. Such data can be used along with weather measurements to improve burning prescriptions (i.e. data on the weather, fuel and other conditions associated with escaped fires and with incomplete burns). It also provides an indication of the areas left unburnt, that is, a measure of residual risk. This is important as an unplanned fire can travel through such areas under certain conditions.

Measure 4

The ratio of the estimated distance of spotting from the upwind side of the Zone, or block, to its width (the smaller the number the better).

11.23 An unplanned fire encountering an area that has been prescribed burnt could jump it via lofted burning material and thereby continue to spread.

11.24 Measure 4 measures the effectiveness of a treated area stopping such a fire. While burning brands may travel up to 30 kilometres or more (Luke & McArthur 1978, p.102) and fire-igniting embers up to a couple of hundred metres,[6] the details of the relationships generally are uncertain.[7] What is clear is that burning brands and embers are much more likely to be produced if bark is shaggy and other suitable materials are suspended in trees and shrubs that are readily reached by flames. The lower the Overall Fuel Hazard, the lower the chances of a fire jumping a treated area.

Measure 5

The proportion of the landscape with fuel quantity below a threshold for fire spread.

11.25 This can be mapped and measured. An unplanned fire can travel around an area, avoiding it altogether.

Other Ways of Measuring Effectiveness

Measure 6

The proportion of areas of given fuel ages burnt by unplanned fire.

11.26 Unplanned fire can go through a treated area independent of the time elapsed since treatment. This happened in the 2002–2003 North East and Gippsland fires. Within the fire perimeter, no area of recent fuel reduction was identified as remaining unburned. This situation will not be repeated in all unplanned fires. Interpretation of this measure will depend on fuel age, the nature of the fire that last burned the area (prescribed or unplanned), weather and other conditions at the time of the unplanned fire.

Measure 7

The estimated probability of a previous fuel reduction burn slowing a headfire (a fire burning with the wind).

11.27 An unplanned fire may travel through a treated area but at a slower rate because of the treatment. In other words, with less fuel there is a greater probability that the fire will have a slower rate of spread. In some cases, this slow-down will be to no spread at all.

11.28 This was investigated in a unique Victorian study by McCarthy and Tolhurst (2001). The authors estimated this probability using information from 114 fires that occurred in the years 1991 to 1998. The largest fire in the study had a final area of 6,500 hectares. The authors examined their results in relation to Forest Fire Danger Index (FFDI) and the Overall Fuel Hazard (OFH).

11.29 They were able to quantify the effects of OFH on the probability of slowing an unplanned fire burning at a particular FFDI with the wind.

6 Based on inferences by A.M. Gill from the Canberra fires of 2003.
7 However, the results of Project Vesta in Western Australia (Project Vesta website) are promising.

Measure 8

Comparing the severity of fires in the Fuel Management Zones.

11.30 'Severity' is a measure of the effect of a fire on the vegetation. An unplanned fire may spread through a treated area but have a lower severity than in a similar area that was not treated. DSE have mapped the severity of the 2002–2003 fires in North East Victoria using satellite imagery.

11.31 Their categories were:

1. Forest with crown burnt (i.e. defoliated);
2. Forest with severe crown scorch (brown foliage);
3. Forest with moderate crown scorch;
4. Forest with light crown scorch; and
5. Treeless, burnt.

11.32 Given that there is more prescribed burning in Zone 1 followed by Zone 2, then the others (see Chapter 7), we might expect that severity in Zone 1 would be less than that in Zone 2, and so on. This measure would have to be interpreted in relation to slope, forest type and fire weather, because not all fires will have the extreme effects of the 2002–2003 fires.

Measuring Relationships Between Varying Factors

Measure 9

The ratio of annual area burned to $\Sigma(3pmFFDI^3)$.

11.33 This would provide a damped measure of change. If prescribed burning was having an effect, the total area burnt by unplanned fire per year in Victoria should decline with time. However, a decline could also be the result of improved firefighting capability. If the area burnt was related in some suitable way to the extent of prescribed burning then a case for its effectiveness could be made. However, because the area burned in unplanned fires per year is widely variable it is not easy to assess whether or not there has been a decline. It might take two decades or more to see if there was a trend.

11.34 If the area burned by unplanned fires was, in fact, related to the weather, a large part of the variation per year might be removed, thereby establishing a better basis for comparison. A study done for Central Victoria (Mackey et al. 2002) showed that the areas burnt per year were related to the sum of the cube of daily 3 pm FFDI[8] except for the remarkable 1983 season. The exception is important, as this was the Extreme year within the available record.

The Results of Quantifying the Effects of Overall Fuel Hazard (OFH) on Probability of Slowing a Fire

While the mathematics are quite complex, the result is easy to grasp. In short, the probability of slowing a fire under an FFDI of 100 (i.e. the upper limit of Extreme fire weather rating) is close to nil if the OFH is between 'high' and 'extreme'. It is only a 50:50 chance even if OFH is 'low'. The situation at an FFDI of 25 (i.e. upper level of High fire weather rating) is quite different: while the chance of slowing a fire burning with the wind at OFHs of 'extreme' and 'very high' remains small, there is a better than even chance that areas with an OFH of 'high' will slow the fire and a 75 per cent chance or better that the fire will be slowed in areas with 'moderate' or 'low' OFH.

The implication of these results is that if the fuel array, measured as OFH, is put into a lower category as the result of prescribed burning, then there will be an increased chance of slowing a fire and an increased chance of putting it out. However, as we have seen, control is not guaranteed just by slowing the fire down as the fire may continue to have an intensity above the threshold for control. It should be noted also that if the perimeter is not spreading with the wind or uphill then the chances of a slowing down leading to perimeter control are increased.

The result remains: with less fuel there is a greater probability that the fire will have a slower rate of spread. In some cases, this slow-down will be to no spread at all.

8 That is, $\Sigma(3pmFFDI^3)$.

11.35 A number of possible reasons explain why such years might be outliers. For example, in those extreme years there may be days in which it might be inappropriate to assume that the numbers of fires per day was related to FFDI. Furthermore, if two individual fires burn on two successive days the total area they burn will be smaller than if the one fire burnt for the same period spreading over two days, so the inherent assumptions of equality –fire duration the same - from year to year might be violated. Thus, in a year when fires burn for days, weeks or even months (as in 2002–2003) we would expect the relationship between area burnt per year and $\Sigma(3\text{pm}\mathrm{FFDI}^3)$ to be different.

11.36 Our preliminary analyses show there is a weak quantitative linear relationship between areas burnt by unplanned fires for Victoria as a whole and the weather index $\Sigma(3\text{pm}\mathrm{FFDI}^3)$ for Melbourne. The year-to-year results would have to be interpreted in relation to the suppression forces available as well as the area of prescribed burning in different Zones.

Measure 10

The nature of the relationship between the logarithms of unplanned-fire area and their log-transformed frequencies.

11.37 It seems reasonable to suggest that if a prescribed burning program were effective then the areas of single unplanned fires would be gradually reduced over time. At least, there might be many small fires readily extinguished and occasional large ones that defied control in the early stages. If so, the shape of the frequency distribution – the numbers of fires in different area classes – would have changed from the linear log-log graphs reported by Rawson and Rees (1982) for Victorian public land to a curvilinear one.

11.38 Of course, there are other influences on fire size like fragmentation of vegetation types, effectiveness of suppression and changes in fuel types. Issues related to the quality of the data in terms of comprehensiveness, accuracy and precision will also be affected by the data source.

Measure 11

The 'number of fires exceeding 400 hectares' (rather than the proportion of fires over 400 hectares).

11.39 The frequency distribution of burned areas can be simplified into two classes. For example, the Victorian Department of Treasury and Finance and the (then) Department of Natural Resources and Environment (1998) have used 400 hectares as the division between larger and smaller fires. In the four decades to 1998, the *percentage* of fires larger than 400 hectares fell dramatically. If we were to use this measure exclusively then we would need to be sure that it wasn't an artefact of reportage. If, for example, small fires were under-reported in the past, then rectifying this deficiency would automatically lead to a lesser proportion of fires exceeding 400 hectares.

11.40 It is likely that fires greater than 400 hectares have been better reported than small ones, so this proposed measure might be an improvement.

Measure 12

Reduce the frequency distribution of the areas of unplanned fires to the average area per fire and use this figure as an effectiveness measure.

11.41 Tolhurst (2003) pointed out there has been a decrease in average area from about 200 hectares for the period 1940 to 1990 down to about 50 hectares for the last decade (not including the 2002–2003 fires). Comments on the use of the numbers of fires would have to be considered as for Measure 11.

Measure 13

Monitor the annual number of fires per unit of FFDI as a measure of reportage and/or effectiveness.

11.42 As noted above, measures that include numbers of fires per year are sensitive to the comprehensiveness of reportage, which may not have been consistent over the years.

11.43 The numbers of fires on public land in Victoria reported by DSE (and its predecessors) increased from 1950 to peak about a decade later, dropped to a low in the early 1970s then rose rapidly to current relatively high levels (Morgan & Roche 1998) of about 630 fires per year (Department of Treasury and Finance 2002). The 'number of fires' in the data is the number attended by DSE staff.

11.44 The figures could reflect actual changes in the numbers of fires in the landscape, or there could have been changes over time in the numbers of fires actually detected and attended within or outside the area of jurisdiction, and changes in the numbers of those actually reaching the database. It is impossible to assess this.

11.45 The Country Fire Authority estimated there were about 3,500 unplanned fires per year for all land tenures in Victoria between 1992 and 2002 (Auditor-General 2003). The Inquiry found that the number of fires per year in Victoria is related to the Melbourne $\Sigma(3\text{pmFFDI})$ for that year.

Philosophical and Comparative Approaches to Determining Effectiveness

Philosophical Guidelines

11.46 The current fire management system is one of managing pro-actively, selecting objectives and seeking to achieve them.

11.47 Two popular but alternative views of fire management are based on ideas of Aboriginal management and the concept of Wilderness. The first claims that if we burned the landscape in the same way, as did the Aboriginal people then we would not have present-day problems with unplanned fires and the conservation of native flora and fauna. Given the weight of this or related views in popular, management and anthropological writings – and in submissions to this Inquiry – we review it in detail in Chapter 12.

11.48 Second, a particular concept of Wilderness asks: 'If nature is allowed to take its own course, surely it will look after itself?' This view implies that burning by Aboriginal people had no effect and that no asset of any sort would be adversely affected by fires left to run. More recent views of the Wilderness concept seek to debunk the idea that Wilderness existed without an effect of humankind (Langton 1998).

11.49 Although it is obvious that some fires have adverse effects (and 'letting Nature take its course' is unwise in some circumstances, at least) the idea behind the Wilderness concept may be that if all fires were allowed to burn they would be self-limiting. Even so, this would imply that boundaries are unimportant. The Inquiry concludes that the idea of letting Nature take its own course is untenable as a practical concept.

Comparison with Perceived 'Ideal' Regions

11.50 Unfavourable comparison of south eastern Australian practices with those in other areas like south western Australia is not uncommon (McCaw et al. 2003, pp.171–87), and appeared in some of the submissions to the Inquiry.

11.51 The claim is that southwestern Australian forests are treated with the 'ideal' prescribed burning regime and that this should be adopted more widely. Areas being annually prescribed burnt have been falling steadily in southwestern Australian forests, but in 1995–6 about seven per cent per year was being burnt (Gill & Moore 1997). This proportion of prescribed burnt land is much greater than in Victoria, but the context, history and biota (animal and plant species) are different.

11.52 To be meaningful, comparisons should be made in terms of land-use objectives, social context, fire weather, forest productivity, floral and faunal characteristics, rates of fuel accumulation, slopes of terrain, lengths of roads and tracks in various recognised categories (access), prescribed-burning days and the availability of firefighting resources.

The Importance of Quantitative Data

11.53 By definition, landscape management is a geographically based enterprise. For effective management, especially fire management, an underpinning of appropriate, accurate and precise data is essential, even central. Indeed, maps and other information previously presented and used in the form of hard-copy Management Plans are often the basis of public land management. Now there is the opportunity to use computer-driven Geographical Information Systems and to regularly update plans as analyses and information come to hand.

11.54 Fire maps, to take but one type of data, are necessary for:

- Measuring fire risk and fire regimes;
- Estimating greenhouse-gas emissions;
- Providing information for state-of-the-environment reports;
- Generating standards of fire cover;
- Conducting fire threat analyses;
- Assessing the effectiveness of prescribed burning; and
- Creating ecological-burning prescriptions.

11.55 A Statewide coverage of fire maps is needed but currently the only fires mapped are on public land.

11.56 A relatively new problem for fire managers is that a potential avalanche of useful data can be obtained from satellites, aircraft and the ground using various sensors such as scanners, still digital cameras, video, radar, lidar, automatic weather stations and global positioning systems, at various scales. These provide information on fire locations, relative fire intensities, fuel curing, fire footprints (where fires have been), infrastructure locations, animal habitat, locations of rare species, weather data and weather systems, vegetation recovery, and so on. Vehicles and aircraft may be tracked in real time.

11.57 It is a challenge appropriately to gather, filter, store, organise, analyse, retrieve and display accurate information so that generations of employees, as well as current staff and researchers, will have ready access to such a valuable asset.

Updating Maps and Archiving Additional Data

11.58 In the course of this Inquiry, we became aware of the need for agencies to update their maps.

11.59 Maps of prescribed burns, particularly, need to be prepared accurately in the field and stored electronically both regionally and centrally. Data on unplanned fires is incomplete. DSE suggest that the extent of the backlog could be checked by comparing fire reports and estimated areas of fires against computer maps (shape files) for omissions. The number and collective area of unentered fire maps could then be expressed as a proportion of the recorded total number of fires and their collective area each year for each region.

11.60 There are many sorts of data that would have benefited the Inquiry, if they had been available. For example, the following information could be archived:

- Fire weather indices;
- Track network details;
- Fuels;
- Fires;
- Operational equipment (numbers and types of vehicles); and
- Skilled operators for prescribed burning. (Locations of equipment, firefighters, caterers, mechanics, pilots, etc. may need to be known at short notice; the skills of these people also need to be known.)

Conclusions

Benefits of Prescribed Burning

11.61 A prime purpose of fuel modification is to mitigate the effects of unplanned fires. The main technique for doing this in public, forested landscapes is prescribed burning. Prescribed burning by its very nature reduces fuel quantities so, by definition, it reduces potential fire intensity. It also changes fuel arrangement in ways that can only be considered beneficial for protection purposes.

11.62 With the mitigation of unplanned fires, the chances of fire control are improved and therefore the risks to life and property are reduced.

Residual Risk

11.63 However, because fuels re-accumulate there is a necessary time dimension to be considered. As fuels re-accumulate, they could support unplanned fire when extreme weather conditions occur, even before prescribed fires are contemplated for economic, environmental or biophysical reasons. Thus, unplanned fire may still burn across recently treated land in extreme weather (Auditor-General 2003, p.50). This happened during the 2002–2003 fires.

11.64 There will always be a residual risk in any prescribed burning program and this is hard to quantify. Prescribed fires may reduce the potential risk from unplanned fires but they also pose a risk in themselves. They may escape to become unplanned fires. Thus: 'prescribed burning is not a panacea' (Auditor-General 2003, p. 49).

Prescribed Burning: Should we be Doing More or Less?

11.65 The extent to which prescribed burning should be practised is a vexed and long-term problem. Few, if any, people will commit themselves to an optimal figure for the amount of prescribed burning needed in Victoria. Assessing this is a major and primary task for fire managers. It is a difficult task, not least because of the long time lags for feedback on the impact of prescribed burning on unplanned fires and their effects. Also, area, by itself, is not the only consideration.

11.66 The large area affected by the summer 2002–2003 fires, the calls for increased ecological burning across large areas of the State, the evidence of Tolhurst on rotation times for Zones 1 and 2, and the apparent decline in area subject to prescribed burning per year suggest that the trend, at least, should be for more prescribed burning rather than less. For strategic reasons, any change in the level of prescribed burning will take time to implement, especially in light of the extensive areas recently burnt by unplanned fire.

Better Systems; Greater Learning

11.67 DSE have a growing and valuable database that needs to be augmented and filled out if the dream of a quantitative understanding of the effectiveness of prescribed burning and other fuel modifications is to be attained. Only with a targeted and comprehensive system of data acquisition, storage, retrieval, analysis and review will progress be made in evaluating the risk associated with unplanned fires as programs of fuel modification evolve.

11.68 Evaluating the effectiveness of prescribed burning even for a perceived single factor like the protection of built assets is extremely difficult. Because of the difficulty, we need systems that store knowledge so lessons can be readily learned.

11.69 Such a system would have a number of parts, some of which we mention in our recommendations below. Basically, it would consider weather, fuel arrays, terrain and ignition patterns in each burning block that created particular areas and patterns of fuel-array changes. Information arising from this program could provide a clear appreciation of the fuel arrays left in deliberately mapped unburnt remnants and the implications of this for the spread of unplanned fire. Eventually, an empirical picture could be drawn of what conditions gave ideal results.

11.70 Given the emphasis in expert submissions to the Inquiry on the effectiveness of prescribed burning in forested south-western Australia for asset protection, a detailed investigation of fire behaviour and management there might usefully contribute to the development of prescribed fire policy in Victoria.

Recommendations

11.71 That DSE:

- Provide further training and/or field staff for the routine acquisition and reporting of geographic data (maps of fire extent for prescribed and unplanned fires) and fuel-array data (quantity, type, condition and arrangement before and after fire as in the Overall Fuel Hazard Guide).
- Routinely and explicitly report on measures of the effectiveness of the prescribed burning program.
- Measure the total area subject to prescribed burning treatment in each Fire Management Zone each year along with the average proportion of that area successfully burned.
- Develop an explicit, routine system of evaluation, analysis and reporting of the effects of prescribed burning in relation to environmental outcomes such as conservation of flora and fauna and water quality.
- Train more crews, use Project Firefighters more extensively (and CFA members or MFESB firefighters where appropriate), to undertake prescribed burning.

11.72 That DSE undertake a formal study of the level of prescribed burning in south western Australia for its possible application in Victoria by comparing respective fuel arrays, terrain, weather, ground access, staff, prescribed burning days, areas conducive to prescribed burning and fire response systems.

11.73 That DSE and CFA map all unplanned fires greater than four hectares on public and private land in order to further develop an understanding of the risk to rural Victoria from unplanned fires.

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Chapter 12
Traditional Burning Practices of Aboriginal People and the Prescribed Burning Debate in Victoria

Overview

12.1 Historical accounts from southern Australia, and direct evidence from central and northern Australia, support the argument that Aborigines used fire as a land management tool. Evidence also suggests that some areas of Australia may not have been subjected to managed fire because of low human population size and resource availability. Other areas were not burned due to their cultural significance or because they were difficult to burn.

12.2 A particular line of reasoning suggests that if we burned the landscape in the same way as the Aboriginal people did in the pre-European period – a congruence of prescribed burning with pre-historic fire regimes – then we would not have the problems we have today with unplanned fires and with conservation of native flora and fauna.

12.3 To many, this is a highly attractive philosophy not only for what it promises directly, but also for its implicit social message. However, to *apply* this philosophy we would need to know the details of past fire regimes for each management unit, so we could attempt to recreate them.

12.4 In this Chapter we review and summarise the key literature to find what might reasonably be concluded in relation to present and future approaches to fire management.

12.5 The Inquiry concludes that we do not know enough about traditional burning strategies and objectives in southern Australia to be able to implement an Aboriginal burning regime. Knowledge has been lost, or is fragmentary. Any use of a 'traditional Aboriginal burning regime' within a park or State Forest in southern Australia would be an experiment in land management rather than a re-creation and should be recognised as such.

Arrival of People and Their Possible Impacts

12.6 Direct evidence for the arrival of people in Australia, based on radiocarbon dating of human remains, indicates colonisation of the continent by around 40,000 years before present (ybp) (Allen 1994), while thermoluminescence dates from occupation sites in the Northern Territory suggest possible arrival by 60,000 ybp (Roberts et al. 1993). Indirect evidence, based on pollen and charcoal records for changes in vegetation and increased occurrence of fire, has been variously argued to suggest colonisation anywhere from 40,000 to 140,000 ybp.

12.7 Notwithstanding the debate concerning the date of first arrival, argument has also arisen over whether Aboriginal occupation of Australia was accompanied by:

1. Little or no human-induced change in vegetation;
2. An early phase of landscape alteration as a new land-use regime was established, followed by some sort of equilibrium which maintained a system with desired properties – a managed landscape; and
3. Continuous change (Bowman 1998).

12.8 The arrival of Europeans late in the 18th century was accompanied by a sudden and massive impact on the Australian environment, which has been on-going. The nature of this impact is well known and is not reviewed here. Relevant to the present discussion is that the occurrence of unplanned fires and their impacts on people and the environment, is now viewed as a serious problem that requires management intervention. To a large extent, this is a consequence of post-European settlement patterns and land uses, with associated high asset values and fragmentation of the landscape into a mosaic of private and public lands with very different management goals and requirements.

12.9 Large fires resulting in significant loss of property and/or human life have punctuated the last one hundred years in Victoria, most notably 1939, 1983 and 2003. The managed use of fire to reduce fuel loads in our public land forests (and other vegetation types) since the 1950s has been the major strategy employed by Government to mitigate the risk of unplanned fire spreading into private lands. Despite this 'prescribed burning' program, large unplanned fires in 1983 and 2003 have cast doubt over its effectiveness.

12.10 Some critics argue that there has been insufficient prescribed burning to provide an effective barrier to the spread of unplanned fires - noting that current targets have rarely been met over the past decade (e.g. see Chapter 10 for evidence from the Gippsland DSE Region). One suggested remedy is an increase in prescribed burning to meet current (or revised-increased) asset protection and/or ecological targets established by the Department of Sustainability and Environment (DSE) and Parks Victoria. Others suggest the institution of an 'Aboriginal burning regime' that would see a patchwork of frequent, low-intensity fires across all public lands to manage fuel loads (Tolhurst 2003).

Possible Evidence for Earlier Fire Regimes

12.11 Ward et al. (2001) reported on a new grasstree *(Xanthorrhoea preissii)* fire history record, based on visible colour banding of leaf bases on the stems of these plants. They propose that fire intervals in the sclerophyll *(Eucalyptus)* forests and shrublands of south western Australia, for the period from 1750 to as recently as 1940, were much shorter than at present, and averaged only three to five years. They argue that this represents the pre-European burning regime practised by the Aboriginal inhabitants. After 1940, they report less frequent fire, with intervals between fires similar to those based on field observations and documentary records over the past 30 to 40 years (i.e. fire intervals of 10 to 15 years).

12.12 These findings have added a direct source of evidence previously lacking in relation to the Aboriginal burning debate. If the grasstree record is valid, then the structure and composition of Australian plant communities where such fire regimes occurred may have been markedly different in the recent past from that observed today. However, it is unclear how many fire-killed woody plants could have survived such a fire regime. Currently, the grasstree record is based on only a small number of records and does not yet provide any evidence concerning the scale of burning that may have occurred in these vegetation types.

Descriptive Sources of Information

12.13 Any supporting evidence for a pre-European, high-frequency, low-intensity burning regime is otherwise based largely on the written accounts of early European explorers and settlers (and their interpretation), ecological observations and studies by ethnographers/anthropologists who have viewed Aboriginal practices in central and northern Australia in the post-European period.

12.14 There are many such accounts throughout southern and eastern Australia and Tasmania for the period from first European contact through to the mid-19th century. Similar accounts are recorded for central and northern Australia into the 20th century, reflecting the survival of traditional Aboriginal practices in these areas until more recently (Gill 2000). These accounts regularly describe Aboriginal people's frequent burning of vegetation, including forest understoreys, to maintain open areas of vegetation for ease of travel, to produce new growth of plants for human consumption (or for consumption by animals used by people), and to drive animals for hunting purposes (see reviews by Hallam [1975], Nicholson [1981], Bowman [1998] and Abbott [2003], among others).

12.15 For cultural reasons, some areas were not burned. Other areas were not regularly occupied by people and may not have been managed using fire. In such places, naturally ignited fires would be the norm. It is unknown whether explicit objectives included a reduced likelihood of large unplanned fires, although this is possible, since such fires could adversely affect the distribution of food resources for some time, could damage sites of cultural significance, and would be a threat to human life.

12.16 A number of early accounts describing the Australian bush note the open nature of forest and woodland understoreys and the ease with which parties were able to move through the countryside in the early exploration and settlement periods. See, for example, the journals of Major Mitchell (1839) in Victoria, and of James Drummond (summarised by Ericson 1969) in south western Australia, and reviews by Hallam (1975), Bowman (1998) and Abbott (2003). This has been ascribed to Aboriginal burning in most cases, with frequent, understorey (low intensity) fire regime precluding the development of a dense shrub layer.

Conflicting Evidence

12.17 Evidence is also available for the presence of dense vegetation in some places, and for the development of open vegetation in the absence of Aboriginal burning. Gell et al. (1993) report increased understorey grassiness in the absence of fire for a forest site in East Gippsland, followed by the development of shrubbiness when prescribed burning was introduced to the area. Wahren et al. (1994) document changes from shrub to grass and herb dominance in the absence of fire and grazing in alpine grassland-shrubland vegetation on the Bogong High Plains.

12.18 Central Victoria, an area massively disturbed by mining and timber harvesting since the 1850s, appears to have been characterised by forested hills – probably Box-Ironbark (*Eucalyptus tricarpa/sideroxylon* complex) forest – often with a dense, shrubby understorey (Howitt 1855), interspersed with grassy plains (Mitchell 1839, Howitt 1855, Westgarth 1848). The latter vegetation was most likely related to present-day Redgum (*E. camaldulensis*) grassy woodlands.

12.19 This suggests that frequent Aboriginal burning may have been a feature of some parts of the landscape but not others. Forest characterised by shrubby understoreys may have experienced fire regimes similar to the fire regimes in such areas today.

Problems of Reconstructing the Past

12.20 Gill and Catling (2002) conclude that reconstructing mean fire frequencies for particular areas or vegetation types from historical records, such as many of those described above, is fraught with difficulty and has met with little success. That is, we cannot establish the nature of traditional Aboriginal burning regimes using data derived from existing historical records.

12.21 In southern Australia the alienation of Aboriginal groups from their traditional lands means that repositories of this knowledge are mostly lost and any reconstructed regime would largely be speculative (Benson & Redpath 1997). The historical observation record of Aboriginal burning in southern Australia provides specific evidence on fire season since dates of fires are recorded in many cases. A review of historical records for Aboriginal fires in south western Australia before and during early European settlement shows that most fires (74 per cent) were lit in summer, and nearly all (86 per cent) occurred in the hottest four months of the year under typically hot and windy conditions (Abbott 2003).

12.22 Data for the size of fires and their return interval is less amenable to quantitative analysis. Fire size is difficult to ascertain from historical accounts; many refer to multiple ignitions being observed, or sources of smoke visible, on the same day, indicative of small individual size (Abbott 2003), and some note the approximate length of burned areas traversed on particular journeys. These range from less than one to many tens of kilometres. Very large fires are also recorded. Sources as early as Vlamingh (Western Australia, 1697) describe apparently extensive fires visible from sea (Abbott 2003), while Gill (2000) reports historical accounts of fires in central Australia being lit in hot, windy conditions conducive to rapid fire spread, and ultimately covering tens of thousands of hectares.

12.23 We can conclude that many fires were small, yet some were large – but can say little about absolute sizes. We can guess that fires in open, grassy areas were likely to be frequent (every few years), while many other areas were heavily wooded and experienced fire less frequently.

Scientific Investigations into Fire Intervals

12.24 Most sources of evidence based on scientific investigations of historical forest fire regimes suggest much longer intervals between stem-damaging fires in the pre-European period than surmised above.

- Using tree-ring evidence, Banks (1988) reports infrequent fire (one to two large fires per century) in Snow Gum *(E. pauciflora)* woodlands prior to European settlement, followed by a sudden increase in the frequency of fire after the introduction of European settlers and their livestock to the alpine and subalpine areas of south eastern Australia.

- Similarly, Burrows et al. (1995) report a mean fire interval of about 80 years for tree-scarring fires in open forests of south western Australia in the pre-European period.
- Mackey et al. (2002) identify a stand-killing fire interval of 75–150 years for Mountain Ash (*E. regnans*) forests of central Victoria based on stand age structures.
- In temperate woodlands of south western Australia, Hobbs (2002) argues that the available evidence supports the notion of a change from less frequent (40–50 years) to more frequent (six to eight years) fire following European settlement.

12.25 Bowman (1998) warns that the dendrochronological (tree-ring) record for fire does not necessarily register low intensity fires that fail to damage the cambium layer of forest trees, and so may have missed Aboriginal burning of the understorey. While true, this argument would also indicate that frequent understorey burning – if it was occurring – failed to preclude tree-scarring, possibly high intensity, fires from recurring at the intervals indicated by the tree-ring records.

12.26 Further to this last point, for example, the age structure of present day stands of Mountain and Alpine Ash in south eastern Australia reflects a pre-European history of stand-killing, high- intensity fires. Such fires are important for recruitment of the species and for the provision of tree-hollow nesting sites for birds and small marsupials (Lindenmayer & Possingham 1995). Small patch burning is likely to have proven difficult on moist south-facing slopes and valleys in mountainous areas of south eastern Australia – as it is today. Such areas are only likely to be available to burn under extreme weather conditions, and then bushfires will quickly spread through areas even if they were burned only a few years earlier (McCarthy & Tolhurst 2001).

12.27 In drier vegetation assemblages of southern Australia such as mallee, slow fuel accumulation rates may preclude the recurrence of fire within seven to ten years or more of previous fire (Cheal et al. 1979; Noble 1984). However, rapid accumulation of ephemeral grasses or Spinifex (*Triodia scariosa* in Victoria) cover, following above-average rainfall years might allow occasional fires at shorter intervals in semi-arid and arid Australia (Bradstock & Cohn 2002).

12.28 Keith et al. (2002) review fire regimes in Australian heathlands and report similar times for fire recurrence based on fuel accumulation rates, suggesting average minimum fire return intervals of five to eight years for dry heaths. These sources of evidence do not support the notion that fires could recur in these vegetation types at intervals of three to five years, consistently over a period of hundreds of years. However, also relevant to the present debate is the suggestion by Bradstock (1990) that changes to fire regime may have a feedback effect, altering species composition and stand flammability properties such that a new fire regime is established.

Fire and Change in the Australian Biota

12.29 The evolution of Australian species, and their adaptation to fire regimes, has occurred over a period much longer than that represented by the presence of people on the continent. The debate about the extent to which Aboriginal fire regimes may represent a suitable strategy for modern fire management in Australia must also take into account this long-term relationship. Kershaw et al. (1993, 2002) interpret increased abundance of charcoal particles in deep-sea cores off the coast of north Queensland as indicative of the regional presence of fire in Australia since at least 1.4 million ybp. Singh and Geissler (1985) report the occurrence of fire back to 800,000 ybp at Lake George in south eastern Australia, increasing especially after 140,000 ybp.

12.30 These authors, and others, argue that fire has increased as a factor driving evolution and adaptation of the Australian biota (plant and animal species) since the Late Tertiary–Early Quaternary periods, accompanying increased aridity and the onset of the glacial–interglacial cycles of the last two million years.

12.31 Even since the arrival of the first people in Australia, evidence suggests continuous change in the people-environment relationship. At the time of Aboriginal arrival, Australia supported a diverse megafauna of marsupial species with body weights greater than 40 kilograms, including Diprotodons, giant kangaroos and giant wombats. Between 30,000 and 10,000 ybp, and at least 10,000 years after people arrived in Australia, most of these species became extinct. Prehistorians and palaeo-environmentalists variously attribute these extinctions to:

- People (the Pleistocene over-kill hypothesis);
- Climate change (the impacts of glacial-interglacial cycles on the distribution of suitable vegetation, appropriate climate for growth and reproduction, and available water); or
- A combination of the two (Martin & Wright 1967; Dodson 1992; Bowman 1998).

12.32 Flannery (1994) argues that the loss of these animals may have changed the nature of plant communities and increased rates of live and dead plant biomass accumulation, so increasing the frequency and intensity of fires. Horton (2000) considers that frequent fire and the maintenance of grassy landscapes would favour large herbivores, but would disadvantage small ones that require shrubby ground cover and log hollows for refuge, shelter and breeding. Since it was the small species that survived better, Horton believes that Aboriginal burning cannot have resulted in a landscape in which grassiness was more common than shrubbiness in forest and woodland understoreys. Such frequent burning might also have limited the recruitment of tree species sufficient for long-term parent replacement.

12.33 In north eastern Australia, rainforest decreased in extent from around 38,000 ybp and was replaced by sclerophyll (Eucalyptus-dominated) vegetation. From around 7,000 ybp, as temperature and rainfall increased, rainforest re-invaded sclerophyll forest and reclaimed these lost areas of habitat, regardless of the presence of humans as an additional ignition source (Kershaw 1986).

12.34 Change has continued in the last 5,000 years at no less rapid a pace. McGlone et al. (1992) provide evidence for the onset of extreme weather events associated with the El Niño–Southern Oscillation (ENSO) in both Australia and New Zealand around this time, and note a possible increase in fire as a result. Head (1989) and Lourandos (1983) report changes in technology, and intensification of Aboriginal occupation and land-use in south eastern Australia. The dingo was introduced to the continent and the thylacine disappeared from mainland Australia (Gollan 1984). The koala disappeared from south western Australia within the last 500–1,000 years (Flood 1983). These events all represent gradual changes in the Australian environment, shaping the nature of plant and animal communities, the people-environment relationship – and the place of fires and their effect on them.

Problems for Modern Fire Management

12.35 In relation to modern fire management we must ask whether there might be conflicts between the cultural and resource exploitation goals of Aboriginal burning and the species conservation goals of management in parks and reserves (Langton 1998).

12.36 Aboriginal burning was purposeful – it had objectives that included the optimisation of food resources (either through hunting or direct growth of plant products) and removal of dense understorey to facilitate easy travel. The role of fires in the conservation/management of species and populations of plants and animals is unclear. Other cultural practices designed to preserve species of significance may have been more important and these may have intersected with how fire was managed. While many animal and plant species were, and are, known by name and are assigned significance, it is not clear that all species (for example, those with no resource or totem value) were valued and managed equally. As with current philosophies of species conservation management, strategies that seek to ensure the survival of key species might or might not adequately protect other species for which data are lacking.

12.37 Further, the massive number of plant and animal introductions that has accompanied European settlement of Australia means that few if any ecosystems will necessarily respond to fire in the way that they may have in the pre-European past. For example, such regimes may favour the survival and expansion of invasive animals and plants, such as blackberry. Small patch size of fires has also been found to result in higher rates of insect and mammal granivory and herbivory than occur for large fire sizes, so that species composition and abundance relationships may also be affected (Cowling & Lamont 1987).

12.38 Nor was traditional burning subject to the same constraints as modern prescribed burning programs. There were no private land assets (fences, houses, livestock, crops) threatened by fires that grew larger than planned. There were few or no constraints in relation to safety and resourcing, such as those faced by our management agencies today (see Chapter 10).

Conclusions

12.39 The purpose of the foregoing survey is not to discredit or promote the 'stewardship' of Aboriginal people over the land during their period of their unique tenure, but to provide a balanced position from which we may reasonably conclude how best to advance management of the species and habitats that remain in our care. This is especially complex given that it is desirable to meet the multiple objectives of competing interest groups in our society.

12.40 No recommendations are made to accompany this Chapter, but the Inquiry offers the following conclusion based on this survey of the relevant literature.

12.41 The view of the Inquiry is that we do not know enough about traditional burning strategies and objectives in southern Australia to be able to implement an Aboriginal fire management regime. Knowledge has been lost due to the alienation of tribes from their land, or is fragmentary. While it would be advantageous to have Aboriginal knowledge added to the decision-making process – as is now done for Kakadu and Uluru-Kata Tjuta National Parks in the Northern Territory (Langton 2000) – any use of a 'traditional Aboriginal burning regime' within a park or State Forest in southern Australia would be an experiment in land management, rather than a re-creation of Aboriginal fire regimes, and should be recognised as such.

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Part C

Term of Reference One: Community and Agency Preparedness

Eldorado Fire North East Victoria January 2003 – DSE

Overview of Part C

Fire damage in East Gippsland February 2003 - CFA

This Part addresses the Inquiry's first Term of Reference by examining community and agency bushfire prevention and preparedness.

The recent Auditor-General's Report, Fire Prevention and Preparedness, May 2003, has already covered much of this topic. However, at the time of its release, the post-fire evaluation undertaken by the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) was not yet complete.

We have reviewed the Auditor-General's analysis and recommendations and note where we believe the recommendations are critical. We also note where recommendations require further extrapolation based on the submissions, consultation and analysis undertaken by the Inquiry since the release of the earlier report.

The following four Chapters include findings and recommendations relating to:

- Individuals and their communities;
- Municipal fire prevention and preparedness planning;
- The fire agencies; and
- The State's Emergency Management framework.

No one could have anticipated the scale and duration of the fires in the North East and Gippsland, although there was evidence of growing concern in some communities about the management of public land and the build up of fuel in forests, caused in part by six consecutive years of drought. Lessons have been learnt and areas for change identified.

The Inquiry concludes that the specialist fire and emergency services and Local Government undertook an appropriate risk assessment and adequately prepared for the 2002–2003 fire season within the parameters of climatic conditions, current legislation, polices and procedures. Public land management issues are discussed in Part B of this report. In Chapters 14 and 15, we make specific recommendations for legislative and policy change to tighten and enhance future planning and preparation, moving to a more holistic, integrated model for fire prevention planning and management.

In Chapter 13 we observe that community preparation, was not uniform in application and diligence. In some communities, significant warning of the impending fires saw a level of, and commitment to, land clearing and tidying up of which Local Government and the fire agencies could only dream in the normal pre-fire season. Some businesses appeared to have inadequate insurance cover for income and payroll, while others were under-insured in respect to assets. In other cases, individuals, communities and businesses demonstrated a very sound and appropriate approach to preparation and risk management.

Chapter 13
Public Awareness and Preparedness

Overview

13.1 The community need not be a passive recipient of services; it can and should be an active participant in developing safety strategies. This principle underpins our discussion and analysis in this Chapter.

13.2 In this Chapter we consider recent surveys conducted by the Auditor-General and the Country Fire Authority (CFA) that assess community knowledge and behaviour in relation to bushfire. We also review four community education and engagement programs and make recommendations to improve them further.

13.3 We investigate how well residents understand fire conditions and how this impacts on appropriate decisions to 'stay or go'. We recommend improved information to guide community members in making this decision.

13.4 This Chapter also makes recommendations to maximise the potential of two valuable communications alerts: the Standard Emergency Warning Signal and Radio Codes of Practice. We conclude with recommendations to encourage an appropriate level of insurance coverage as a sound preparedness measure.

Community Understanding of Heightened Fire Risk for 2002–2003

13.5 The Auditor-General's 2003 Report, *Fire Prevention and Preparedness*, is unequivocal: in the event of a large bushfire such as that experienced in 2002–2003, the community 'cannot rely solely on emergency services to protect their lives and property'[1]. Communities need to be able to undertake thorough preparation, to carefully plan the response of their individual households and, where appropriate, to become involved in community self help and awareness initiatives. As the Auditor-General's Report stresses, preparation can mean the difference between losing or saving buildings and property, and can mean the difference between 'life, injury and even death of occupants'.

13.6 In assessing the community's preparedness for the 2002–2003 bushfire season, the Inquiry needed to ascertain whether the community understood the heightened fire risk and their individual responsibilities for protecting their own property and accountabilities.

Results of Auditor-General's 2002 Survey of Risk Awareness

13.7 Independently of the fire agencies, the Auditor-General's Office conducted a survey of 800 households early in the fire season (from 15 to 24 November 2002). The survey[2] was conducted in two fire-prone areas – Gippsland and the Dandenong Ranges, both frequently affected by unplanned fires in the past. The survey's aim was to examine community knowledge of and preparedness for bushfires. By chance, part of the survey area overlapped the subsequent area affected by the 2002–2003 bushfires.

13.8 In terms of knowledge of fire, the survey found that approximately 79 per cent of respondents thought the prospect of bushfire in their area was 'likely' or 'very likely' in the next five years. Further, 51 per cent of those surveyed felt that damage to the house and property was 'likely' or 'very likely' from that bushfire.

13.9 Importantly, the Auditor-General's Report[3] noted that people 'who had attended a CFA Community Fireguard or other community meeting were significantly more likely' to believe that a fire was probable than those who had not attended any meetings. This suggests that community meetings effectively raise awareness of fire risk.

13.10 To summarise: residents saw bushfire as a high risk, given the persistent dry to drought conditions that have been a feature in this State over the last six years. However, just over half the respondents saw *themselves* at risk. The question for the Inquiry was whether these individuals were in a position to make an informed decision to protect themselves, their families and their property in the event of a fire.

13.11 Access to appropriate information is a crucial factor in preparedness for those who choose to live in areas prone to bushfire. For both existing and new residents, this information can come from a range of sources including the CFA, Metropolitan Fire and Emergency Services Board and Local Government. What is critical is that the information provided is consistent and practical. In addition, suitable processes are needed to translate this information into appropriate action at a local level.

13.12 These issues are explored later in this Chapter.

1 Auditor-General Victoria, *Fire Prevention and Preparedness*, May 2003 p. 69.
2 *Fire Prevention and Preparedness*, pp. 75–77
3 *Fire Prevention and Preparedness*, p. 75

'Within minutes the smoke cloud was upon us, building intensity, a swirling mass of white/brown/red/black towering above. The wind picked up, all the trees were being sucked down towards the valley below us as birds struggled to fly out against it. The noise built from a distant roar until it sounded like a jet taking off at our side'.

Howman's Gap Alpine Centre Submission

Understanding Bushfire Options: The Decision to Stay or Go?

13.13 In 2001, the Australasian Fire Authorities Council[4] published a position paper on community safety and evacuation under threat from bushfire. They made the case against large-scale evacuation in favour of well-prepared and able-bodied residents being encouraged to stay and protect their property. If residents decide to stay, it is essential that they be fully informed of the risks.

13.14 The Auditor-General's survey[5] found that a majority of respondents selected the following options when asked what they would do if a bushfire occurred in the area and they were at home:

- Stay to defend the residence throughout the fire;
- Do as much as possible to protect the house but leave if fire threatens;
- Stay, but leave when advised by emergency services; or
- Leave as soon as they were aware of fire in the area.

13.15 Even though over half said they would stay initially, only 27 per cent would remain on site to defend the residence throughout the fire. The option to stay and defend the property is supported by CSIRO research into the Ash Wednesday fires in 1983 and the fires around Sydney in 1994. The CSIRO concludes there is a relative ten-fold increase in household survival if the 'stay and defend' option (following the passing of a fire front) is put in place, when compared with leaving the property unoccupied[6].

13.16 Further in the Auditor-General's survey, only four per cent answered that they would leave home at the announcement of a day of high fire danger. CFA's advice[7] has been that residents should leave by 10 am on days of high fire danger. A significant number of respondents appear to be intending to adopt an approach somewhere between the CFA preferred positions of 'stay' or 'go early'.

13.17 The Auditor-General's Report viewed the CFA approach as too prescriptive and recommended that it reconsider its advice on the 10 am departure on all high fire danger days. Timing should be based on local risk assessment and be built into local community education and awareness programs. The Inquiry supports this view.

The Decision to Stay or Go

13.18 Awareness is growing, albeit slowly, that residents who stay and safeguard their property following the passing of the fire front, have a much better chance of survival than those who leave at the last minute. This message is reaching more people since the Ash Wednesday fires of 1983 that saw the loss of life and property through people leaving at an inappropriate time[8]. The well-prepared and maintained home has been shown to be a safer option than escaping either on foot or in a car at the height of the fire.

13.19 However, the survey conducted by the Auditor-General demonstrated[9] that significant numbers of people hold 'incorrect beliefs and knowledge that may lead them to make household survival plans that could place them in danger'[10]. This was particularly so in relation to the protection afforded by houses under attack by bushfire and the time a house would take to burn. The survey showed that slightly more than half of the respondents falsely believed that houses are destroyed in the time it takes a fire front to pass through an area.

13.20 Further, residents in fire-prone areas are not aware of the conditions that they will face as a result of a decision to leave at an inappropriate time. Such conditions include a rapidly moving fire front, wind and fire noise, flying materials, radiant heat, smoke and soot affecting visibility, and the effect of smoke and soot on car filters.

4 Australian Fire Authorities Council, 2001, *Position Paper on Community Safety and Evacuation During Bushfires*.
5 *Fire Prevention and Preparedness*, p. 78.
6 G.C. Ramsay, N.A. McArthur and V. P. Dowling CSIRO (1996). *Building in a fire–prone environment: research on building survival in two major bushfires*. Proceedings of the Linnaeus Society of New South Wales – Sydney 1995. This referred to surveys following fires in the Otways Ranges in 1983 and in NSW in 1994.
7 CFA: the current advice is that timing for departure should be based on an assessment of local conditions and risk.
8 N. Krusel and S. Petris, *A Study of Civilian Deaths in the 1983 Ash Wednesday Bushfires Victoria Australia*, CFA Occasional Paper No. 1.
9 We assume, here, that the sample used was representative.
10 *Fire Prevention and Preparedness*, p.81.

13.21 All residents require a greater understanding of what they will encounter as the fire front passes even though that understanding may prove traumatic to those who have had earlier, personal experience of bushfire events. There is also a need to highlight positive stories using electronic and printed media, for example:

- Survival stories;
- Practical skills development (perhaps through lifestyle programs); and
- Demonstrations of how to prepare the property and the family for fire.

13.22 This is a way to educate people that staying can make a difference. Key messages could be delivered to areas that have not been recently affected by bushfire, in readiness for the next and subsequent fire years.

Recommendation

13.23 **That CFA further develops the information supporting the decision to stay or go, to incorporate a better understanding of both the likely consequences of leaving home at inappropriate times, and the conditions and emotional impacts likely to be experienced during the passage of the fire front.**

Evacuate: To Where?

13.24 The Auditor-General's Report[11] highlighted Victoria's unique legislative provision allowing residents the right to stay with their properties and not be forcibly evacuated. There is no legal authority in Victoria to direct a person with a financial interest in a property to evacuate.

13.25 This legislative provision has been supported by the McLeod Report[12] into the Australian Capital Territory (ACT) bushfires following apparent confusion in the evacuation directions given to residents by police, and the advice given by the fire service to stay and protect their property. Furthermore, initial analysis suggests many of the houses destroyed in the ACT could have been saved if homeowners had stayed with their properties.

13.26 However, if the household makes the decision to evacuate, where do they go?

13.27 This is not an issue for those who choose to leave early in the day (as recommended by CFA) and who, in most cases, will have the time to safely make their own arrangements to go either to an evacuation centre or away from the fire area. However, for those who have chosen to evacuate when the fire is approaching, where to go becomes a crucial decision.

13.28 Consultation with Municipal Councils and community groups suggests there is some confusion between **fire refuges**, that is, a place to stay while the fire front passes; **evacuation centres** (often a school, hall or other government building) where people can seek shelter for a longer period of time, sleep over and get meals; and **recovery centres** where someone would seek advice, financial assistance etc.

13.29 A Fire Refuge Steering Committee (comprised of emergency service agencies and Local Government) is currently working to develop a comprehensive approach to the provision of public fire refuges for Victoria. This is a critical aspect of community safety.

13.30 The Committee is developing guidelines to establish and operate refuges, and is formulating a model community consultation process to enable local decision-making in the actual implementation of refuges in particular areas.

13.31 The risk to life from bushfire is critically dependent on individual and group behaviour, which can vary from place to place. It is therefore appropriate that public fire refuges be seen as part of a suite of choices to be implemented locally and not necessarily be universally provided. This is reinforced by the fact that the owners/operators of premises designated as public refuges carry a duty of care to users and potential users.

13.32 The Fire Refuge concept originated after the 1983 Ash Wednesday Fires; well before the current 'stay and defend or go early' strategy advocated by the CFA was developed. Any fire refuge policy must not undermine that strategy, and must be seen as a complementary element in a systemic approach to community bushfire safety.

13.33 The Inquiry notes that this work will not be finalised in time for the coming fire season, but expects there will be some interim products available to help communities think about refuge issues.

11 *Fire Prevention and Preparedness*, p.82.
12 McLeod 2003, *Inquiry into the Operational response to the January 2003 Bushfires in the ACT*, pp. 187–92.

East Gippsland Shire Council noted that the threat of fires in the North East of Victoria moving into Gippsland saw a significant increased effort within communities to clean up properties and remove flammable material. This Shire, along with many others, significantly increased the opening hours of the local tips. They noted that the amount of green waste disposal was extraordinary.

CFA Community Education and Information Program

13.34 Access to appropriate information is a crucial factor in preparedness for those who choose to live in areas prone to bushfire. The CFA believe their target audience equates to **2.6 million**, which incorporates the outer Melbourne areas and approximately one million dwellings[13].

13.35 Over the summer of 2002–2003, the CFA continued to provide extensive community information and education campaigns to better equip families in protecting themselves, their homes and their property.

13.36 These campaigns comprised three key elements:

- A summer publicity campaign to raise general awareness of bushfire risk within the community;
- Interactive Bushfire Blitz community meetings; and
- The Community Fireguard program, which continued to facilitate the formation of groups in high-risk areas, and to maintain current group activity.

13.37 Specifically, the CFA:

- Conducted over **1,500 meetings** around the State, including both fire-affected and other areas. Typically, between 11,000 and 16,000 Victorians participate annually in the CFA summer program, which provides preparedness information tailored to the local area and conditions;
- Provided approximately **138,000** information brochures to community members (i.e. available 2001–2002 fire season estimate); and
- Released radio, television and print media community service messages, prior to and during the fire season.

13.38 The finding of this Inquiry is that appropriate information is available in the public domain. But how much reaches that target audience of well over two million people?

CFA's May 2003 Survey of Fire-Affected Communities

13.39 In May 2003, CFA commissioned a survey of the community in the fire-affected areas of North East Victoria and East Gippsland[14]. The 602 telephone interviews, conducted by an independent consultant, were part of CFA's normal community safety post-incident analysis process.

13.40 The survey sought responses to the experience of households, pre-, during- and post-fire. The preliminary results indicate that 75.6 per cent of households judged themselves to be either 'well prepared' or 'very well prepared' to deal with a bushfire before this summer. This figure climbed to 96.3 per cent by the time the fire was a threat to their property. Inquiry consultations in those same areas illustrated that from the time of initial threat to exposure to the fire front, there was a massive scaling up of local and regional preventative activities.

13.41 The Auditor-General's Report[15] refers to the considerable research program undertaken by the CFA over the last decade to better understand community behaviour during a wildfire. That research has led to a shift away from media-based campaigns with generic safety messages to interactive, participative community-based programs. These programs aim to provide specific information to meet local needs, emphasising the need for households to undertake 'necessary preparedness activities' well before the outbreak of fire in their local area.

13 Submission to the Inquiry by the CFA: *From the Foothills to the Alpine Heights*, June 2003 p. 22.
14 *From the Foothills to the Alpine Heights*, pp. 257–8.
15 *Fire Prevention and Preparedness*, p. 70.

DSE Community Education Program

13.42 By way of comparison, the strategic plan for DSE 's education and information program still remains in draft form from 1995[16], and is yet to gain funding for its development and implementation. This has more direct implications than ever before given that distinctions between public and private land fires are not clear cut, and the number of homes and weekenders in areas next to land managed by DSE has increased. The educative process needs to reinforce the message that 'Prevention of fires on public land requires that residents in adjoining properties undertake prevention activities'[17].

Four Current Programs

13.43 The focus of current community education and engagement appears to have four distinct programs (each of which is discussed below):

- Summer Publicity Campaign;
- Bushfire Blitz Program;
- Community Fireguard; and
- Community engagement through CFA Brigades.

Summer Publicity Campaign

13.44 This campaign is run every summer and includes the production and broadcast of television and radio advertising promoting key fire safety and preparedness messages. It is supported with printed literature distributed by both CFA Brigades and CFA headquarters in Melbourne and regional centres. In recent years, the campaign has been launched with a full day program on ABC Regional Radio that includes interviews with fire service experts, talk back and information lines for the community to access specific advice on preparedness for the coming summer.

13.45 It is the finding of the Inquiry that the fire suppression agencies should undertake rigorous summer program performance reviews to assess the extent to which access to information leads to safe behaviour.

Bushfire Blitz Program

13.46 This initiative, which commenced in 1997, is a major component of an extensive community education and awareness program to assist homeowners in making their homes and properties as safe as possible from the dangers of bushfires.

13.47 Bushfire Blitz may take the form of:

- Street corner meetings;
- Street walk meetings; or
- Community meetings (for a larger group).

13.48 All have a similar focus: identifying local hazards, devising practical interventions, informing about personal safety and understanding bushfire behaviour. The CFA attempts to use established community and activity-based interest groups such as Landcare, if they are available.

13.49 Overall, this scheme is considered very positively by the Inquiry. However, the consultations showed that many members of the public misunderstood the 'Bushfire Blitz' terminology used in public information by the fire agencies, particularly in public announcements during the 2002–2003 fire campaign.

13.50 Instructions, such as '*activate your personal fire plan now*' – used frequently in public communication to get householders and their families prepared for fire in their area – saw some members of the public going directly to their local Councils, seeking a copy of their plan which they mistakenly believed would be available on file. In fact, the plan preparation is voluntary, with the householder developing and maintaining it using a publication available from the CFA, *Living in the Bush – Bushfire Survival Plan Workbook*.

13.51 The finding of the Inquiry is that the work of the fire agencies, notably CFA, in working with communities and individuals is commendable and the CFA should be justifiably proud of their achievements.

13.52 However, the Inquiry notes that clarity of language and terminology would enhance outcomes.

16 *Fire Prevention and Preparedness*, pp. 72-74.
17 *Fire Prevention and Preparedness*, p. 73.

'When the lightning strikes occurred on 8 January 2003, final fire preparations were put in place for a possible bush fire. Verandahs were cleared, extinguishers were placed into roof cavities and large sprinklers operated continuously, wetting the grass and into the forest, the woodpile and the gas tanks. The CFA were pleased with the preparations. Comments such as 'three quarters of the work has already been done' were common from the firefighters on site.

We believe that it was not a matter of luck that our facility and ongoing business remain strong and intact. It was because we planned, took advice from responsible agencies and acted on our bushfire plan when the need arrived'.

Howman's Gap Alpine Centre submission

Recommendations

13.53 That the three fire agencies (CFA, DSE and MFESB) develop and implement a joint Statewide fire awareness education and information program aimed at encouraging a higher degree of personal and household self-reliance.

13.54 That CFA should remain the lead agency in delivering the community education and information program to rural Victoria.

13.55 That CFA and MFESB:

- Conduct an annual survey of households to test the level of awareness and acceptance of fire knowledge among Victorians; and
- Regularly measure whether access to information leads to safe behaviours.

13.56 That the Co-ordinator-in-Chief of Emergency Management directs that all emergency management agencies review, by June 2004, terminology and language in current communication and public education material to ensure it is clear, easily understood and consistent, particularly with regard to fire.

13.57 That CFA and MFESB encourage householders to review their fire safety plan annually.

Community Fireguard (CFG)

13.58 This initiative, which commenced in 1993, has seen the development of up to 1,000 Community Fireguard groups across the State[18]. The Auditor-General's report indicates over 330 Community Fireguard groups are currently active across Victoria[19].

13.59 The CFA describes the CFG in these terms:

'Community Fireguard is intended to provide residents of high-risk areas with an understanding of the risk of unplanned fires and to support them in developing strategies appropriate for their situation. The program seeks to empower people in local areas to take responsibility for being effectively prepared. Once groups are established and have undertaken several program meetings, the level of CFA participation in the group usually reduces as the group develops greater confidence and self-reliance. CFG groups are able to develop a wide range of local initiatives and actions'[20].

13.60 Components of the CFG program for group participants, include:

- Personal fire safety planning and asset protection;
- Understanding fire in a rural landscape, and the potential impacts on personal safety and property, as well as how to safely defend against it;
- Understanding the roles of fire and emergency services personnel;
- Awareness of potential impacts of fires on utilities (reticulated water, power and telephone services);
- Development of bushfire action plans for the participants; and
- Development of effective fire information networks.

13.61 CFA are of the view that the 'fundamentals of the CFG have proved effective and should be maintained[21].' However, in response to a specific question from the Inquiry on the future direction of CFG groups, the CFA noted 'there needs to be greater definition of the parameters of the program and what it can and cannot provide'.

18 *From the Foothills to the Alpine Heights*, p. 253.
19 *Fire Prevention and Preparedness*, p. 71.
20 Extract from 'Questions for the CFA Arising from Public Submissions, Public Consultations and Research', 2003.
21 'Questions for the CFA Arising from Public Submissions, Public Consultations and Research', 2003.

13.62 CFG groups have no response or operational status in suppression in a fire event, and any action taken by the participants in relation to fires outside their own property is done by their choice and at their own risk.

13.63 The Inquiry notes that the CFA does not provide protective clothing, equipment or communication facilities to CFG groups, nor does it assist in accessing them. The Inquiry was advised that to do so would place the CFA in the position of assuming some financial and legal liability for CFG groups – similar to their liability for a formal Brigade – but without the accompanying control (including quality control) over any actions the CFG group might take.

13.64 The role, responsibilities and accountabilities of CFG were raised in discussions with the Inquiry. Some groups appear to have become more active in support of their communities during the fires, becoming engaged in fire suppression beyond their own land. The Inquiry understands that this was not CFA's intended role for these groups. CFG operations during the fires in the North East and Gippsland have therefore highlighted an emerging exposure for both the CFA and the community.

13.65 Certainly, many of the CFG groups had taken on community information dissemination tasks during the North East and Gippsland fires, activating their telephone trees, checking the properties of absentee landowners and those people in their communities with additional needs due to age, disability and illness, or those who did not have access to private transport.

13.66 We heard of cases where the Municipal Emergency Co-ordination Centres tasked the CFG with developing and implementing telephone trees. It is also evident that, in some cases, these groups and/or individuals undertook fire suppression activities away from their own land. It was reported that a female CFG co-ordinator used adapted farm equipment to extinguish spot fires single-handedly in the local area (while being observed by a CFA strike team from outside the area who were awaiting operational orders).

13.67 Developing and implementing telephone trees and extinguishing spot fires are operational roles, the first clearly linked to CFA activities arising out of CFG, the second a case where the landholder clearly went beyond what is intended by CFG activities. The management of strike teams is discussed in Part D.

13.68 The Inquiry believes that the CFA has worked well with local communities to facilitate fire awareness but may need to consider this new development carefully in the acknowledgement that it is not always possible for fire agencies to be present at all fires, particularly bushfires.

13.69 The McLeod Report into the operational response to the 2003 ACT bushfires[22] noted the speed at which bushfires can present a serious threat: 'their intensity and spread (which far exceeds the normal fire experience in built-up areas) mean that no government or community can guarantee that fire services will be able to attend all residences or structures that may be threatened by large bushfires.'

13.70 The report recommended that authorities be committed 'to doing all that they can to help, including advising the community how best to go about achieving a higher degree of personal and household self-reliance.'[23]

13.71 The Inquiry was advised that the fire suppression agencies informed a number of small and isolated communities that there was a high likelihood that neither DSE crews nor CFA Brigades would be available to assist in the event of the fires reaching them. Some of these communities had a CFG. In effect, these communities were given a little knowledge, no protective clothing, no equipment and were left to protect themselves. This caused considerable anxiety among many community members.

13.72 While the Inquiry understands what led to these situations and the resultant actions and decisions, more should be done to empower these communities if they face a similar scenario in the future.

13.73 CFA needs to review and further develop the CFG model. CFG has a valuable place in the suite of programs available to assist and educate Victorians. However, CFG is not an option for communities required to engage in fire suppression because assistance is unavailable or delayed.

13.74 We recommend that the CFA work with communities to develop more flexible solutions that fully recognise those tasks that, by default or design, some communities are required to undertake. Proposals for a suite of solutions are required to be placed before Government and local communities. In some cases, creating a formal Brigade may be the answer. In others, assistance in getting equipment and becoming trained in its use is needed. A more flexible approach to the special situation and needs of remote or isolated communities is required.

22 McLeod 2003, *Inquiry into the Operational response to the January 2003 Bushfires in the ACT*, p. 174.
23 McLeod, p. 236.

Recommendations

13.75 That CFA, in conjunction with isolated small communities, develop and promote a suite of appropriate fire readiness and fire management strategies to meet their needs.

13.76 That CFA reports to the Minister for Police and Emergency Services on recommended solutions and implementation strategies for isolated small communities by June 2004.

13.77 That CFA clarifies and restates the roles and function of existing Community Fireguard Groups (including their relationship to the Municipal Fire Prevention Plan) to members, co-ordinators, Incident Controllers and Municipal Emergency Resource Officers, prior to the 2003–2004 fire season.

13.78 That Community Fireguard Group co-ordinators' names are supplied to their local municipality for the 2003–2004 fire season, and are updated annually for use in information exchange should a Municipal Emergency Co-ordination Centre or Incident Control Centre be established.

13.79 That CFA provides technical advice to Community Fireguard Groups in the selection and purchase of appropriate equipment and protective clothing for use on their own land.

13.80 That CFA, recognising the value of the Community Fireguard Group program, undertake a review by June 2004 to identify opportunities to further develop the program to ensure its continuing appropriateness in preparing communities for fire into the future.

CFA Brigades

13.81 CFA Brigades are another way in which communities prepare for, and engage in, bushfire events. The history and role of CFA Brigades is well covered in Chapter 2 and in the Auditor-General's Report. CFA Brigades have a proud history and a deservedly high reputation. The efforts of the Brigades and volunteers in the fire season of 2002–2003 have been widely acknowledged.

13.82 As a member of a Brigade, community members have access to the full range of information relating to preparedness for bushfire and a depth of understanding of how to apply this knowledge.

13.83 The Inquiry received a number of submissions relating to the operation of Brigades falling into a number of categories:

- Communications equipment;
- Maps;
- Access tracks;
- Water sources;
- Equipment types;
- Management of crews;
- Issues relating to AIIMS-ICS;
- Incorporation of local knowledge into the development of strategy and the implementation of tactics; and
- Perceived differences in the culture and work practices of paid DSE crews and volunteers.

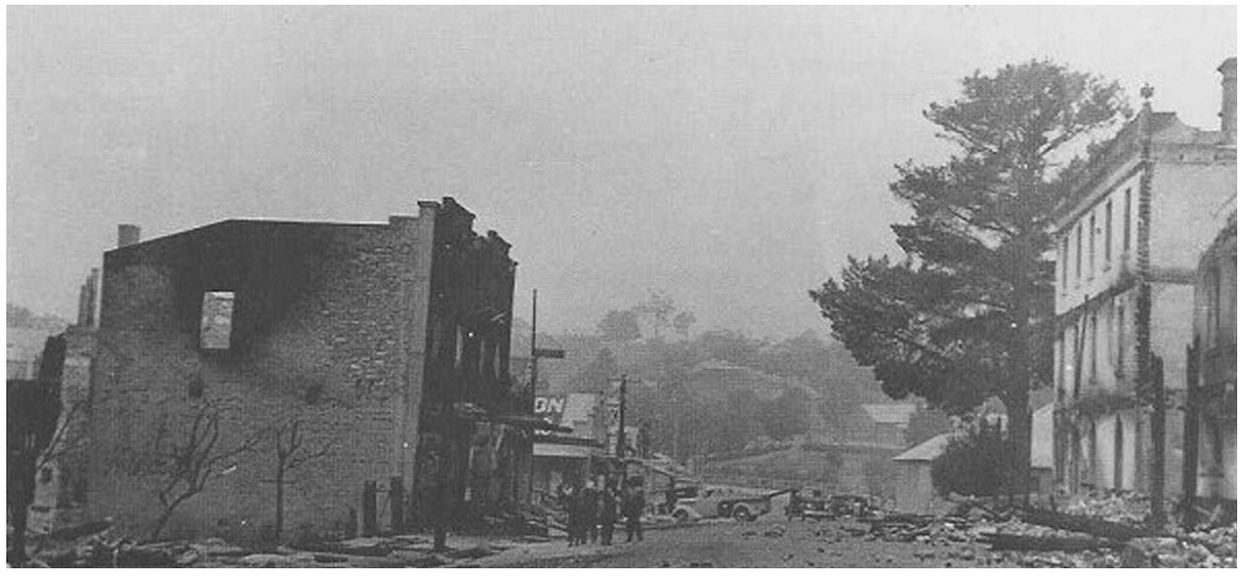
13.84 These issues are addressed in detail in Part D of this report.

Outstanding Issues

13.85 It is clear that CFA offers a broad base of educative programs and enabling processes in relation to community preparedness for bushfire. The MFESB's work complements this in the area where regional and metropolitan media overlaps. More should be done to ensure each agency remains on message and that the message is consistent.

13.86 It also remains unclear to the Inquiry what is the actual 'trigger' for households, neighbours or communities to move from 'awareness' to a heightened level of involvement and active participation in community-wide fire prevention planning and suppression. Research on this would inform the further development and refinement information programs.

13.87 The last issue to be explored is whether there is sufficient connection between the two ends of the CFA community empowerment program. At one end, the information exchange of a Bushfire Blitz program naturally extends into the community self-help process that is Community Fireguard. At the other end is involvement in, or the formation of, a new CFA Brigade. There appears little middle ground between the self-help process at one end and the fully committed response structure, which is sanctioned and protected, at the end. The Inquiry believes this warrants attention.



Omeo after 1939 fire - CFA

Public Awareness Communication Systems

Standard Emergency Warning Signal

13.88 The Standard Emergency Warning Signal (SEWS) is designed:

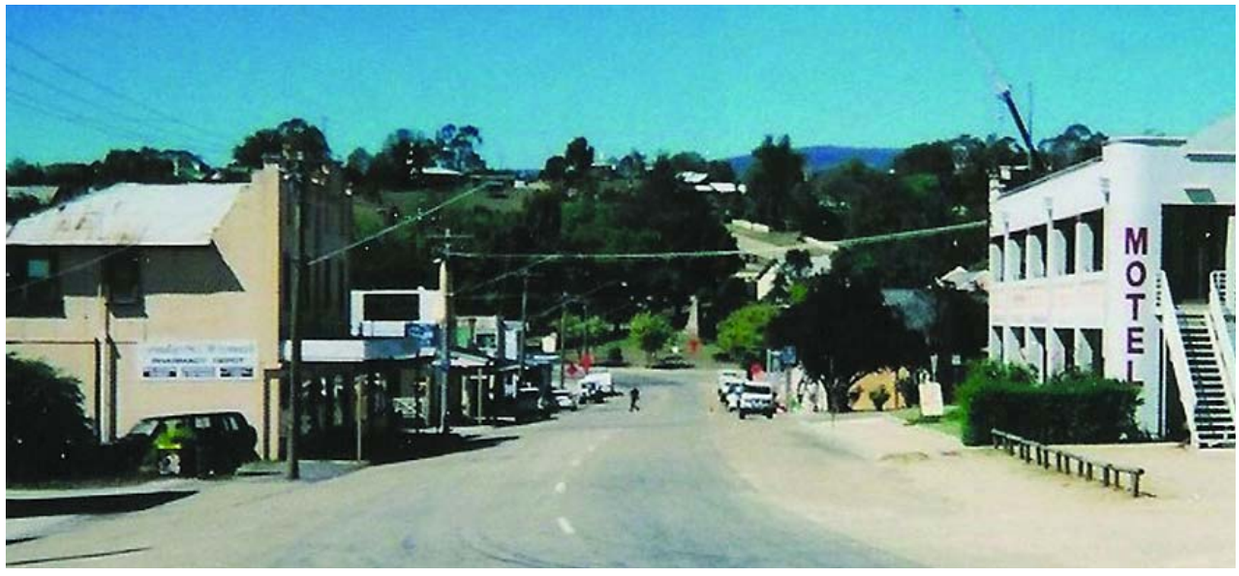
- To alert radio/television listeners/viewers that an official emergency announcement is about to be made concerning an actual or imminent emergency that has the potential to affect them; and
- To alert the community at large, via a public address system, that an important official emergency announcement is about to be broadcast.

13.89 SEWS is a warning signal – the same as is used by the media in the northern States of Australia as a cyclone warning. Originally launched in Victoria in 1992 using a different tone, SEWS was re-launched in 1998 with the current signal, in conformity with a national decision at the time.

13.90 During the North East Victorian and Gippsland fires, the SEWS was used sparingly. There were two occasions in Gippsland where warnings in this format were issued.

13.91 DSE, CFA, Emergency Response Co-ordinators and some sections of the electronic media, have suggested that the current system be reviewed. In some cases, media stations have been unable to locate their copy of the signal, when asked to play it by Victoria Police during emergencies.

13.92 The accompanying instructions to SEWS need to be dated and a more contemporary message needs to be developed. Protocols for use need to be modernised and be more inclusive of those in the community with additional needs (eg hearing impaired, cultural and linguistic diversity). Further, an awareness program for the media needs to be re-established. Consideration should also be given to occasionally playing the signal as part of exercises to build understanding and awareness of its purpose in the broader community.



Omeo after 2003 fire - CFA

Recommendation

13.93 **That the Co-ordinator-in-Chief of Emergency Management directs the Media subcommittee of the State Emergency Response Committee to review the use of the Standard Emergency Warning Signal and its accompanying message.**

Radio Codes of Practice

13.94 The Inquiry notes that the Community Broadcasting Codes of Practice document (2002) does not deal with the issue of reporting emergency situations specifically.

13.95 Part of this Code deals with news and current affairs, the intention being to promote accuracy and fairness. However, the Commercial Radio Codes of Practice and Guidelines document (2001) specifically aims 'to ensure that licensees have procedures in place to enable timely and accurate broadcast of emergency information.' Views were expressed in some parts of the broadcasting industry that more guidance would assist in emergency situations, especially given concerns about the language used in the SEWS.

13.96 We also noted that some rural radio stations have skeleton staff as they relay feed from another station – generally in a capital city that may be in another State. These stations are less able to respond to local emergency issues. The Inquiry believes that this issue should be considered in our recommended review of the Codes of Practice.

Recommendation

13.97 **That Victoria include an agenda item for both the National Emergency Management Committee and the National Meeting of Emergency Services Ministers recommending that the Australian Communications Authority review both the Commercial Radio Codes of Practice and Guidelines, and Community Broadcasting Codes of Practice, to ensure they provide necessary guidance and obligations on radio stations during emergencies and in relation to emergency warnings.**

'…it was horrific the wind blew the fire horizontally across the paddock, it seemed to ignite all at once. The wind was roaring, the fire was roaring, there was sparks and smoke everywhere making it impossible to breathe…even though I feel that I performed well during the fires, it was basically due to the fact that I did not know what the hell I was in for…when the dragon roars you had bloody well better listen.'

Fran & John James

Insurance as a Preparedness Measure

13.98 There is a growing willingness in outer urban and rural Victoria for householders to stay and defend their homes and property from fire, if they are adequately prepared to do so.

13.99 However, this should be seen as an adjunct to maintaining insurance coverage against losses through bushfires. Insurance remains a necessary option for protecting assets and living in a rural landscape. An appropriate level of insurance coverage is a sound preparedness measure and should be encouraged.

13.100 Submissions and anecdotal advice from landholders and businesses point to the high level of fixed cost required from annual cashflow, for a rural property to adequately insure all structural and business needs. Those needs include fences, yards, and associated machinery sheds and equipment. On a typical property, these costs go well beyond the normal cover for urban Victorians insuring a house, contents and the family car. As a result, some householders will always remain under-insured or will self-insure, wearing considerable risk – usually at times of poorest cashflow (for example, under drought).

13.101 Current insurance industry practice does not appear to provide any additional obligations on those property owners in bushfire-prone areas, nor does it provide incentives for those property owners who put in place additional measures to protect their properties from fire. For example, the insurance industry provides such incentives to induce households in high risk burglary areas to have deadlocks fitted to all external doors.

13.102 Attempts to deal with this issue in the past have found there are 'hurdles' to this approach, particularly in verifying standards of work, continuing maintenance of approved equipment, etc. Further, staying and fighting the fire brings with it the issue of increased personal risk.

Recommendations

13.103 **That CFA, in their education and information packages, encourage appropriate insurance cover, and ensure that insurance becomes a part of the householder's annual checklist.**

13.104 **That Government work with the insurance industry to explore options for incentives such as a reduction in premiums for those who take appropriate self-protection measures on their properties, similar to incentives for anti-theft home security.**

Conclusion

13.105 Access to appropriate information is a crucial factor in preparing those who choose to live in areas prone to bushfire.

13.106 Our focus in this Chapter has been on whether existing information and processes encourage the community to be an active participant in developing safety strategies.

13.107 While many effective programs are in place, we conclude that there is scope for improved communication and education. Among other things, we have suggested increasing positive survival stories through the summer publicity campaign; re-focusing efforts to educate people that staying can make a difference, and clarifying the language used in the Bushfire Blitz program.

13.108 The Inquiry believes that the CFA has worked well with local communities to facilitate fire awareness but may need to carefully consider new developments within the Community Fireguard group program.

Chapter 14
Planning for Fire – An Holistic Approach

Overview

14.1 Fire does not respect boundaries, nor does it respect organisational arrangements. There is no logic, therefore, in planning separately across different tenure arrangements.

14.2 As we saw in Chapter 3 and as later Chapters in Part C show, a number of different plans cover the prevention and mitigation of fire in Victoria. This Chapter notes a number of concerns relating to existing arrangements and proposes a new, consolidated planning process – the Municipal Fire Management Plan.

14.3 Chapter 14 describes this new process and outlines the many benefits it will bring: greater consistency, more effective co-ordination, better co-operation, effective and concurrent implementation of response and recovery activities and reduced duplication of effort.

Municipal Fire Prevention Plan

14.4 Municipal Fire Prevention Plans ('the plan') address the planning for prevention and mitigation works on private land and land under the control of the municipality. The Municipal Fire Prevention Officer and the Municipal Fire Prevention Committee are responsible for developing the plan and presenting it to Council for adoption.

14.5 The plan may include proposals for burning or for clearing firebreaks and hazards within the municipality, as well as provide advice to other responsible authorities for the clearance of hazards from land under their control.

14.6 Existing plans are subject to audit under the provisions of the *Country Fire Authority Act 1958*[1]. Plans must be audited at least every three years to assess compliance with the provisions of the Act and the Country Fire Authority Regulations 1992.

14.7 The Inquiry is satisfied that the audits of Municipal Fire Prevention Plans had been completed in accordance with the provisions of the legislation prior to the 2002–2003 fires. It is worth noting that there are proposals under consideration in the Office of the Emergency Services Commissioner and the Country Fire Authority (CFA) to amend the current arrangements for audit of these plans to apply greater scrutiny to their actual *implementation*.

14.8 The principal concerns in relation to the preparation of these plans, raised with both the Inquiry and in the Auditor-General's Report[2] were that:

- The utilities and other agencies with public land management responsibilities do not actively participate in the planning process, nor can they be compelled to undertake works that would complement the proposed measures in the plan;
- The plan only addresses private land within the municipality and land under the control of the council within municipalities; and
- Even though the Department of Sustainability and Environment (DSE) is a participant in the planning process, there is limited scope to resolve concerns relating to the interface between public and private land.

Fire Protection Plans for Public Land

14.9 Fire planning for public land is completed at three levels:

- Fire Protection Plans at a regional level;
- Fire Operations Plans for each DSE Fire District; and
- Individual burning plans for specific locations/management objectives.

14.10 The Fire Protection Plans are strategic in nature and are meant to… 'apply for 10 years, with the provision for revision after five years'. It is intended that… 'Each plan must define the fire protection objectives and indicate the strategies to be adopted within the planning area…'[3]. The Fire Protection plans inform the Fire Operations Plans.

14.11 The Fire Operations Plans under the control of DSE list all fuel reduction burns and major works to be performed before the fire season commences. The Manager, Fire in each Region signs these off…' by 30 September each year, or before the first spring burning operation, whichever is sooner'[4].

14.12 These plans, which may cover a number of municipalities, are then distributed for public comment and a consultation process with Municipal Fire Prevention Committees is undertaken.

14.13 The most significant concern raised with the Inquiry in relation to these plans was the manner in which consultation is pursued. At present, a completed plan is presented to the community and the Municipal Fire Prevention Committee for comments and feedback. However, the nature of these plans is such that they are perceived as a finished product where any feedback will be noted but not necessarily acted on.

1 Section 55A *Country Fire Authority Act 1958*.
2 Auditor-General Victoria, *Fire Prevention and Preparedness*, Government Printer, May 2003, p. 64.
3 DNRE 1995. *Code of Practice for Fire Management on Public Land*, State Government of Victoria, Melbourne.
4 DSE Fire Management Instruction S.P. 1-Fire Operations Plans June 1999.

14.14 While the *Code of Practice for Fire Management on Public Land 1995* provides that both the Fire Protection Plan and the Fire Operations Plans are to be developed by DSE in consultation with the community, the Inquiry believes the community does not value the process and, as such, the community consultation process needs reconsideration.

14.15 Information presented to the Inquiry indicates that proposals for works on public land where it interfaces with private land are not developed in consultation with landowners or local fire brigades. Consequently, any sense of community ownership of the plans is minimal.

Fire Prevention and Mitigation Plans for Utilities

14.16 Land tenure provides no boundary to the spread of fire. Since the decision in the 1990s to privatise, corporatise and 'regionalise' a number of utilities in this State, responsibility for the prevention and suppression of fire has transferred from the Government sector to the private investor or has been devolved to regional authorities. It has been suggested in submissions that over this time, there has been a decline in the aggregate staff and equipment available for fire prevention and fire suppression works.

14.17 The utilities involved in this process are:

- Water distribution;
- Electricity generation, transmission and distribution; and
- Rail transport.

14.18 Each of these, described in detail in Chapter 3, have developed their own approach to meeting bushfire prevention and preparedness responsibilities. Here, we review the preparations for the 2002–2003 fire season by these utilities, before turning to three further industry players:

- Roads authorities;
- Plantations; and
- Alpine Resort Management Boards.

Water Companies

14.19 Fire impacts have the capacity to immediately alter the quality of water from a catchment and, depending on the extent and nature of the dominant vegetation, to have a prolonged adverse impact on the water harvest over many years. However, provided the appropriate prevention and suppression measures are put in place, these impacts can be minimised – as can the associated costs to improve medium-term water quality.

14.20 There is a range of Water Authorities across the State; Chapter 3 provides their details and context. Melbourne Water, as the largest water authority within the State, liaises at all levels with the statutory fire authorities including DSE and the Country Fire Authority (CFA), and is represented on appropriate Regional and Municipal Fire Prevention Committees in areas where their assets are located. Melbourne Water also carries out bushfire prevention works, utilising a mobile and well-equipped field workforce trained and accredited to DSE standards, and is first responder to many unplanned fire events.

14.21 Melbourne Water informed the Inquiry of a range of mitigation strategies that the company has put in place, including seasonal or project firefighters. The company advises that it is developing more formal arrangements with DSE Fire Management Branch through the establishment of a Memorandum of Understanding covering fire suppression activities in their catchments.

14.22 In the Inquiry's opinion, Melbourne Water appears well placed for the coming fire season. Because of the importance of Victoria's water catchment areas, the Inquiry believes that Government should be assured that adequate fire mitigation and fire suppression planning is in place for all the State's water catchments, but especially the Melbourne catchments.

14.23 An extreme fire in the catchments would have severe impacts on water yield well into the future and could, in a worst-case scenario, require development of alternative water storage. Therefore, in accordance with recommendation six in the Inquiry's Interim Report,[5] further review of fire prevention and preparedness arrangements for Victoria's – and, particularly, Melbourne's – water catchments is warranted.

5 See Appendix III.

Recommendation 6 from the Interim Report

That the Premier requests that the Minister for Water critically review the fire prevention planning and fire response strategies for Victoria's water catchments.

14.24 CFA has advised the Inquiry that, since privatisation, Water Authorities across the State have been reluctant to take an active role in the Municipal Fire Prevention Planning process.

14.25 The Inquiry is of the view that these agencies have a critical role in fire prevention and mitigation planning, must be represented in this process and be required to provide input.

Power Transmission and Distribution Companies

14.26 The fire prevention function remains the responsibility of transmission and distribution companies (see Chapter 3), with each power company submitting a Bushfire Mitigation Plan to the Office of the Chief Electrical Inspector (OCEI), covering their responsibilities and processes. Under the Electricity Safety (Electric Line Clearance) Regulations 1999, each company must ensure appropriate vegetation management and control, under and adjacent to power lines.

14.27 This plan sets out the work to be completed over the next 12 months to ensure wildfire risks associated with the company's field assets are minimised. These plans have been approved, and an OCEI audit before the 2002–2003 fire season found that the companies' plans were appropriate. OCEI advised the Inquiry that all plans are available for public viewing from the network operators.

14.28 The Inquiry is of the view that these operators should be required to provide input into the Municipal Fire Prevention planning process in areas through which, or in which, their assets exist.

Rail Transport Operators

14.29 The Public Transport Division, which oversees rail transport and infrastructure in this State, has a co-ordinated Emergency/Incident Management Response Plan, which includes bushfire. The Inquiry could find no evidence that this plan undergoes any audit by an organisation with fire management experience.

14.30 Sub-lessees for rail operators in Victoria have the operational responsibility for carrying out VicTrack's statutory fire responsibilities (refer to Chapter 3 for further explanation). However, they in turn have sub-contracted rail line maintenance. Again, there is no indication that this work is subject to any audit or monitoring process.

14.31 Councils, at present, cannot serve a fire prevention notice on VicTrack. However, such a notice may be served on the lessees. The chain of command for fire prevention work on and around railway tracks is presently confusing, with many municipalities remaining unclear as to which body is responsible for fire prevention on leased rail lines.

14.32 All rail operators should be required to provide input into their relevant municipal fire prevention planning process.

Roads Authorities

14.33 In Chapter 3, we noted the three levels of government involved with road infrastructure (i.e. Federal, State and Local). Each needs to work in co-operation with the Municipal Council through which their designated road passes.

14.34 Factors that need to be considered in the broader planning and mitigation process are:

- Managing the potential intensity of fire that may result on roadsides;
- Restricting the propagation and spread of fire from roadsides to adjoining public and private land;
- Providing for adequate protection of the travelling public from fire that may occur on, or pass through, roadsides; and
- Ensuring roads are safe for travel after a fire has passed through.

14.35 VicRoads has produced a document called *Code of Practice for Roadside Management* that deals with fire, and CFA has produced a document that deals with planning for fire on roadsides called the *Roadside Fire Management Guidelines*.

14.36 All three levels of Government – even owners of private roads – should be required to provide input into the municipal fire prevention planning process.

Plantations

14.37 Commonwealth and State policy is to encourage the development of the plantation industry. Accordingly, in recent years there has been increased investment and rapid expansion of eucalyptus plantations for the short rotation pulpwood production, particularly in the south west of the State. With this growth, and the more moderate expansion of radiata pine, the private plantation estate is now approximately 360,000 hectares[6] Statewide. As a result of this shift to an industry driven by external investment, there will have to be an increased reliance on the private sector in regional fire prevention, mitigation and suppression.

14.38 Chapter 3 provided some background on the plantation sector in this State. While not at the scale of previous bushfire events in Victoria's past, the loss of approximately 2,500 hectares of plantations in the Victorian fires over 2002–2003 will have a significant impact on the plantation owners, wood production industries and the local communities they support. In the plantation sector, the returns are typically obtained 25 years, or longer, from the initial planting. Therefore, plantation companies take the threat of fire very seriously, and insure against this eventuality. However, within the community and, to some degree within the volunteer fire services, plantations are still not regarded as assets despite the employment they create and the long-term prospect of a significant return to the regional economy at harvest.

14.39 The Inquiry supports the findings of the Auditor-General[7] in recommending that 'State and local government and the CFA improve the standard of municipal fire prevention planning and ensure its consistent implementation in forest plantations.'

Forest Industry Brigades

14.40 In Victoria, there are now over 25 Forest Industry Brigades established by 15 different plantation owners[8]. There is some industry discussion as to whether the current criteria for establishing an Industry Brigade is appropriate, especially as it does not cater for owners who might have significant holdings over a more dispersed area. (Currently, a company may be required to establish, equip and staff a Forest Industry Brigade if a plantation owner has more than 500 hectares within a 25-kilometre radius. Over 10,000 hectares, a Forest Industry Brigade must be formed.)

14.41 The Inquiry supports the findings of the Auditor-General[9] in recommending that 'the CFA adopt a firm line in encouraging companies at risk to form industry brigades as provided for under legislation.'

14.42 The Auditor-General notes that it is not clear how well the formation of these Brigades adequately protects the forest industry. There is also confusion within the Brigades as to how they fit within the CFA command structure and to whom they owe their first duty of loyalty when fighting fire.

14.43 However, submissions to and discussions with the Inquiry suggest that Forest Industry Brigades played a very active role in the 2002–2003 bushfires and should be accorded more of the protection afforded to regular CFA Brigades. The Inquiry also noted that Forest Industry Brigades responded well to calls for assistance from the CFA and operated for significant periods fighting fire on non-plantation land.

14.44 It has been recognised that the CFA Act needs to be amended – specifically, section 93B, where it is not lawful for Forest Industry Brigades to act outside the Country Area of Victoria. This means that Forest Industry Brigades are not authorised to act in areas managed by DSE or across State borders. This omission in the Act is of particular concern as many industry players manage land that adjoins public land managed by DSE, or crosses the New South Wales or South Australian borders. This part of the Act directly conflicts with the spirit of mutual assistance and co-operation that has built up over time.

14.45 The need for a review of the Forest Industry Brigade legislation after a suitable period of operation and settling has already been recognised and the forest industry, CFA and Government are currently working through this review.

Recommendations

14.46 **That, following the review of Forest Industry Brigades, *the Country Fire Authority Act 1958* be amended to ensure that the Forest Industry Brigades, which are acting in an approved manner, have the same powers and rights as other Brigades when attending fires on public land or interstate.**

14.47 **That the CFA should not be given the power to direct Forest Industry Brigades to engage in fire prevention and suppression activities off their land and that decision should remain the responsibility of the plantation company.**

6 AFFA (2003) National Plantation Inventory – Australia (annual update).
7 *Fire Prevention and Preparedness*, p. 12.
8 *Fire Prevention and Preparedness*, p. 99.
9 *Fire Prevention and Preparedness*, p. 12.

Planning for Plantations

14.48 All rural land managers have responsibility to ensure effective and responsive suppression, supported by appropriate planning and land management. In plantations, these practices involve planning and maintenance of access tracks, firebreaks and available water, and the management of fuel loads on their estate.

14.49 Historically, available data indicates that the majority of fires resulting in significant plantation losses have started outside the forest estate, and the 2002–2003 fires have followed this trend.

14.50 The land management practices of adjoining landholders can have a significant impact on a plantation's assets and, accordingly, there is a need to have consistent fire protection policies in place for all classes of rural land use, including:

- Establishing property design guidelines;
- Developing ignition management protocols such as modification of machinery exhaust temperatures;
- Specifying minimum fire equipment/resources for all equipment working in plantations; and
- Implementing work bans and restriction on public access when local fire-risk factors are high.

14.51 The CFA have progressed towards developing good design guidelines for plantations during 2002[10] but the forest industry has protested at their release because the guidelines are based on a single land use category (plantations only). The forest industry believe this may heighten the general public's view that, in fire situations, plantations are a greater fire risk, or inherently more dangerous. They strongly argue that these guidelines should only be released as part of a broader package of guidelines for all other rural industries (for example, cropping and grazing), thereby ensuring a consistent approach to fire prevention on all rural land. The Inquiry supports this view.

14.52 The Inquiry supports the findings of the Auditor-General[11] in recommending that 'the DSE, the CFA and the plantation industry initiate work with the Bushfire Co-operative Research Centre[12] to develop… standards to minimise the wildfire risk in commercial forest plantations.'

14.53 In discussions with the Inquiry, the plantations industry suggested that while they had been proactive in developing design guidelines to alleviate planning issues, in some cases Municipal Councils had allowed 'inappropriate' development (for example, housing) next to, or in, areas where plantations and forest are a predominant land use. This was done without adequate consideration of the fire risk.

14.54 A consistent approach is needed to ensure that the existing rights of landholders, such as forestry companies are taken into consideration. Equity must be considered when Municipal Councils approve new subdivisions and land rezoning in proximity to plantations.

14.55 To sum up, it would seem there are instances both of development encroaching on long-established plantations and of plantations being approved too close to residential areas.

14.56 The Inquiry therefore gives qualified support to the findings of the Auditor-General[13] in recommending that 'the CFA formally endorse State Fire Prevention Design Guidelines for Plantations to provide guidance to key stakeholders'.

Recommendations

14.57 That CFA and the Plantation Industry jointly develop and agree on Fire Prevention Guidelines for Plantations by June 2004, to be then promoted and distributed by the Industry.

14.58 That Municipal Councils:

- **Ensure consistent approaches to planning for fire prevention and protection; and**
- **Consider existing rights of neighbours in planning development applications.**

Alpine Resort Management Boards

14.59 Alpine Resort Management Boards are considered to be Municipalities for the purpose of the *Emergency Management Act 1986* and therefore prepare Emergency Management Plans for the area within their boundaries. However, unlike Municipal Councils they are not required to produce Fire Prevention Plans.

10 *Fire Prevention and Preparedness*, p. 11.
11 *Fire Prevention and Preparedness*, p. 12.
12 An organisation established by the Federal Government, involving a broad range of industry stakeholders, charged with the task of researching the full spectrum of bushfire related issues.
13 *Fire Prevention and Preparedness*, p. 12

14.60 In order to fill this gap, the Alpine Resort Management Boards have addressed the general issues of fire prevention in their Emergency Management Plans. The DSE Strategic Fire Protection Plans address land up to the boundaries of the resorts, however, there is limited interaction between the two organisations to ensure the work done across the two land tenures is consistent.

14.61 It is clear to the Inquiry that the treatment of land under the control of the Alpine Resort Management Boards should be no different to any other land tenure. Accordingly, there is a need to prepare comprehensive fire prevention plans for Alpine Resorts and such planning should be integrated and consistent with the planning undertaken for the surrounding land tenure.

14.62 The recommendations relating to the development of Municipal Fire Management Plans should therefore apply equally to Alpine Resort Management Boards.

Concerns Relating to the Existing Planning Arrangements

14.63 The Inquiry is of the view that the current planning arrangements, particularly at municipal level, have a number of inherent weaknesses:

- They demand a significant commitment of resources from all agencies involved, particularly the municipalities, and result in duplication of effort and information;
- The legislation that requires fire prevention planning is fragmented (in some cases, duplicated by other, related legislation), diverse, incomplete and does not compel all responsible agencies to work co-operatively within the process; and
- Planning treats public and private land separately and does not adequately address the planning needs of the interface between them. Even though consultation with interested parties is envisaged and encouraged, there is insufficient integration between the different plans, and consultation and input from other stakeholders is inadequate.

A New Approach to Municipal Planning

14.64 The Inquiry proposes a consolidated planning process at municipal level so that, at a minimum, the issues currently dealt with by the Municipal Fire Prevention Plan, the Strategic Fire Protection Plans for Public Land and the planning undertaken by utilities and other Government departments are brought together to produce a single and consolidated Municipal Fire Management Plan.

14.65 The development of agency-specific preparedness and response planning should remain the responsibility of those agencies, but should be informed by the outcomes of the municipal fire management planning process.

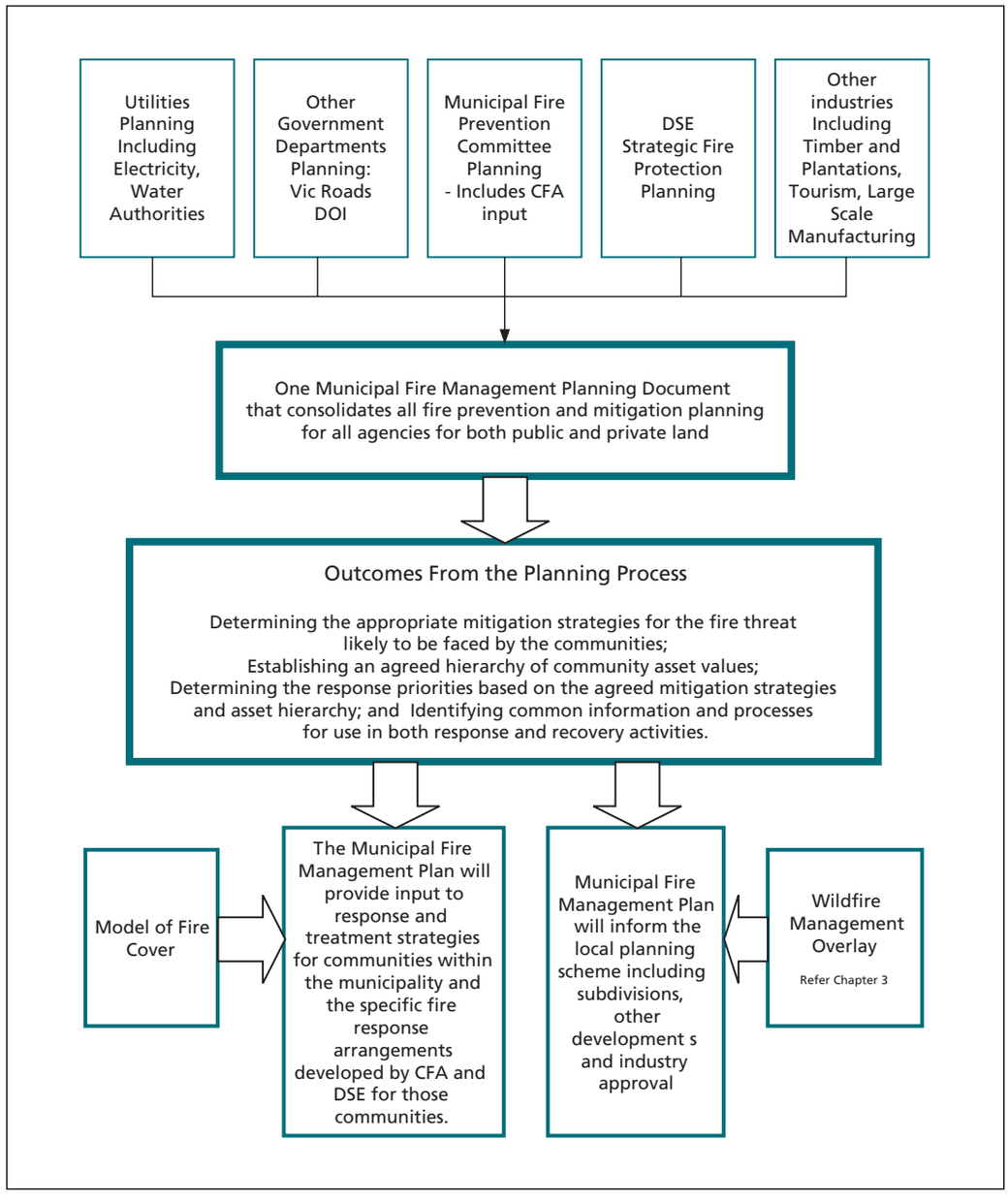
14.66 Figure 14.1 maps the consolidation of fire management planning arrangements. Part E, The Way Forward, takes this approach further by exploring the concept of an 'all hazards–all agency' comprehensive approach to emergency management in Victoria. We make further recommendations in Part E in respect to planning and legislation.

Model of Fire Cover

14.67 The Model of Fire Cover, currently being developed within the Office of the Emergency Services Commissioner (OESC), will be a critical tool in developing the proposed Municipal Fire Management Plan, and in implementing the outcomes of that planning (see Figure 14.1). The Model of Fire Cover is a tool that will be applied across the whole of the State, including public land, to provide both valid and consistent quantitative measures of risk.

14.68 The Model identifies the risk environments that exist based on statistical evidence collated from a range of data sources. The recommended Municipal Fire Management Committee and individual agencies can then build on this model through their enhanced knowledge of the local area and their understanding of what assets are of importance to that community. The model is designed to identify the drivers of risk, allowing mitigation strategies to be targeted appropriately to achieve community-agreed outcomes.

Figure 14.1: Consolidation of Fire Management Planning Arrangements



14.69 Development work on the first stage of the Model, structural fires, is complete and the Model is undergoing independent validation. The next stage to be developed will be the wildfire component. The Auditor-General's Report[14] supports this work and recommends that DSE be more actively involved in developing this next stage. The Inquiry supports this view.

Key Outcomes from the Proposed Planning Process

14.70 As figure 14.1 indicates, outcomes to be achieved at this level of planning are as follows.

Determining the Appropriate Mitigation Strategies

14.71 In particular, this will focus on:

- The urban-rural interface, recognising that many new subdivisions are particularly targeted to those seeking a more 'green' environment; and/or
- The changing nature of farming and land use – for example, plantations, aquaculture, horticulture.

Establishing an Agreed Inventory of Community Assets

14.72 Many submissions were critical that, as part of their fire management strategies, the fire suppression agencies did not consult with the community on protecting community assets. The Inquiry believes that identifying assets at, or during, the suppression activity is too late.

14.73 Each land manager within an area needs to be able to provide advice about which assets they consider important for themselves, their key stakeholders and/or their business, that will inform their own specific prevention and suppression activities. These may be 'built' assets in terms of infrastructure and associated services (for example, a radio communications tower; rural housing and businesses, including plantations; a Parks Victoria information and interpretation centre; a ski lodge; electricity transmission lines), or 'natural' or environmental assets such as specific ecological habitats, forest reserves, and cultural or recreational sites.

14.74 In order to develop a Municipal Fire Management Plan, the many different groups, organisations and agencies, by way of example Catchment Management Authorities, should work together to develop a list of important assets in the community and, where possible, offer some view of their priority for protection. This will guide prevention and preparedness arrangements and help in the development of joint strategy in the event of a fire either originating within the municipality or crossing from a neighbouring municipality.

14.75 There should be, wherever possible and appropriate, agreement within the community before a fire event on where their priorities lie while recognising that during the actual suppression all options may not be available due to prevailing fire conditions. Difference of opinion and priority must be managed at the local level between the levels of government as the elected representatives of that community.

Determining Response Priorities based on the Agreed Mitigation Strategies and Asset Hierarchy

14.76 Fire suppression strategies are developed after considering desired outcomes against available resources and the prevailing fire conditions. At times, decisions will be required on strategy and options. This model proposes that, where possible, Municipal Fire Management Plans be used to inform those choices.

Identifying Common Information and Processes for Use in Both Response and Recovery Activities

14.77 Consultations with Municipal Councils indicated the difficulty in keeping accurate and updated records for people 'at risk' in the event of an emergency arising. While no such system can be current on a daily basis, due to the continually changing circumstances of communities, an early recognition of the requirements of people with additional needs must be factored into planning. Councils do not have to see their role as the collector of such information; rather the collator through available sources (eg district nurse, elderly citizens club, etc).

14 *Fire Prevention and Preparedness*, p. 37

14.78 The finding of the Inquiry is that Municipal Councils should work with local networks to develop the most accurate picture of those within their community who may be at risk in an emergency situation. This must be done under the principles of the *Information Privacy Act 2000*. Further, at the outset of an emergency, any community briefing should seek any updates on changed circumstances.

14.79 The provision of this information should be without fear of action under the privacy legislation.

Benefits of the New Municipal Fire Management Plan

14.80 In view of these key outcomes, the benefits of a consolidated planning process are considerable. The plan:

- Should provide greater consistency between the preparedness, response and recovery elements of planning and ensure more effective co-ordination across the interface between public and private land.
- Will encourage better co-operation between agencies that have responsibility for response and recovery during emergencies through the use of common information and data systems.
- Promote effective and concurrent implementation of both response and recovery activities by ensuring that emergency responders, and those involved in co-ordination and recovery, are working with common information and systems; and
- Most importantly, it will eliminate much of the duplication that exists in the current arrangements where several committees operate at municipal level, managing different bits of the same emergency.

Involvement in the New Planning Arrangements

14.81 All agencies and interest groups with responsibilities and obligations for land management and fire prevention planning at municipal and regional level should continue, or commence, their involvement. This will be critical to ensure appropriate and effective planning for fire management across a municipality. The structure in place to develop and implement this planning must ensure that all agencies and organisations having appropriate interests, contribute to the planning process

15 *Fire Prevention and Preparedness*, p. 65.
16 *Fire Prevention and Preparedness*, p. 11.

Management of the New Planning Arrangements

14.82 Within a municipality, planning for emergencies generally, and fire in particular, is a critical function. There is ample evidence in the past to demonstrate that some Municipal Councils have not given due weight to these obligations. This is evidenced in the practice of some municipalities appointing low-ranking officers to the roles of Municipal Fire Prevention Officer. The Auditor-General also discusses this issue, noting the need for 'skills in strategic planning, risk assessment and management skills'.[15]

14.83 Community safety and fire prevention can be compromised where the task of municipal planning is not given sufficient priority within council. In implementing the arrangements proposed in this Chapter, the Inquiry believes Municipal Councils must appoint an appropriately senior officer working at a strategic level within council to oversee this critical function.

Audit Arrangements

14.84 Audit arrangements should be a fundamental component of effective planning. Therefore, as is currently the case, the new planning arrangements should include effective and transparent audit processes that consider the format and content of the plans. The audit should, over time, be extended to consider effective implementation.

14.85 The Auditor-General has already recommended that 'the Office of the Emergency Services Commissioner, in consultation with the CFA, the Public Transport Division, and the OCEI, establish systems to improve performance reporting on wildfire trends and the outcomes for industry.'[16]

14.86 Options for management of an expanded audit processes are limited. With an expanded brief, which includes public lands, roads and utilities, responsibility for the audit function may have to be reconsidered. The Inquiry does not recommend that this new function necessarily be performed by the CFA alone.

14.87 The Inquiry recommends that CFA, DSE, OESC and Local Government develop an appropriate audit model for endorsement by Government.

Case Study: Tallangatta Valley – Late January 2003

In late January the continual spread of the fires in North East Victoria showed that containing the fires within heavily forested areas was proving difficult. This was due to the dry condition of the fuel and the intensity of the fire behaviour causing regular spotting across control lines.

The Mt Beauty IMTs strategic response included the construction of mineral-earth control lines along the bottom of the Tallangatta Valley adjacent to the road as a fall back tactic if the fire could not be stopped on forested public land. A 10 metre wide mineral earth-break on private property parallel to the road was commenced. As a consequently, fencing, stockyards, gardens, pasture and other farm infrastructure would have been damaged as the bulldozers progressed through the valley.

The strategy was adopted without reference to the landowners of the affected properties. Tension arose when landowners objected to this strategy and at one point a number of community members acting in concert diverted the construction from private property to the roadside of the fence.

The Inquiry questioned DSE on the events and was advised that during construction, landowners were approached and, where they objected to the placement of the line on their property the line was constructed on the adjacent road reserve. This was not the view of the landowners directly affected.

The failure to consult landowners during the development of this strategy and the assertive manner in which fire ground commanders executed the strategy created great angst within the community. Many landowners actively opposed the implementation of the strategy and attempted to convince the Mt Beauty IMT to change its decision on the placement of the control line. Any opportunity to develop and partnership between the IMT and the community they were responsible for protecting was compromised.

Lessons Learnt

Strategy developed in isolation from the community and without input from any key stakeholder is likely to be compromised. The likely strategic response to a fire must be established between the agencies and the community before the fire starts. Strategies should be based on an agreed understanding of the values placed on private and community assets and how they will be protected during fire suppression activity. This is best achieved through an holistic planning process that identifies those values well before the fire starts. On this occasion, any possibility of developing a co-operative partnership was lost due to the failure to communicate with and give consideration to the views of the community.

Boundary Issues

14.88 With any attempt to bring together all appropriate interests in the one municipal fire management planning process, difficulties will arise including the degree to which municipal, departmental and other agencies' boundaries are aligned. Goodwill must be exercised here, and organisations may have to put community interest before agency processes and protocols.

14.89 Many of the current fire prevention and mitigation plans have an historical basis, with the boundaries developed on a range of different and variable criteria (for example, DSE Fire Regions, CFA Area Boundaries). However, CFA Area Boundaries mesh in well with the Local Government area boundaries. Other organisations with an interest in fire management are represented in a range of municipalities (for example, VicRoads, railways, power companies).

14.90 We therefore believe that the municipal boundary is the most appropriate, both practically and legislatively, on which to base fire management planning.

Recommendations

14.91 That Government review legislation for utilities operating within the State to ensure their involvement in regional fire preparedness and mitigation planning.

14.92 That the *Country Fire Authority Act* 1958 be amended to:

- Replace the current Municipal Fire Prevention Plan and the requirement for a Fire Prevention Committee with a Municipal Fire Management Plan, and Municipal Fire Management Committee; and
- Bring together all stakeholders with an involvement in fire management for both private and public land within the municipality.

14.93 That the Victoria Emergency Management Council establish a subcommittee by June 2004, to ensure an all-agency and appropriate industries policy framework is developed and agreed in respect to the planning for fire prevention, mitigation and suppression.

14.94 That the new Municipal Fire Management Plan is informed by the policy directions of the subcommittee of the Victoria Emergency Management Council.

14.95 That the Municipal Fire Management Plan amendment includes appropriate provisions for the audit of the plans including:

- Content;
- Process of development and implementation; and
- Compliance reporting to the Victoria Emergency Management Council.

14.96 That the Government identifies an appropriate body, or bodies, to undertake the audit of the Municipal Fire Management Plans.

Conclusion

14.97 Broad policy direction for the development of planning at all levels of fire prevention and mitigation currently rests with the response agencies. There is no formal structure to ensure consistency across agencies or to gain endorsement from Government.

14.98 We believe that the State would benefit from establishing a group operating as a subcommittee of the Victoria Emergency Management Council tasked with ensuring there is a policy framework, developed by the responsible agencies, within which the necessary planning can take place effectively and efficiently at all levels.

14.99 Such a group would, for example, consider the 'Fire Control Priorities' developed by DSE and CFA and recommend them for endorsement by the Victoria Emergency Management Council as well as providing a forum in which agencies can promote new policy initiatives.

14.100 The Inquiry is of the view that this planning process can be broadened to encompass the full spectrum of emergency management planning over time with even greater benefits accruing in terms of enhanced community safety, better co-ordination and reduced duplication of effort.

Chapter 15
Agency Preparedness

Overview

15.1 The Auditor-General's recent report,[1] addresses many aspects of the preparedness activities of the Country Fire Authority (CFA) and the Department of Sustainability and Environment (DSE). Recommendations were made in relation to the CFA–DSE Co-operative Agreement, agreements with interstate agencies and integrated planning between the agencies. These agreements are elaborated in this Chapter.

15.2 The Inquiry concurs with the Auditor-General and supports those recommendations. In this Chapter, the Inquiry addresses some of these issues in greater depth and adds weight to the recommendations already made.

15.3 We also acknowledge that planning undertaken by the emergency services in the lead up to the 2002–2003 summer took place in a context of planning for, and responding to, other events and inquiries. The picture that emerges is one of intense activity for all agencies, particularly the fire services, with very little respite from incident response and the implementation of organisational change.

External Influences on Fire Agencies Prior to the 2002–2003 Fire Season

Terrorism and Other Emergency Management Issues

15.4 Following the 11 September 2001 terrorist attacks in the United States, the subsequent 'white powder' incidents and the Bali terrorist attacks, there has continued to be general concern about terrorism in Australia. This has led to a considerable review of capability and scenario planning for potential response by emergency management agencies.

15.5 Agencies have been heavily committed to upgrading capability, improving security arrangements for public places and events, and working with critical industries on their risk management. Further, the threat of anthrax placed considerable additional workload on the emergency management agencies (particularly police, the Metropolitan Fire and Emergency Services Board [MFESB], CFA and Department of Human Services) as they followed up many 'white powder' scares over the following months. Agencies were required to maintain a level of preparedness across a range of issues, placing additional pressures on fire agencies prior to the fire season.

Linton and the Fire Agencies

15.6 Significant fires in the Dandenong Ranges in 1997 and the 1998 fire near Linton (southwest of Ballarat) resulted in the deaths of three members of the general public and the deaths of five CFA volunteers respectively. These incidents were pivotal in prompting the review of the agreements in place between CFA and DSE, as well as safety arrangements for all firefighters.

15.7 To ensure firefighter safety remained paramount in fire management, a number of changes were implemented in DSE and CFA, including:

- Continued integration of the CFA group structure with the Incident Control System;
- Requirement for compulsory minimum skills for firefighters;
- Continuous improvement systems within the Incident Control System;
- Review of systems generally within DSE and CFA; and
- Continued development of the Co-operative Agreement between CFA and DSE to ensure effective co-ordination of the agencies.

Restructuring of Government Departments

15.8 December 2002 saw machinery-of-government changes to a number of government Departments, with the former Department of Natural Resources and Environment dividing to form the Departments of Sustainability and Environment, Primary Industries (DPI) and Victorian Communities.

15.9 These significant changes, occurring as they did during the fire season, could have had a major impact on firefighting arrangements for public land, as many of the frontline firefighters were now in another Department. No formal agreements were in place to access these staff. Fortunately, this did not prove to be an issue for 2002–2003. Discussions have already commenced to ensure appropriate arrangements are in place for the next fire season.

15.10 The Inquiry noted that the complex legislative arrangements relating to workers compensation may result in that the Departmental Secretary employing an officer who is released to fight fires under the direction of another entity (Department) may be required to recompense the WorkCover Authority in respect to payments made in relation to an injury. Significant work is required to ensure protection for all concerned.

1 Auditor-General Victoria, *Fire Prevention and Preparedness*, Government Printer 2003.

Recommendations

15.11 That DSE and the Department of Primary Industries formalise an agreement by the 2003-2004 fire season documenting the policies, procedures and financial arrangements relating to the availability of Department of Primary Industries staff to be trained and released for fire prevention and suppression activities on public land.

15.12 That DSE investigates whether such agreements should exist with other government Departments and agencies, particularly those with officers located in rural Victoria who may be involved in fire response and support operations in the future, based on their expertise and experience.

15.13 That DSE commences discussion with the Victorian WorkCover Authority in respect to employer liability for those staff being released to, and directed, by another agency in fire prevention and suppression activities.

Deployment of Firefighters to Interstate and to the United States

15.14 The cumulative effect of fatigue remains an issue for Victorian firefighting resources. From the end of 2001 until the commencement of the 2002–2003 fire season, there were continuing calls on the expertise of the fire agencies. Those deployments are illustrated in Table 15.1. They include assistance with firefighting in New South Wales and a deployment to assist with severe forest fires in the United States.

15.15 By the time the North East and Gippsland fires commenced in early January, the former Department of Natural Resources and Environment (now DSE and DPI) and Parks Victoria had attended over 470 fires for the 2002–2003 fire season. CFA reported 13,733 responses from the commencement of the fire season until that time. It should be remembered that CFA have a broader role in emergencies, including road incidents, house and structural fires, and specialist rescue.

15.16 With the continuing drought and its impact on the volunteer, largely rural-based workforce, and the heightened level of preparedness for fire across the State, resources were severely strained, even prior to the fires in the North East and Gippsland.

Impact of the Drought on Water Availability for Firefighting

15.17 The fires of 2002–2003, together with six years of drought, have highlighted problems with the availability of adequate water supplies for firefighting purposes.

15.18 Irrigation channels and dams have traditionally provided easy and ubiquitous access to water for firefighting in rural Victoria; however, pipelines are replacing open irrigation channels, particularly in the North West and Western Victoria. Specific arrangements must be made at the planning stage in order to ensure later access to water from pipelines. Even so, pipelines often do not permit rapid replenishment of CFA tankers because of their variable and limited flow rates and pressures. Estimates suggest fill times could increase from the current time of approximately eight minutes to, perhaps, 40 minutes.

15.19 Water Authorities cannot be compelled under current arrangements and legislation to provide the water pressure or volume to ensure rapid replenishment of firefighting vehicles. Volunteers and the community have been very vocal about this issue.

15.20 In some parts of the State, local arrangements have been negotiated with Water Authorities to guarantee adequate water supply for firefighting. This includes placement of hydrants and large-volume, static water tanks connected to pipelines and part-funded by the Fire Access Road Subsidy Scheme. (Municipalities are required to fund the hydrants; a matched funding scheme of one dollar for every two dollars applies in the case of static water tanks provided under the Fire Access Roads Scheme.)

15.21 Other options are needed for the contingency planning necessary to ensure water for firefighting. In keeping with the concept of fire safety being a partnership between State and Local Government and communities, public land managers, Catchment Management Authorities/Water Authorities, fire agencies and community groups should work together to develop and implement environmentally sound local solutions to ensure water supply for firefighting.

Table 15.1: Fire Agency Commitments 2001–2002 Outside Victoria

Location	CFA commitments	DSE commitments	Total
Sydney Dec. 2001– Jan. 2002	2,593 personnel, 122 appliances	803 personnel	3,396
Northern NSW Oct.—Nov. 2002	453 personnel, 26 appliances	146 personnel	599
Sydney Dec. 2002	320 personnel, 16 appliances	9 personnel	329
USA Aug.–Sept. 2002		13 personnel	13

Source: Personnel and equipment figures supplied from CFA and DSE records 2003

15.22 An example of this is the proposal by community groups at Stanley in the North East, to use a small parcel of public land, currently an old mining site of little apparent environmental value, to establish a small dam to provide water for firefighting. The group has suggested the dam can be filled from a spring without interfering with the water catchment.

Recommendations

15.23 **That Government in the development of its statewide water policy includes appropriate consideration of access to water for firefighting.**

15.24 **That communities, public land managers, Water Authorities and Catchment Management Authorities jointly identify and implement local and environmentally sound solutions to improve the availability of water for firefighting through the Municipal Fire Management Planning process.**

15.25 **That the fire agencies develop contingency plans in relation to access to water for firefighting, including where appropriate, the use of static, large volume water tanks.**

Joint Planning

15.26 The major component of joint planning for response to and management of fire is the Co-operative Agreement between CFA and DSE. There is a Memorandum of Understanding between CFA and MFESB, which is currently under review, and a draft Memorandum of Understanding between DSE and MFESB.

Country Fire Authority

Regional Operations Management Plans

15.27 The Operations Manager in each CFA Region is responsible for the preparation of a Regional Operations Management Plan. This plan addresses the specific operational arrangements within each region and the way in which resources are applied to the response to, and management of, fires and other emergencies. This planning is undertaken in consultation with senior volunteer and career personnel within the Region and in accordance with a structure approved by the Chief Officer, CFA.

Wildfire Response Plans

15.28 An important component of preparedness and response planning for CFA is the preparation of Wildfire Response Plans. These are prepared for specific and generic risks within each region and include specific response arrangements for wildfire. These plans are also prepared in consultation with senior Brigade members from the area addressed in the plan, and the relevant DSE Fire Management Officer.

Department of Sustainability and Environment

15.29 Each DSE Region is responsible for preparing a Readiness and Response Plan. These plans address the specific detail relating to the readiness and response arrangements for all DSE personnel within the Fire Region along with the co-operative arrangements in place with DPI and Parks Victoria.

15.30 The plans are distributed to key stakeholders including the relevant CFA Regional Operations Managers. Six Readiness and Response plans[2] were in place by November 2002 – five Regional and one Statewide.

2 Source: DSE Fire Management, 3 Sept. 2003.

Agency Resources

Recruitment and Management of Personnel

15.31 The Auditor-General's report[3] examined the recruitment and management of DSE's Project Firefighter program and the CFA's recruitment of volunteer firefighters. The findings in relation to DSE's Project Firefighter program stressed the need to broaden the program focus to ensure Project Firefighters were available not only for fire suppression activities but for mitigation/prevention activities, such as the conduct of prescribed burning. This issue is discussed in more detail later in this Chapter.

15.32 The Inquiry is satisfied that DSE and CFA had undertaken the necessary planning to ensure there were sufficient resources available to respond to fires that may occur in the 2002–2003 fire season.

15.33 Incident Management Team[4] members are identified by each agency in accordance with the Co-operative Agreement. Each year the Chief Fire Officer, DSE and Chief Officer, CFA endorse personnel for functional roles within Incident Management Teams. The endorsement of an officer to undertake a role within an Incident Management Team is based on formal qualifications in incident management and experience. By way of example, DSE report[5] that 13 per cent of their personnel hold level 2 or 3 accreditation in a fire role[6].

Training of Firefighters

15.34 Both DSE and CFA have implemented extensive training programs for firefighting personnel. DSE undertakes a comprehensive training program for all Project Firefighters on the commencement of their employment.

15.35 CFA has pursued a major training initiative over the past three years focusing on the establishment of minimum skills profiles for all firefighters. This project has resulted in 21,673[7] personnel trained in Minimum Skills – Wildfire.

15.36 DSE provided advice that 1,194 personnel[8] currently have accreditation in a range of fire roles, such as: incident controllers, planning or operations officers and firefighters.

Training of Incident Management Team Members

15.37 Both DSE and CFA have ongoing training and refresher programs in incident management for personnel endorsed for incident management roles. There are also training programs to provide incident management skills for personnel identified as future Incident Management Team members.

15.38 The opportunities for Incident Management Team members from DSE and CFA to train and exercise together appear to be limited. Joint exercises were held at Benalla for DSE and CFA personnel in late November 2002. A number of other joint meetings and briefings across the State between DSE and CFA incident managers were held prior to the summer. However, there is no evidence of formalised exercise programs to ensure that Incident Management Team members have an opportunity to work together and develop improved rapport.

15.39 During the public consultation, the Inquiry became aware of issues related to personnel management within some Incident Management Teams. The Inquiry believes that to develop improved working arrangements within those Teams, personnel should be assessed with respect to their abilities in managing people to best outcomes, not only on their experience and knowledge in dealing with fires.

Recommendation

15.40 That DSE and CFA review selection and training programs for Incident Controllers and Incident Management Team members to ensure that they include all necessary competencies in recognition that technical skills are only one component of the required attributes.

3 *Fire Prevention and Preparedness*, pp. 107– 9.
4 Incident Management Teams and Incident Controllers are discussed later in this Chapter and in Part D.
5 Source: DSE Fire Management, 3 Sept. 2003.
6 An Incident Controller Level 2 is qualified to control a Type 2 incident (a developing/developed incident of medium size or complexity which is expected to be controlled within 24 hours, and involving resources from outside the local area. An Incident Controller Level 3 is qualified to control a Type 3 incident (a large or complex incident where resources from a range of locations are involved, normally multi-agency and normally expected to exceed 24 hours). Definitions are taken from Auditor-General *Fire Prevention and Preparedness*, p. 157.
7 Source: CFA, 30 June 2003.
8 Source: DSE Fire Management, 3 Sept. 2003.

Sustaining Long-term Firefighting and Incident Management Capacity – Succession Planning

15.41 Submissions to the Inquiry, and comments made during consultations with agency personnel and the public, highlighted a concern regarding the age and declining number of experienced Incident Management Team members, particularly, experienced fire ground supervisors.

15.42 Of most concern is the ability of Incident Management Teams to sustain an operation as large as the North East and Gippsland fires given the number of personnel endorsed to manage large complex fires. These concerns apply equally to DSE and CFA. The Auditor-General[9] addressed this issue in detail.

15.43 The Auditor-General's concerns were borne out by experience in the 2002–2003 summer. Submissions received by the Inquiry, and observations made by a number of DSE and CFA personnel in discussions with Inquiry members, indicated the need to develop a longer-term resource management strategy to ensure the future availability of:

- Trained and experienced fireground supervisors;
- Personnel experienced in conducting backburning operations; and
- Fully-qualified personnel to undertake senior roles in Incident Management Teams.

15.44 This is of particular concern for DSE in light of the recent organisational changes and the prospect of further restructuring in the near future.

15.45 The Inquiry strongly supports the findings and recommendations made by the Auditor-General[10]. In particular, those relating to succession planning are critical for DSE's immediate and longer-term firefighting capability. The Inquiry believes that good firefighters and incident controllers **are developed and not recruited**.

Agreements and Memoranda of Understanding

The Co-operative Agreement Between CFA and DSE – September 2002

15.46 The Auditor-General's report[11] made a number of observations and recommendations in relation to this Agreement. The Inquiry supports these findings and wishes to specifically address the establishment of broader objectives for fire suppression activities.

15.47 As part of this agreement, DSE and CFA established a number of broad priorities for their response to and management of fires. These were 'the protection of firefighters, the public, essential community assets and the environment, control of fires in the shortest practicable time and the provision of the best possible fire service to the people of Victoria.'[12]

2002–2003 Bushfires: Fire Control Priorities

15.48 Early in the response to the fires started by lightning in North East Victoria, the Chief Fire Officer, DSE and the Chief Officer, CFA met and confirmed these priorities and communicated them again to members of both agencies. For the purposes of this report, are referred to as the 'Fire Control Priorities'.

15.49 Those priorities were:

- Firefighter safety;
- Community and asset protection;
- Aggressive first attack on new outbreaks to extinguish fires;
- Ecological and environmental value protection; and
- Fire containment and control.

15.50 An overriding concern was the need to maintain sustainable resourcing for the whole of the fire season.

15.51 The Inquiry notes, however, that these priorities were not clearly communicated to the public prior to the summer fire season, nor during the response to the fires. This may have caused concern and some confusion for communities when decisions regarding broader strategy were being made. During public consultation, it became increasingly clear to the Inquiry that communities have high expectations of the fire services in relation to information about what the fire is doing, what action the fire services are taking, and why they are pursuing a particular strategy.

9 *Fire Prevention and Preparedness*, pp. 110–114.
10 *Fire Prevention and Preparedness*, p. 114.
11 *Fire Prevention and Preparedness*, pp. 34–7.
12 Co-operative Agreement between CFA and DNRE – September 2002.

15.52 The State-level priorities should be clear and prominent statements within the Agreement need to be communicated at the local level. Prior to each summer, they need to be effectively communicated from Government to the community, as well as to regional and local fire service members. Agency pre-incident planning and Municipal Fire Management Plans should be developed with reference to the Fire Control Priorities, along with the identification of local risks and community priorities.

15.53 In addition to this Agreement, DSE Regions and CFA Area staff prepare local Co-operative Agreements to provide more specific detail on joint response arrangements. These agreements complement the content of plans produced by the two agencies and the State-level Co-operative Agreement.

Recommendation

15.54 **That Statewide Fire Control Priorities:**

- **Be developed annually by CFA and DSE;**
- **Be endorsed by the Victoria Emergency Management Council;**
- **Be incorporated into the co-operative agreement between the DSE and the CFA; and**
- **Inform the Fire Control Priorities in the Municipal Fire Management Plans.**

Incident Management Arrangements – AIIMS-ICS

15.55 The effectiveness of incident management arrangements for fire suppression is a critical issue for the Inquiry. Accordingly, the system used by the agencies is described below. The way in which that system was applied is discussed further in Part D.

15.56 The Co-operative Agreement[13] between CFA and DSE states, as its first governing operational principle, that all fire suppression operations will be conducted in accordance with the principles and procedures set out in the AIIMS Manual. This is a reference to the Australian Inter-service Incident Management Systems[14] (AIIMS). AIIMS is a concept developed to support the manager who is responsible for taking action to resolve an emergency situation.

Incident Control System

15.57 The central component of AIIMS is the Incident Control System (ICS), based on the principles of:

- Management by objectives;
- A single Incident Controller;
- A span of control[15] for fire ground supervisors of about 1:5;
- Functional responsibility for each position within an Incident Management Team;
- Management plans as an integral part of control; and
- Command of firefighting resources retained within the agencies.

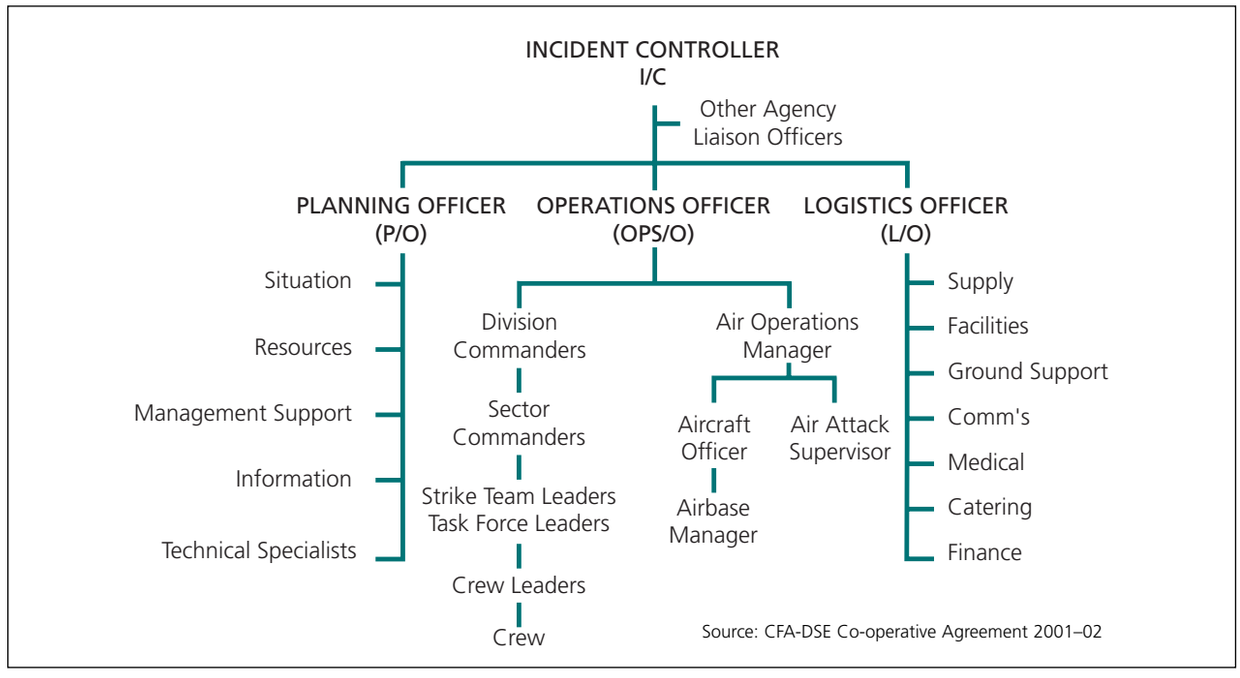
15.58 The Incident Control System was introduced into DSE in the late 1980s in the form of the 'Large Fire Organisation' arrangements, and into CFA in the early 1990s. Its underpinning principles for managing fires and emergencies were seen to address a number of existing problems with incident management identified during the response to major fires, particularly those that occurred in 1982–1983. The Incident Control System has been applied to the management of fires since that time.

15.59 The system can be applied to the management of any incident with an Incident Management Team structure designed around the principal functions of control, operations, planning and logistics. Within these broad functions there are a number of tasks that must be addressed and the number of personnel within the Incident Management Team appointed to carry out these roles expands and contracts depending on the needs and complexity of the incident.

15.60 The Incident Controller appoints the Incident Management Team for each fire in consultation with relevant agency managers. The Incident Management Team is responsible for preparing a plan to manage the incident and implementing that plan. In doing so, they liaise with support agencies, the community and the police emergency response co-ordinators to achieve (i) the set objectives for effective control of the incident and (ii) the broader community safety priorities set in local and State emergency management plans.

13 Co-operative Agreement between CFA and DNRE – September 2002.
14 AIIMS Teamwork in Emergency Management, Australasian Fire Authorities Council.
15 Span of control is a management concept that relates to the number of groups or individuals controlled by one person, and provides a structure for the delegation of functions.

Figure 15.1: Incident Management Team Structure for a Large or Complex Incident



15.61 For small incidents, the Incident Management Team may operate from a Control Point[16] in the field. For larger or more complex incidents, a pre-planned static Incident Control Centre may be established to accommodate members of the team that require more equipment and facilities to undertake their role effectively. DSE and CFA have identified a number of facilities throughout Victoria that have been pre-planned as Incident Control Centres. These facilities have been equipped with communications and other facilities to support the operations of an Incident Management Team when required.

15.62 During the response to the fires that occurred in 2002–2003, Incident Management Teams were formed for all fires. Written submissions and consultations with agency representatives and the public, show that the Incident Control System was, generally, an effective method of managing these fires.

Concerns About the Incident Control System

15.63 In the Auditor-General's Report[17], the following observations were made in relation to the Incident Control System:

> 'We found that the Incident Control System was well entrenched in the DSE and underpinned all key aspects of its fire management activities such as operational planning and fire line operations. There is a strong commitment to Incident Control System training and implementation. However, we found that within the CFA the situation is more problematic. There is a clear organisational commitment to ICS at a central and regional level and the ICS structure is adopted for larger fires. However, the ICS has not been fully adopted at group level and may not be adopted during rapid development stages of smaller fires where significant risk to personal safety may exist'.

15.64 The Inquiry is of the view that the Auditor-General's concerns are valid. There were instances where, for a number of reasons, CFA personnel did not operate within the structures established by the Incident Management Teams for supervision of the fire ground. The specific challenges relating to the application of the Incident Control System are addressed in Part D.

16 Control Point – management from a short-term communications position – may be an emergency vehicle for a localised incident.
17 *Fire Prevention and Preparedness*, p. 41.

15.65 The Inquiry is of the view that CFA should establish a model for Fire Brigade Groups that clearly explains their role during the planning for, and response to, fires and incidents. Plans that set out a process and timetable to implement the necessary changes within CFA should be developed and communicated to all key stakeholders.

15.66 This issue was addressed in the Inquiry's Interim Report, included as Appendix III. Our recommendation (recommendation 2), which has been accepted by the Government, is extrapolated here to provide a timeframe.

Recommendation

15.67 **That CFA continues to work with its Brigades to complete the integration of AIIMS-ICS with the Group Structure for full implementation by the 2004-2005 fire season.**

Interstate Agreements and Liaison

15.68 Senior agency personnel from Victoria, New South Wales and South Australia meet regularly to discuss arrangements for the management of fire impacting on State borders. These discussions are focused on ensuring effective mutual aid arrangements are in place and that the agencies can operate together safely and efficiently.

15.69 A number of forums have been established covering Victoria's borders with both New South Wales and South Australia. Each of these has produced documents detailing joint response arrangements. These documents have been reviewed periodically with the most recent reviews between 1999 and 2002.

15.70 However, only one agreement has been established at State level and signed off by senior agency representatives. This is a Memorandum of Understanding between CFA Victoria and the Country Fire Service in South Australia. This agreement was finalised in December 1999 and deals with key response issues affecting the two agencies along the length of the Victoria – South Australia border.

15.71 The remaining agreements in place are ad hoc arrangements developed by local fire service managers that relate to specific geographic areas along the border. These documents provide comprehensive guidelines for the agencies involved and cover:

- Notification of prescribed burns;
- Notification of fires;
- Initial attack arrangements;
- Incident management arrangements;
- Communications procedures;
- Management of aircraft;
- Cost recovery; and
- Legal arrangements covering compensation for firefighters and indemnities.

15.72 Only one of these agreements makes any reference to the development of joint strategy for management of fires or the process by which agreement might be reached on specific fire management strategies. Both DSE and CFA have indicated to the Inquiry that the current arrangements need to be reviewed and updated. The work of local fire service managers to establish effective operational planning and response arrangements is acknowledged, however, there is scope for significant improvement.

15.73 The Inquiry is of the view that one of these agreements offers a useful model for further development. The Southern Border Fire Co-ordination Association is a forum of Government fire services and land management agencies and the private forest industry, operating in the South West Victoria and the South East of South Australia. This group has worked together for many years to ensure effective fire prevention and joint response arrangements are in place to protect both plantation assets and communities in this area.

15.74 These agreements have no weight in law, nor would it be expected that they should. What is expected is an holistic approach to bushfire co-ordination and management in South Eastern Australia.

15.75 To achieve this holistic approach, overarching principles and processes must be in place to provide appropriate guidance for fire service managers. This enables mutual aid and joint operational arrangements to develop fire management strategies. It also guides processes to resolve disputes that may arise in relation to appropriate strategy for any given fire impacting on border areas.

'The co-ordination of fire detection and suppression within the South Australian/Victorian southern border is achieved through the Southern Border Fire Co-ordination Association, a body formed by representatives of organisations with fire suppression responsibilities and capabilities, and organisations statutory support responsibilities in the area. This need was recognised following the 1979 Caroline fire.'

Guidelines for Co-operation Between Victorian and South Australian Organisations on Fire Suppression in the Southern Border Area.

Recommendations

15.76 That the Victorian fire agencies negotiate with their counterparts in New South Wales and South Australia to put in place agreements for mutual aid and the development of cross border strategy for the management of fires burning in the vicinity of, or across, State borders, and these agreements are reviewed annually.

15.77 That any local level agreements developed to address geographically specific risks or issues must be consistent with State-level arrangements.

Information Management

Costs

15.78 The DSE budget allocated to fuel reduction burning in 2001–2002 was about $2 million, or approximately 4 per cent of the total Fire Management Budget ($48.5 million). The Auditor-General's report[18] commented that the budget allocation did not reflect the full cost of resources committed to fuel reduction burning program with other non-Fire Management staff having their salaries charged against their normal duties. Prescribed burning is an important task and, with the establishment of DSE and DPI from the former DNRE, non-DSE agencies will need to be able to invoice for costs.

15.79 In 1998, the Department of Treasury and Finance (DTF) and the then Department of Natural Resources (DNRE) reviewed the Department's fire management performance (revisited in 2002). Among other things, the 1998 report analysed the Department's performance from the late 1940s. Notwithstanding this recent summer, DTF concluded that while the numbers of wildfires occurring on public land had increased over the period, the area burnt and the percentage of fires that exceed 400 hectares in size had fallen dramatically – as had total fire management expenditure in real terms.

15.80 A separate, but similar analysis conducted by economists in the then DNRE's Performance and Evaluation Division in 1997 concluded that 'for every $1 of funding allocated to fire management, Victoria benefits by $22 in saving assets'.

15.81 DSE recognises the difficulty of establishing assessment tools in relation to fire; they have, over time, considered and started a range of projects. Recognising that this is a broader issue than just DSE's own fire management, the Department[19] have suggested that the recently established Bushfire Co-operative Research Centre develop this vital piece of work further for all jurisdictions.

15.82 More recently, DSE has engaged an external contractor to further develop its risk management approach to fire management. Preliminary work suggests that while DSE has not previously succeeded in analysing the balance of investment between preparedness and suppression, there is only a low risk that the current balance is seriously in error. Models to assess the appropriate resource balance between the various elements of prevention, preparedness, response and recovery – based on quantitative measures – are required.

18 *Fire Prevention and Preparedness*, p. 55.
19 DSE responses to Inquiry questions, 20 August 2003, p. 13.

Case Study: Deddick Valley and Tubbut – Early February 2003

Fire began to impact on the Deddick Valley around Delicknora and Tubbut in early February. Due to the extent of the Victorian fires and the strain on available resources, responsibility for the Delicknora Sector of the fire in the Deddick Valley was delegated to the IMT at Jindabyne. Jindabyne IMT were managing the fires in southern NSW. The fire control strategy agreed between the IMTs at Orbost and Jindabyne included control lines and backburning in the Delicknora area, including control lines on private land.

Private land had lower fuel loads and there was greater likelihood of success for this strategy. This resulted in the burning of private forest, pasture and fences.

The concerns raised by the community focused on the works undertaken by NSW National Parks and Wildlife firefighters to implement this strategy. Advice that the burning was going to be undertaken was not thoroughly communicated to the local community. Communication with Victorian firefighters operating in adjoining sectors was not complete. When community members did attempt to determine what was happening they were given conflicting information.

Even though the arrangements in place to develop the agreed strategies were ad hoc, the Inquiry is satisfied that the strategic fire control decisions were appropriate The Inquiry notes however, that the Orbost IMT failed to adequately provide accurate and timely information to these communities. Additionally, the efforts to brief firefighters and fire ground managers under their control, on strategy and structures put in place to implement these strategies, were insufficient.

Lessons Learnt

The principle of recognising the value of local knowledge and the need to communicate effectively with communities should be addressed in the agreements that are developed with interstate agencies. The process for development, implementation and communication of strategy applied to fires burning across state borders must be documented in these agreements.

15.83 DSE believes that its current 'base' allocation of $48.5 million for its overall Fire Management program is sufficient to provide fire management services for a fire season of 'below average' severity. However, DSE have been working with DTF to develop a more 'representative' annual budget based around severity indicators to meet the needs of 80 per cent of the fire seasons and reduce the need to seek a Treasurer's Advance to cover the costs in a given year[20]. This level of budget coverage has been estimated to be $68.2 million,[21] and represents delivering fire management services for a fire season described by DSE as at the middle range for 'significant' severity.

15.84 Further, in light of the phase-down in the State Forest sawlog licences by approximately 30 per cent statewide, referred to in Chapter 2, there will be impacts on the amount of regeneration burning required on an annual basis. Many of these areas previously managed for commercial forestry outcomes will revert to a broader conservation focus, therefore requiring differing fuel management practices. The net result will need to be factored in to the overall fuel reduction burning budget required by DSE Fire Management.

15.85 The Inquiry supports the findings of the Auditor-General[22] in recommending that DSE… 'fully costs fuel reduction burning activities within its internal budgeting process, allocates appropriate funding levels and allocates the cost of staff employed from other business units; and, in consultation with the Department of Treasury and Finance, considers revised funding arrangements that introduce greater flexibility to allow for differing levels of funding to reflect factors such as seasonal variations.'

15.86 However the Inquiry concludes that theses recommendations are in themselves not sufficient and makes further recommendations.

Recommendations

15.87 **That Government supports the immediate development of financial models to analyse and determine the appropriate level of investment in fire management planning, preparedness and suppression on public land.**

20 DNRE and DTF, The cyclical nature of fire season severity and its impact on the price of fire management services on Victoria's public land, Working Group Report March 2002, page i.
21 ibid., p. 4.
22 *Fire Prevention and Preparedness*, p. 7.

- Since the 1940s, unplanned fires on public land have increased but areas burnt have decreased.
- During this time 'real' expenditure has declined.
- For every $1 spent on fire management, Victoria benefits by $22 in saved assets.

Source: DTF-DNRE Working Party Report 1998

15.88 That the financial models incorporate changes in public land use, particularly '*Our Forests Our Future*', and the subsequent changes in fire management priorities.

15.89 That the financial arrangements incorporate full cost recovery for prescribed burning to be undertaken over a number of weekends utilising Project Firefighters, CFA volunteers and MFESB members.

15.90 That Government reviews the funding for DSE for the 2004-2005 fire season to ensure that appropriate resources are available for fire prevention planning and preparedness.

Roads and Access Tracks

15.91 DSE and Parks Victoria are responsible for managing over 25,000 kilometres[23] of roads and tracks in their various jurisdictions on public land across the State. These are maintained for forestry operations, water catchment management, recreational use and fire management purposes. Each year, prior to the fire season, approximately 16,000 kilometres[24] of fire track network is prepared as part of the pre-fire season preparedness.

15.92 Ready ground access for personnel with machinery, equipment and materials is an essential component in a rapid and safe response to bushfires and to minimise their spread. DSE aims to control 75 per cent of all bushfires at less than five hectares in size.[25] This response target is designed to provide due regard to the land management objectives on, and environmental values in, the public land estate and the economic impacts of fire.

15.93 Achieving this ready access requires maintaining a strategic network of roads and tracks (including bridges), and the construction of additional roads and tracks where necessary to complement the network. Accurate and readily available information is required on the location, condition and accessibility of that fire access network.

23 *Fire Prevention and Preparedness*, p. 136.
24 DSE Fire Management supplied this estimate.
25 DSE draft responses to Inquiry questions, August 2003.
26 *Fire Prevention and Preparedness*, p. 139.

15.94 Submissions to the Inquiry from a range of sources pointed to continuing problems with information about, and access to, suitable well-signposted and well-maintained tracks on public land. The database for that information is reviewed annually but, with the assessment being based on variable knowledge and experience, these assessments remain subjective, making data comparisons problematic.

15.95 To better understand the road access network, the Auditor-General[26] examined the results of a 2002 desktop assessment of the condition of those roads related to forest and fire management. The finding was that approximately 80 per cent of aggregate fire management and forest management roads were rated as in good or fair condition. The Auditor-General's subsequent regional visits to the Dandenong Ranges and Gippsland showed that the condition of some roads described as in poor condition could reduce the ability of fire agencies to respond promptly.

15.96 Load limits were another concern: where some bridges have a load-limit of 5 tonnes, the weight of some firefighting equipment may reach up to 50 tonnes.

15.97 Public road network details are listed in DSE's Fire Protection Plans for each fire district, including the component maintained specifically for fire protection. The Operational Plans list all fuel reduction burns and major works to be performed before the fire season commences. Major works could include road upgrades or other infrastructure (for example, a new fire tower), but would not include blading-off roads and culvert maintenance.

15.98 As stated earlier in Chapter 2, some public land use has changed from State Forests to National Parks and other conservation purposes. It is argued in submissions that this has resulted in the 'effective' closure of a number of roads and tracks on public land to conventional traffic due to a decline in road maintenance, making some roads progressively suitable for four-wheel drive summer use only. This does not appear to be the result of a deliberate change in policy. Further, there are pressures on the existing road and track network from other land management issues, such as weed and pest animal invasion and the provision of recreational four-wheel drive access.

15.99 If the fire agencies are adversely impacted by these changes to the road and track network within the public land estate, other forms of fire management capability may have to be employed to assist the on-ground firefighters to ensure that a bushfire is effectively suppressed – for example, the use of specialised firefighting and rappel aircraft and better detection measures. A reduced dependence on access roads and the subsequent impact on prevention costs will need to be balanced against an increase in the cost of suppression.

15.100 DSE[27] believe there is no evidence that the state of the road and track network contributed significantly to the scale of this year's major fire event. However, the lack of, or poor condition of, road signage was seen as a notable 'debrief' issue and has been identified as a matter requiring consideration.

15.101 DSE is involved in a project (ROADS) over the next two years, commencing in late 2002, to review the strategic road and track management systems.

15.102 The Inquiry supports the findings of the Auditor-General[28] in recommending that:

- 'DSE provide regular, appropriate information on changes to, and the condition of, the fire access network on public land;
- DSE enhance the proposed upgrade of existing systems governing the fire access network by:
  - clarifying system management responsibilities between DSE business entities;
  - identifying and addressing external stakeholder information needs;
  - introducing systematic inspection processes;
  - implementing regular safety audit processes; and
- DSE develop an appropriate and agreed infrastructure management strategy'.

15.103 The Inquiry is of the view that an analysis needs to be completed of both the financial and environmental impacts of developing new roads and tracks during firefighting as compared to maintaining and improving the existing network. This would be an input into any modelling of fire management planning, preparedness and suppression on public land.

15.104 Finally, the Inquiry remains concerned about the high level of anxiety within the community in respect to public land road and track access. Submissions questioned the Government's commitment to continuing access to National Parks and other wilderness and conservation areas. The Inquiry has formed the view that the Government should undertake community consultation on the issue of roads and access tracks on public land.

Recommendations

15.105 That DSE assesses the environmental and monetary cost of establishment and rehabilitation of temporary tracks, per 100km, constructed during firefighting operations, and compare this with the recurrent costs of a program of maintaining existing tracks.

15.106 That DSE includes the costs of tracks, as above, in the development of financial models to analyse and determine the appropriate level of investment in fire management planning, preparedness and suppression on public land.

15.107 That DSE undertake community consultation on policies relating to roads and access tracks on public land, particularly in respect to fire management.

Aircraft

15.108 Aircraft preparedness and response is discussed in Chapter 22 Part D of this report. The Inquiry commissioned an independent consultant report entitled 'A Report on Aerial Fire Fighting Resources' by AVISE. The report was prepared by Capt. Nick Le-Ray-Meyer AM, ATPL, and reviewed by Dr Bob Dannatt DBA, MBA, F Dip. Com Eng., AAvPA, ATPL. The full report is in Appendix VII.

27 DSE responses to Inquiry questions, 20 August 2003. This is based on the joint CFA–DSE debrief.
28 *Fire Prevention and Preparedness*, p. 140.

Conclusion

15.109 It is the finding of the Inquiry that CFA and DSE were appropriately prepared for the 2003-2004 fire season. CFA and DSE are recognised as leading firefighting agencies throughout Australia and overseas. The findings in Chapter 6 and tables in Appendix IV support this view noting that while the number of fires on public land have increased over time the area burnt has declined. The partnership between DSE and CFA has proved effective.

15.110 Further, the emergency services have also had to prepare for and deal with a range of other demands on their resources including the outworking of the Linton Coronial Inquest and terrorism threats. Despite the best will and intention, these activities will impact to some degree on preparation for fire management in this State.

15.111 In the face of changes in government administrative arrangements, an array of agreements between agencies and difficulties in boundary and border co-operative agreements; goodwill and personalities have promoted sound co-operation between the various fire agencies but these remain complex and incomplete. The Inquiry remains concerned that these arrangements are not viable in the longer term and recommendations have been made in respect to these issues.

15.112 The Inquiry commends the high level of acceptance of AIIMS-ICS as the incident management system in place within Victoria for dealing with unplanned fires and encourages the speedy adoption of ICS across the CFA.

15.113 Finally, costs associated with fuel reduction burning need to be better determined and more flexible arrangement put in place to meet regional fuel management schedules on public land.

Regeneration of ecalypt forest four months after the fire.

Chapter 16
Emergency Services Preparedness

Overview

16.1 This Chapter begins with an overview of Victoria's emergency management, emergency response and emergency recovery arrangements.

16.2 We then report on the Inquiry's review of meeting documentation and minutes for relevant emergency management bodies, prior to the 2002–2003 fire season.

16.3 At the end of the Chapter we turn to the important issue of continuous improvement. We report that Victoria's emergency arrangements have been well tested in recent years and are robust. However, we also note that emergency management and emergency services must continue to evolve to stay ahead of local and global changes.

The Development of Victoria's Emergency Management Arrangements

Victoria State Disaster Plan

16.4 The document that forms the basis of today's emergency management arrangements is the Victoria State Disaster Plan (VSDP), also known as DISPLAN. The VSDP was first prepared in the 1960s to resolve problems co-ordinating the State's human and material resources during the significant fires of 1962. Apart from DISPLAN, which did not have legislative backing, the only other arrangements in place for managing significant emergencies involved the fire services, the then Forests Commission of Victoria, and some specific disaster-related responsibilities held by some State Government departments and statutory authorities.

Emergency Management Act 1986

16.5 A number of reviews of Victoria's disaster management arrangements were conducted as a result of the catastrophic Ash Wednesday bushfires that occurred in February 1983. They concluded that the response was not well managed nor co-ordinated and, in November 1983, Cabinet agreed to adopt a provisional set of disaster management arrangements which were embodied in the *State Disasters Act 1983*.

16.6 In June 1985, the then Minister for Police and Emergency Services directed that a working party be formed to report on Victoria's disaster management arrangements, the findings of which were reported to the Minister in October of the same year. The findings of the working party led to the development of Victoria's current emergency management arrangements and the passage of the *Emergency Management Act 1986*.

16.7 *The Emergency Management Act 1986* defines the State's emergency management structure, assigns roles and responsibilities, and provides special provisions for the integrated management of emergencies. The principal objective of the Act is:

'… to ensure that [prevention, response and recovery] are organised within a structure which facilitates planning, preparedness, operational co-ordination and community participation' (section 4A).

16.8 The Act is unique in Australia in that it appoints the Minister for Police and Emergency Services as the Co-ordinator-in-Chief of Emergency Management. This ensures the Government of the day is fully involved in the development of emergency management policy and practice. The Act also provides for the appointment of Victoria Police as co-ordinator of emergency response.

16.9 The operational roles of organisations participating in emergency management are spelled out in specific legislation or charter. For example, the operational roles of the fire services and Municipal Councils are set out in other Acts.

State Emergency Recovery Plan

16.10 The State Emergency Recovery Plan was formalised in 1987 to develop specific arrangements for planning and managing the recovery aspects of emergencies.

16.11 In 1994, the *Emergency Management Act 1986* was amended, the Recovery Plan officially recognised, and the word 'disaster' formally replaced with the word 'emergency' in most usages. More recently, the term 'emergency response' has replaced the term DISPLAN in day-to-day usage.

Fire Disaster Control Unit

16.12 Another outcome of the Ash Wednesday bushfires was the establishment in 1983 of the Fire Disaster Control Unit in the Department of the Premier and Cabinet. The Unit later transferred to the Ministry for Police and Emergency Services and became the Office of the Co-ordinator-in-Chief of Disaster Control. The title changed over the years and in June 2000 became the Office of the Emergency Services Commissioner (OESC), when the position of Commissioner was created in the Act.

Review of Emergency Management Arrangements

16.13 Victoria's emergency management arrangements are constantly tested both operationally and in redefining relationships between the agencies. When tested they are also reviewed to ensure they can better deal with significant emergencies, thereby fostering a culture of continuous improvement. Such emergencies have included the 1993 Northern Victorian floods, 1997 bushfires, Longford explosion and subsequent gas crisis in September 1998, planning for the Year 2000 transition, September 11 terrorist attacks in the United States in 2001 and the extensive 'white powder' hoaxes that followed in Australia. More recently, the Bali bombings in October 2002 and subsequent changes in the global security environment have tested Victoria's emergency management arrangements.

16.14 Victoria's approach continues to develop, in the spirit of that captured by Arnold Howitt[1] of the John F Kennedy Business School at Harvard University, who wrote after the September 11 terrorist attacks that:

> '… well developed emergency management arrangements should include among other attributes, an all hazards and multi agency approach, considered emergency contingency planning, an appropriate incident management system to allow for the direction and co-ordination of workers from different organisations during a disaster, interoperable communications systems and regular and repeated training exercises and simulations'.

Role of the Minister

16.15 The Minister to whom the *Emergency Management Act 1986* is allocated (the Minister for Police and Emergency Services) is the Co-ordinator-in-Chief of Emergency Management.

16.16 The role of the Co-ordinator-in-Chief is to:

(a) Ensure that adequate emergency management measures are taken by government agencies; and
(b) Co-ordinate the activities of government agencies carrying out their statutory functions, powers, duties and responsibilities in taking such measures.

Victoria Emergency Management Council

16.17 The Victoria Emergency Management Council advises the Co-ordinator-in-Chief on matters including the co-ordination of Government and non-government agencies responsible for prevention, response and recovery. Council membership consists of nominees of Government ministers and of non-government agencies. The Act does not specify which agencies should be represented on the council. The Emergency Services Commissioner is the Council's Executive Officer with OESC providing the Council's secretariat functions.

The Emergency Management Arrangements

16.18 The arrangements are built on the nationally accepted 'all hazards, comprehensive and integrated' model of emergency management. *All hazards* means that a wide range of types of emergencies are managed within the arrangements, *comprehensive* means that the management streams of prevention, response and recovery are focal points, and *integrated* means that all agencies make their specialist contributions.

16.19 The emergency management arrangements establish the basis for organisations to relate and work together to achieve the outcome desired – that is, a safer community. In addition to emergency services organisations, all government Departments and all Municipal Councils, there are specific roles assigned to particular organisations such as the Red Cross to carry out the integrative and co-ordinative aspects of emergency management.

1 A. Howitt, 'New York's Preparedness Should Inspire Other Cities to Act' *The Boston Globe* (17 September 2001).

Emergency Response Arrangements

16.20 The Response function is concerned with combating emergencies, and providing rescue and immediate relief services to those affected. Response involves the emergency services, with Victoria Police personnel taking the specific emergency management role of Co-ordinators. Police ensure that response activities are managed and resourced.

16.21 The response arrangements have been developed to act as a natural extension of the agencies' day to day practices on any occasion when two or more agencies are working together. This happens from the level of local incidents such as road rescues, to the most major Statewide flood or bushfire. The *control agency* for each type of emergency is pre-determined, and other agencies work within a management structure. There is no formal activation of the arrangements or declaration of an emergency in response to an event. Escalation from Municipal to Divisional and, ultimately, State-level, occurs automatically according to need and the capacity of each of these levels to resource the event.

16.22 The State level is responsible for obtaining resource support from other States, Territories and/or the Commonwealth when needed (for example, Defence Forces). Exceptions to this principle are local arrangements for mutual aid or cross-border assistance, and Commonwealth operational support in the vicinity of military bases, which can be arranged at the local level.

Multi-Agency Exercises

16.23 Victoria's emergency service organisations and those other organisations with responsibilities under the emergency management arrangements come together in the multi-agency setting at various times throughout the year to exercise the arrangements. Exercises revolve around both the crisis and consequence elements of response and, at a minimum; focus on command, control and co-ordination.

16.24 Depending on the chosen event, exercises will include rehearsing one or more of the Municipal, Divisional or State level aspects of an emergency; the State and Commonwealth arrangements; and/or the interstate arrangements developed between agencies/States.

16.25 The Victorian arrangements have been compared on many occasions to those in other States and Territories of Australia. As a result of the September 11 terrorist attacks, they have also been compared to those in the United States, England, Northern Ireland and parts of Asia. In all cases, the Victorian arrangements have been found to be robust in their constitution and seamless in their application.

Emergency Recovery Arrangements

16.26 Recovery is assisting persons and communities affected by emergencies to achieve a proper and effective level of functioning. Recovery takes place during, immediately following and, often, for some considerable time after an emergency.

16.27 Recovery management is specifically concerned with the:

- **Physical aspects** of restoration and reconstruction of damaged community infrastructure and private housing;
- **Economic aspect** of restoration of productive activity and local employment;
- **Social, financial and psychological aspects** of personal, family and community functioning.

16.28 As with response, a range of organisations provide recovery services in Victoria. Principally, these are Municipal Councils and the Department of Human Services (DHS) through its regional network. DHS has been appointed under the Act as the co-ordinating agency for recovery, and a senior officer is appointed as the State Recovery Co-ordinator. The State Emergency Recovery Plan is the guiding document for recovery management.

Emergency Management Preparation for the 2002–2003 Fire Season

State Emergency Response Planning Committee

16.29 The State Emergency Response Planning Committee held its annual pre fire season meeting on 31 October 2002. Discussions covered the coming fire season including:

- Weather;
- Fire risk forecast;
- Fire agency preparations; and
- Progress of the Fire Refuges working party. This working party is looking into standards for fire refuges, and the development of a pilot community consultation and decision-making process.

State Emergency Recovery Planning Committee

16.30 The State Emergency Recovery Planning Committee held its pre fire season meeting on 19 December 2002. Among other items, agencies reported on pre-planning for the fire season, and community support issues related to the prolonged drought.

Victoria Emergency Management Council

16.31 The Victoria Emergency Management Council held its annual pre fire season meeting on 20 November 2002, at which time the approaching fire season and continuing drought were discussed. The Bureau of Meteorology and key agencies with response and recovery obligations in bushfire emergencies provided readiness updates and discussed possible issues relating to the upcoming season.

16.32 The Bureau of Meteorology also provided information on anticipated weather patterns, expected rainfall and ongoing concerns with the El Niño. The key points of discussion revolved around the 55 per cent likelihood of the summer being warmer on average than would normally be expected, and that rainfall was expected to continue to be below average levels into mid-2003. Both these key points culminated in the Bureau of Meteorology giving advice that there was a strong likelihood that this would lead to a dangerous fire season in 2002–2003.

16.33 The fire services collectively recognised the significance of the Bureau of Meteorology's report and advised of the arrangements underway within and between organisations to prepare for the forthcoming season[2]. They expressed concern about the possible length of the fire season and the management of firefighter fatigue. It was noted that all other States were in a similar situation and this could affect the availability of interstate firefighters.

Continuous Improvement

16.34 The finding of the Inquiry is that Victoria has learnt from careful review and analysis of fire events such as the Ash Wednesday Fires of 1983, the Dandenong Ranges Fires in 1997, and the deaths of firefighters at Linton. Similarly, Victoria's emergency management arrangements have evolved to include learning from other emergency events such as the 1993 floods, the Longford Gas Crisis, recent terrorist attacks in the United States and Bali, and the 'white powder' incidents of 2001.

16.35 The Arthur's Seat chairlift emergency in January 2003 provided an opportunity to further evaluate the State's 'all hazards – all agencies' approach. With the CFA as the lead agency, 200 staff from 10 different organisations were fully involved, including police and emergency services, ambulance, hospitals, Local Government and non- government organisations.

16.36 More formal inter-agency multi-disciplinary teams include the Urban Search and Rescue Team, which have personnel from fire services, Victoria State Emergency Service (VICSES) and the ambulance service. They undertake rescues from collapsed structures. The complex flood warning arrangements for some flood-prone rural communities involve Municipal Councils, Bureau of Meteorology, VICSES, local media, community groups and organisations, and private industry.

2 As noted previously, the three major fire services are Country Fire Authority (CFA), the then Department of Natural Resources and Environment (now the Department of Sustainability and Environment [DSE]and Department of Primary Industries and the Metropolitan Fire and Emergency Services Board [MFESB]).

16.37 Since 1983, fire response has seen significant improvement in integrated operations. In 1983, the Metropolitan Fire and Emergency Services Board (MFESB) was, at best, marginally involved in response to the widespread bushfires. By 1997, MFESB taskforces, under MFESB command, were successfully deployed to assist the CFA in the Dandenong Ranges Fires. During the 2002–2003 bushfires, MFESB appliances and firefighters stepped up to resource CFA fire stations in the outer urban area to enable CFA resources to be deployed as strike teams in the North East and Gippsland. MFESB officers played key roles in Incident Management Teams and appropriately trained MFESB firefighters worked under CFA command on the fire ground – demonstrating a high level of trust and co-operation between the services.

Conclusion

16.38 The Inquiry has reviewed documentation and minutes for the relevant Emergency Management bodies within Victoria. The Inquiry believes that these clearly indicate that the fire agencies were focused on the coming 2002–2003 fire season, had created a heightened level of public awareness, and had fully informed Government, as well as all the other emergency agencies of their preparations, both within and outside of the State. Further, separate consultations and discussions with emergency agencies throughout the period of this review indicated their general sense of awareness and preparedness during the last fire season.

16.39 Having carried out a detailed and intensive review of the fires of 2002–2003, the Inquiry concludes that Victoria's emergency management arrangements are sound, have a continuous improvement focus and compare favourably with international best practice.

16.40 However, no emergency management arrangements are perfect and the risk environment Victoria confronts continues to change. The community's expectations of service from all government agencies – particularly from the emergency services – is also changing.

16.41 Emergency management, and emergency services must continue to evolve to stay ahead of these changes.

16.42 Part E of this report makes recommendations to further strengthen Victoria's emergency management arrangements. The recommendations are made not from a finding that the response to, and recovery from the fires was flawed or mismanaged, but as means of further developing systemic arrangements that will improve fire safety in particular, and public safety in general.

Part D
Term of Reference Two: Response and Recovery

Fire Line
North East Victoria
January 2003 – DSE

Overview of Part D

Briefing of DSE and CFA Crew at Swifts Creek February 2003 - CFA.

In Part C we made recommendations for a new approach to fire management planning that would include both private and public land.

We also made recommendations for better ways to work with the community. That the community can, and should, be an active partner in the preparation for and management of fire has been conclusively demonstrated.

In Part D, we analyse how well the fire agencies responded to the initial fire emergency, in particular, the multiple lightning strikes of 7 and 8 January 2003 (Chapter 17). Chapters 18 to 21 focus on interagency co-operation and co-ordination. We assess the effectiveness of the State's emergency management system and address how well resources were mobilised and how effectively they were deployed. We also focus on community involvement during the fire response and the role of those at the fire line, both paid crews and volunteers. In Chapter 22 we turn our attention to the aircraft operations and the State Aircraft Unit and, in Chapter 23, look at the community's communication needs during the fires and ask if those needs were met.

Part D does not only deal with response issues; in Chapter 24 we address a number of issues relating to the *recovery* from the fires. In particular, we stress that recovery is a task that must take place in parallel to response rather than after the response activities have concluded. The Inquiry also makes recommendations in relation to the need for a case management approach to recovery. This should ensure the work of recovery agencies alleviates rather than adds to the stress experienced by communities who have been impacted by the emergency event.

Strategies and Tactics

Most importantly, in Part D we analyse the effectiveness of the firefighting strategies and tactics employed during the 2002–2003 fires. In Chapter 19 we look closely at the Incident Control System and how it was applied, asking: did the right people make the right decisions at the right time? Because our analysis assumes an understanding of the relationship between strategy development and tactical firefighting some background here is warranted.

A key principle of the Incident Control System is that the Incident Management Team develop the *overall strategy* for the fire, or fires, utilising available intelligence derived from technological and human sources. Those on the fire ground develop the firefighting *tactics* to meet the strategic objectives for the fire.

This accords with command and control systems employed by the military where command sets the *strategic targets* or tasks, and expects front line leaders to develop the *tactics* to achieve them. This approach builds on the very logical view that, providing they are appropriately trained and equipped, those at the frontline are most likely to be aware of terrain, weather, enemy location, condition and number of resources etc., and are therefore best placed to make the correct tactical decision.

We believe the same logic should apply to incident control systems for emergency management in general, and firefighting in particular.

Communication systems and two-way communication protocols are obviously critical components of a successful incident control system. Firefighter safety must, of course, remain a critical priority in the development of both strategy and tactics.

In our Interim Report (attached as Appendix III), we provided some preliminary views on these questions and suggested that local knowledge was not sufficiently utilised in the decision-making processes of some Incident Management Teams.

The initial finding of the Inquiry was that some Incident Management Teams may have applied the incident control system and its attendant procedures and systems too rigidly, or inflexibly. In effect, this limited tactical decision-making by sector commanders and strike-team leaders. Tensions between the fire ground and the Incident Management Teams resulted. Suggestions, recommendations and tactical proposals from the fire ground were in some cases refused outright. In other situations, processes were too slow for suggestions to be approved.

Opportunities to safely attack sectors of the fire were missed.

On many occasions we were told that the recommendations of the Linton Coronial Inquiry about firefighter safety caused firefighting management to be risk averse. This explanation was put forward to explain some of the anger, annoyance and criticism of fire management. The Inquiry does not support this view. The Linton recommendations do not preclude an aggressive attack on fires *when it is safe to do so*. The likely explanation is more complex.

The priority given to firefighter safety is appropriate and apparent to all. While we acknowledge that there may be some sensitivity and, perhaps, some overreaction to the Coroner's recommendations, this is not the only issue to consider. The location of Incident Control Centres, the experience of some Incident Controllers, the application of AIIMS–ICS and other factors, all contributed to the level of criticism of fire management.

Chapter 17
Initial Response to the Fires

Overview

17.1 A critical issue for the Inquiry was the question of whether the fires started by lightning on 7 and 8 January 2003 could have been extinguished before severe fire weather developed on Friday 17 January[1].

17.2 Many of the written and verbal submissions we received from members of the public asked why the fires were not extinguished in the first few days, while they were small.

17.3 It was suggested that weather conditions for the first ten days following the thunderstorm should have permitted a more aggressive initial attack than was initiated.

17.4 There were allegations that a number of reported fires were simply ignored by the Department of Sustainability and Environment (DSE). And there were claims that DSE and the Country Fire Authority (CFA) employed conservative firefighting strategies. These allegations were offered as explanations of why the fires 'got away'.

17.5 The Inquiry analysed the number and location of ignitions over the first ten days of the fires. We considered the nature of the terrain and the ability to access the fires. We assessed the fuel loads and fuel moisture content, and the documented weather conditions. Detailed inspection tours of the fire areas were undertaken, and extensive briefings and discussions held with the firefighters who fought and managed the fires.

17.6 The Inquiry was advised that the fire management strategy immediately after the lightning strikes was to focus initial response on those fires close to, or which may have posed a threat to, community assets – and then to attack the more remote fires.

17.7 It has been suggested, and the Inquiry is inclined to support the view, that it is most unlikely that any pre fire season risk assessment would have justified the resource levels necessary to successfully extinguish all of the lightning strike fires of 7 and 8 January before they became established.

17.8 To do so would have required very considerable resources, including:

- An increased number of appropriate aircraft on standby;
- Heavy equipment;
- Qualified rappel crews; and
- More firefighters with remote-area skills and experience to successfully contain fires through initial attack.

17.9 The Inquiry has concluded that, given the number, location and accessibility of fires caused by lightning strikes, the fuel load available to support fire, the prevailing weather conditions and the suppression resources available, all reasonable efforts were made by DSE and CFA in the first ten days to contain the fires as quickly as possible.

17.10 While there were suggestions that alternative strategies or priorities should have been established, and there are areas where the Inquiry recommends different approaches, it is simply not possible to establish what difference those alternative approaches would have made, once the fires started.

Factors Affecting Initial Attack

17.11 The context in which the fire services prepared for the 2002–2003 summer has been discussed in Chapter 15. In addition to the issues identified there, the Inquiry has been advised that many other factors impacted on the ability of the fire services to extinguish or effectively contain the fires during initial attack. In combination, these factors made DSE and CFA's task extremely difficult.

17.12 These issues are outlined in more detail below.

Fires Already Burning

17.13 A lightning strike on 6 January in far-East Gippsland in the Coopracambra National Park north of Genoa started a fire at Yambulla. This fire had the potential to spread significantly and to impact on large areas of both public and private land. One hundred and eighty DSE, Parks Victoria and Department of Primary Industry (DPI) personnel were deployed to this fire along with eight bulldozers and four aircraft. The personnel deployed included a number of Gippsland-based firefighters, skilled in remote-area techniques, such as rappel.

1 Part A, Chapter 4, The Story of the 2002-2003 Victorian Fire, Provides a synopsis of the major fires during the 2002-2003 fire season.

'If you had wanted to light three fires in the Ovens Fire District that would have caused the most grief, the locations you would choose would be where the Anderson's Peak, Mount Feathertop and Mount Arthur fires started.'

Senior, experienced fire manager, North East Victoria

17.14 This fire was eventually controlled on 11 January and staff were released to other fires.

New Fires that Started on 7 and 8 January

17.15 The dry thunderstorms that crossed the State on 7 and 8 January caused a huge number of lightning strikes, starting fires throughout North Central Victoria, North East Victoria, Gippsland, the Australian Capital Territory (ACT) and New South Wales (see Chapter 4).

17.16 The fires in the ACT eventually burnt into Canberra.

17.17 The Inquiry was advised that the fires that started on 7 January in North Central Victoria around Bendigo were detected and extinguished quickly by DSE and CFA crews. Many fires that started on 7 and 8 January in North East Victoria were also discovered very quickly and, by 10 am on 8 January, 14 fires had been detected. As the day progressed and the storm continued to move east, new fires were started. By midnight on 8 January, more than 80 fires caused by lightning had been detected on public land.

17.18 Records indicate that a large number of fires were reported over a comparatively short period of time but, because of cloud obscuring some areas of the Alps and the remote nature of some of the country affected by thunderstorms and lightning, not all fires were detected on the first day. Similarly, it was not possible to confirm the location of all the reported fires.

17.19 A number of additional fires were detected on Thursday 9 January.

17.20 Figure 17.1 shows the distribution of the lightning strikes detected after the passage of the thunderstorms through eastern Victoria. This map gives some indication of the number, distribution and location of the early fires, and suggests the scale of the task confronting the fire services.

17.21 In addition to these fires, on 8 January the CFA attended a further 83 fires started by lightning and other causes, and 78 other incidents across the State. This had a significant impact on the availability of CFA firefighting crews, particularly in North East Victoria and Gippsland.

17.22 DSE and CFA policy is to attack new fires as soon as they are detected. Accordingly, those fires that began earlier in the day were the first to have resources deployed to them. As new outbreaks were detected, fire managers were faced with a number of complex and difficult decisions. They needed to set priorities for the allocation of firefighting resources and needed to redirect resources already deployed to existing fires.

17.23 DSE began moving firefighters from the west of the state to North East Victoria and Gippsland as the day progressed. The Inquiry was told that the distance travelled by these crews is one explanation for the time it took to deploy additional personnel to the newly-detected fires.

Number of Fires Contained on 8 and 9 January

17.24 Of the more than 80 fires in North East Victoria ignited by lighting on 8 January, 40 were either contained or under control by late afternoon on 9 January.

17.25 Table 17.1 summarises the resources deployed to the fires on 9 January by DSE, Parks Victoria and DPI.

Figure 17.1: Total Lightning Strikes – Eastern Victoria.

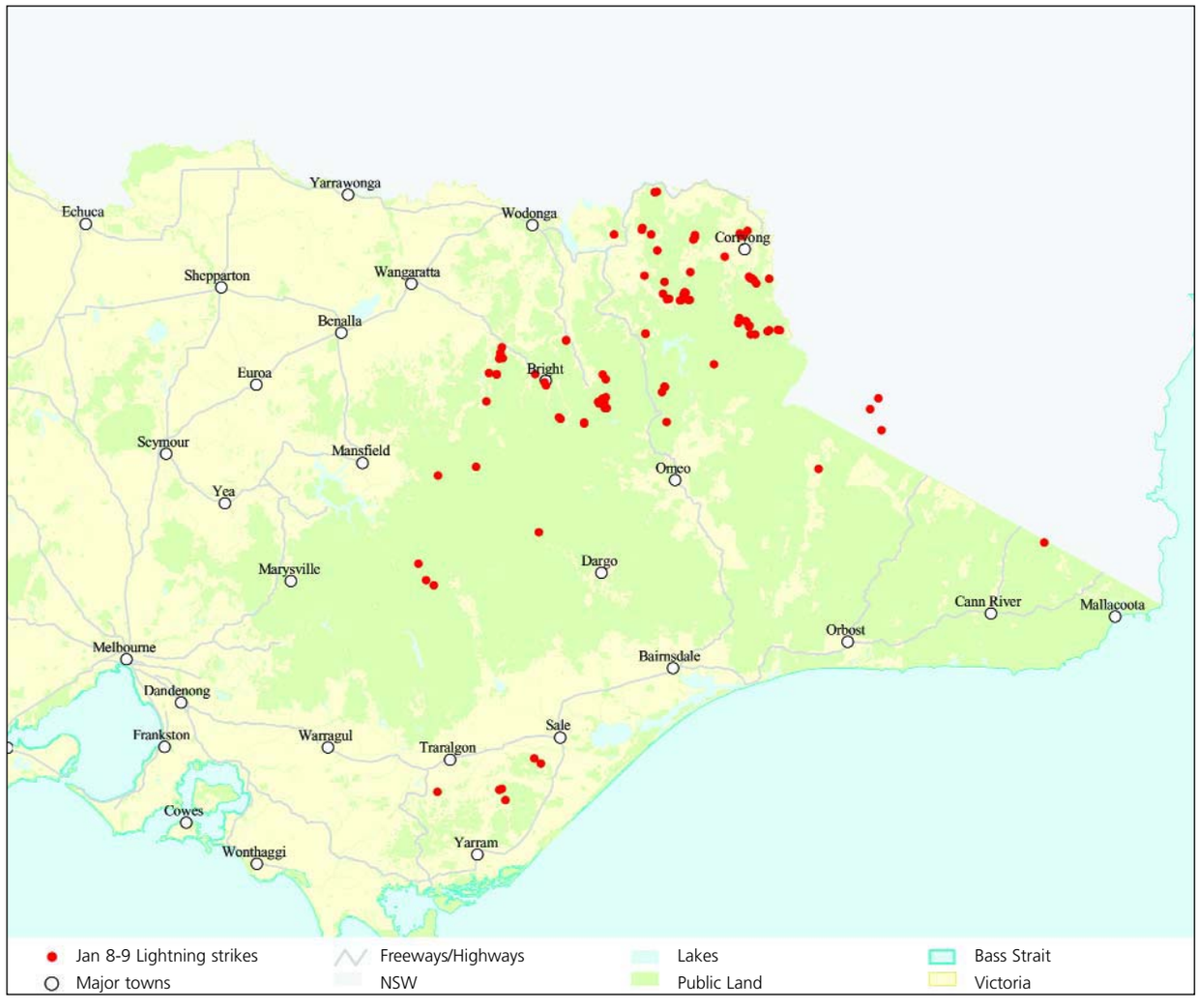


Table 17.1: Number and Location of Fires and Firefighters Deployed, 9 January 2003

Incident Management Team	Number of Fires	DSE, ParksVic., DPI
Cann River - Yambulla Fire	1 fire	87 Firefighters
Mansfield	4 fires	30 Firefighters
Ovens	18 fires	203 Firefighters
Tallangatta/Corryong	30 fires	106 Firefighters
Heyfield	11 fires	81 Firefighters
Erica	5 fires	24 Firefighters
Yarram	2 fires	99 Firefighters
Swifts Creek	5 fires	24 Firefighters
Total	76 fires	654 Firefighters

Number of Fires Attended by CFA

17.26 In submissions to the Inquiry and during public consultations, a number of people suggested that more CFA resources could have been deployed to the fires in the critical first few days.

17.27 Information provided to the Inquiry shows that CFA resources were heavily committed to fire suppression on 8 January, responding to both the lightning strikes and other fires and emergencies elsewhere across the State.

17.28 The most critical resource required for fires started by lightning is skilled and experienced remote-area firefighters. CFA advice indicates that only a small number of volunteer firefighters have those skills.

17.29 Table 17.2 provides an indication of the CFA commitment to the fire suppression effort on Thursday 9 January. In addition to attending fires and other incidents on private land, CFA deployed considerable resources to assist DSE on public land.

Number of Fires Contained by Saturday 11 January

17.30 Analysis of records indicates that by Saturday 11 January, three days after the thunderstorms had moved through Victoria, only 17 of the more than 80 fires that had resulted from lightning strikes were still 'going'. In addition, the fire in far-East Gippsland at Yambulla had been contained.

17.31 The Inquiry is satisfied that this analysis shows a concerted effort on the part of the firefighting agencies to contain the fires. Those fires that were not contained are discussed in more detail below.

Availability of Appropriately Skilled Crews

17.32 A number of the fires that started on 7 and 8 January were burning in very steep and rough terrain. DSE advise that firefighting in this environment is dangerous and demanding. Personnel undertaking this type of firefighting must be very fit and appropriately trained and equipped. The personnel who supervise these operations must have appropriate experience and understanding of fire behaviour in these conditions.

17.33 Given that these personnel are often the first to be deployed, many crews, including rappel crews, were engaged in fighting the Yambulla fire in East Gippsland on 8 January. The deployment of all four specialist DSE rappel crews at the start of the fires is described below.

17.34 The Number 1 North East Rappel Crew was deployed to the Anderson's Peak fire (Mt Buffalo) during the morning of 8 January and remained overnight. Direct attack was unsuccessful and this crew was then redeployed to cut a helipad to ferry in further crews.

17.35 North East Rappel Crew 2 was deployed to the Catherine River fire, south-east of Mt Buffalo during the morning of 8 January and remained overnight. The rappel crew contained the fire overnight but it subsequently crossed control lines several times during the following days. It was finally contained and declared safe on 16 January.

Table 17.2: CFA Deployment to Fires, by Location, 9 January 2003

Incident Management Team	Fire	CFA Role[2]
Ovens	Fillinos – lower slopes of Mt Buffalo	Support
	Bakers Gully – south of Bright	Support
	Bill Hick Track – south-west of Dederang	Support
	Glue Pot – Kiewa Valley	Control
	Mountain Creek – north-east of Mt Beauty	Control
	Sandy Creek – Ovens Valley	Support
Corryong	Mt. Mittamatite – north of Corryong	Control
	Elliot Ridge – near Corryong	Support
Heyfield	Mt Bulldog – north of Heyfield	Support
	Emu Track (Holey Plains State Park)	Support
Yarram	Tom's Cap – south of Traralgon	Support
	Little Tower Rd – south of Traralgon	Support
	Betty's Rd – south of Traralgon	Support
	Old Rosedale Rd – south of Traralgon	Support
Erica	Rules Rd – north of Erica	Support
Swifts Creek	Frosts – near Omeo	Support
Other Incidents	115 other incidents attended including 55 fires	Support

17.36 Gippsland Rappel Crews 1 and 2 were both working on the Yambulla Fire, north-west of Genoa, during the morning of 8 January. When the scale of lightning activity in North East Victoria became evident, the DSE State Fire Co-ordinator arranged for both crews to be released from Gippsland.

17.37 Gippsland Rappel Crew 1 was transported by fixed-wing aircraft to the Upper Murray and deployed to the Cavalier Spur fire early on the morning of 9 January. Direct attack was unsuccessful. This fire was initially contained by indirect attack, but was overrun when weather conditions deteriorated.

17.38 An escaped fire from the Yambulla Fire destroyed equipment and harnesses belonging to Gippsland Rappel Crew 2 on the evening of 7 January, making the crew unavailable for rappel work. When released from Yambulla on 8 January, the crew was transported to Heyfield to re-equip. This task was completed by the afternoon of 9 January, but all rappel helicopters were committed to higher-priority activities during that afternoon. The crew was deployed to the Lazarinin Creek fire, north of Heyfield, in the early morning of 10 January to contain a significant escape from a fire line. This fire was contained to 50 hectares on 11 January.

17.39 Hover Exit Crews[3] 1 and 2 were both dispatched from Horsham/Halls Gap on the afternoon of 8 January and deployed to various fires in the North East on 9 January. These crews were deployed as ground crews as no fires could be identified as suitable for access by 'Hover Exit'.

Availability of Appropriate Aircraft

17.40 Demand for aircraft resources during the initial fire response was beyond the State's supply capacity. Given the number of fires and their geographic dispersion it was not possible to deploy aircraft to all the fires that warranted air support. As indicated earlier, aircraft were already committed to firefighting operations at the Yambulla fire in East Gippsland.

17.41 In North East Victoria, there was a conscious decision to deploy some of the available aircraft to reconnaissance tasks to assist fire managers to locate and report on the status of the fires. This was considered necessary to enable an informed decision on priorities for the fire attack. Other aircraft were engaged in aerial fire attack.

2 Where CFA is the 'support', DSE is the control agency and vice versa. CFA is the control agency when the fire is principally on private land and DSE when the fire is principally on public land. CFA records for the number of firefighters at each fire were not available.

3 Hover Exit Crews are involved in the direct transfer of specialist fire personnel and equipment from a hovering helicopter to the ground. They are used when ground vegetation or terrain prevents a helicopter from conducting a full skid landing.

17.42 Later on 8 January, localised extreme weather had an impact on aircraft operations and availability when wind speeds grounded the aircraft operating from the Mt Beauty airstrip.

17.43 After reviewing available records, the Inquiry has concluded that, despite the significant demands for aircraft on 8 January, there were some aircraft not used to best effect. A small number of aircraft were not deployed to aerial fire attack when it may have been possible to do so. The Inquiry has been unable to conclusively determine why this occurred. However, the explanation may be that those managing the response to the fires were more focused on the task of identifying the location and potential of the new fires.

17.44 Some have argued that had these aircraft been deployed to support ground crews in initial fire attack, the spread of some fires may have been limited. This cannot be conclusively established.

17.45 Based on the information available to the Inquiry, and based on the issues discussed in Part B relating to fire intensity and fuel loads, we are of the view that the small number of aircraft not immediately deployed to firefighting did not compromise the overall outcome.

National Aerial Firefighting Strategy

17.46 During the fires in New South Wales in 2001–2002, the Commonwealth Government offered to facilitate the establishment of a *National Aerial Firefighting Strategy* to better share and co-ordinate resources. The Commonwealth Minister for Regional Services, Territories and Local Government asked the Australasian Fire Authorities Council (AFAC) to develop a suitable resource assessment and management strategy.

17.47 This strategy was submitted to the Commonwealth Minister in August 2002, but was not approved before the 2002–2003 fire season. While some additional resources were made available, mainly to New South Wales, they fell well short of the resources proposed by AFAC. Victoria, New South Wales and the Commonwealth jointly funded further aerial resources during the fires in January 2003. Arranging additional resources during a fire season is slow, cannot be guaranteed, is considerably more expensive than arranging them at other times, and resources are sometimes unavailable.

17.48 It is impossible to quantify how much difference the proposed additional resources in the AFAC model would have made to the fire situation had they been available when the dry storm swept across South East Australia in January 2003. What can be said is that aerial resources play a crucial role in holding fires in the early stages until on-ground firefighters are available for direct attack, or in direct attack on small fires in remote and difficult terrain. There is also substantial research evidence from recent fires supporting the effectiveness of heavy water bombers in firefighting at the urban-rural interface.

17.49 After the May 2003 national meeting of Ministers with responsibility for emergency services, a communiqué was released calling on the Federal Government to support an appropriate national aerial firefighting strategy as a matter of urgency.

17.50 Chapter 22 provides further discussion in relation to aircraft operations throughout the 2002–2003 summer.

Recommendation

17.51 That an appropriately resourced, national aerial firefighting strategy is urgently required, and that the Victorian Government make representations to the Commonwealth to support the Australasian Fire Authorities Council recommendations.

Need to Maintain a Statewide Reserve for New Outbreaks

17.52 As discussed in Part A, most of Victoria was assessed as being at high to extreme bushfire risk during the summer of 2002–2003. The fire services have an obligation to all Victorian communities to provide and maintain an appropriate level of fire cover and response capability, Statewide. For this reason, it was not possible to deploy all resources in the immediate and near vicinity of a fire, until back-up or ancillary services were put in place that were capable of protecting threatened or affected areas in the event of additional outbreaks.

Priorities to Protect Communities and Assets Immediately Threatened

17.53 In determining where to deploy resources in the initial response to the fires on 8 January, the agreed Fire Control Priorities[4] were activated and fires that presented an immediate danger to community and private assets were given highest priority. Obviously, the fires that had the greatest number of crews and equipment allocated were those with the potential to immediately impact on private property.

17.54 Fires that started on 8 January in this category were:

- The Tom's Cap fire in the Mullungdung State Forest, south east of Traralgon;
- The Emu track fire in the Holey Plains State Park, west of the Longford township near Sale;
- The Mount Mittamatite fire, north of Corryong;
- The Cravensville fire in the Tallangatta Valley;
- The Cavalier Spur fire, north west of Harrietville; and
- The fires in the Buffalo River Valley, south west of Myrtleford.

The Fires that Were Not Contained

17.55 A number of fires that started from lightning strikes on 7 and 8 January were not contained in the first ten days. These fires eventually spread and joined to become the North East Victorian and Gippsland fires.

17.56 DSE have provided the following details of these fires.

Anderson's Peak Fire

17.57 This fire started in a rugged and inaccessible part of the Mt Buffalo plateau. The fire originated from lightning in Alpine Ash fuels[5] and the first arriving rappel crew reported extreme fuel hazard[6], rapid forward rate of spread and spotting activity.

17.58 Because of this fire behaviour, the rappel crew abandoned direct attack and began building a helipad to allow aircraft to ferry in additional crew if conditions eased. This would allow for another attempt at direct attack on the fire. The conditions overnight did not ameliorate and, by morning, the fire had increased in size to 100 hectares. Despite a number of attempts at direct attack, the fire continued to spread.

Mt Arthur Fires

17.59 Three fires in close proximity started on Mt Arthur late on the morning of 8 January. Direct attack was undertaken soon after the fires were reported. However, by late afternoon the three fires had already joined and covered approximately 100 hectares. The crews were redeployed to other fires that had started and were posing a more immediate threat to communities and private assets. Direct attack was attempted again on 9 January, however, stronger winds in the afternoon resulted in the fire escaping control lines.

Mt Feathertop Fire

17.60 This fire started in Alpine Ash forest described by the first arriving crews as having high levels of elevated and bark fuels. The fire was burning fiercely on a steep slope. Despite initial direct attack, the fire had covered 10 hectares by nightfall with strong winds reported at a nearby fire. The risks to firefighters became significant and they reverted to construction of control lines rather than direct attack.

17.61 Direct attack was attempted again on 9 January with aerial resources supporting the firefighters on the ground. By 3 pm that day, crews reported that the fire was now 150 hectares in size and they were experiencing intense and erratic fire behaviour. In these circumstances they were unable to contain the fire. The majority of the crews were redeployed to other fires where the probability of success was higher.

Razorback Fire

17.62 This fire was reported late on 8 January and was burning in mixed-species forest. At this time, available crews were already committed to the fires that had started earlier in the day, many of which were posing an immediate threat to private property. The Razorback fire was in a remote area of the forest with difficult access through very rugged and rocky terrain. The time taken to get crews on scene meant they arrived after dark.

4 See Chapter 15, Part C.
5 Alpine Ash is a 'no fire' vegetation type. This means fuel reduction burning is not possible as a means of managing fuel loads.
6 Overall Fuel Hazard Guide, Department of Natural Resources and Environment, May 1999. Discussed in Chapter 7.

17.63 The first arriving crew walked into the fire during the night to undertake reconnaissance. By the time they arrived, the fire was already in excess of 10 hectares. Efforts were made to contain both the Razorback fire and another nearby fire using ground crews and large bulldozers. However, the fire jumped control lines on 11 January and continued to spread, despite a number of further efforts to contain it.

Pinnibar Fire Complex

17.64 A number of lightning strikes in the Mt Pinnibar area started fires in Alpine Ash and mixed-species forest with extreme fuel loads. Direct attack had begun by mid-afternoon on 8 January with the fire covering approximately 10 hectares by 7 pm that night. Additional fires were reported in the area just before nightfall on 8 January in very remote and inaccessible country.

17.65 Direct attack with fire bombing aircraft was undertaken early on 9 January. The nearest airbase to these fires was 50 minutes flying time for fixed-wing fire bombers, and the delay between loads appears to have limited the effectiveness of this strategy.

Conclusion

17.66 Records show that, in the past, large numbers of fires have been caused by dry storm events. However, the fires of 7 and 8 January may well have been unprecedented – at least in terms of the number of lightning strikes causing fires.

17.67 The Inquiry finds that, given the context of the drought, prevailing weather conditions, and the forest fuel load available to support fire, the initial response to the fires resulting from the dry thunderstorms that swept across south eastern Australia on the 7 and 8 January was, overall, professional and timely. Resources were generally deployed with speed and precision and the outcomes of this are evident. Within the first few days, most of the more than 80 fires were extinguished or under control.

17.68 We have not found any incident or events that indicate systemic failures on the part of the agencies responding to the fires. Neither could we conclude that any incident or event significantly impacted on the end result.

17.69 However, there has been criticism in some areas and opportunities for improvement are certainly available.

17.70 In retrospect, there may have been some opportunity for a different approach to the deployment of aircraft in the early stages – although, using aerial resources to fight the fire was balanced against the need to gather intelligence on the number and location of lightning strikes. In any emergency, the initial response occurs in an environment where the Incident Controller and agency Co-ordinators are still gathering the necessary information to understand the complete situation confronting them. In this situation, it is understandable if intelligence gathering is given some priority.

Chapter 18
The State's Emergency Management Arrangements in Action

Overview

18.1 As described in Part C, Victoria's emergency management arrangements identify the control agencies for different types of emergencies and outline the planning arrangements for dealing with them. They also identify arrangements to ensure effective co-ordination of all agencies involved in the response to, and recovery from, a given emergency. And they identify arrangements that will ensure adequate resources are available to manage the emergency.

18.2 These arrangements provide the framework in which the emergency service organisations and other responsible agencies operate.

18.3 The *Emergency Management Act 1986* (the Act) is clearly intended to provide the multi-agency framework for Victoria's emergency management arrangements. Internal agency systems and structures, including incident command and control systems, must be structured so they can operate within, and be complementary to, the provisions of the Act and the Emergency Management Manual Victoria.

18.4 The Inquiry believes that agencies must ensure a clear focus on the consequences of an emergency on the community. In addition, both response and recovery agencies must ensure their incident control and operational management systems provide a seamless and consistent approach.

18.5 The Inquiry has assessed whether Victoria's emergency management arrangements provided an effective management framework during the 2002–2003 fires. Were these arrangements an appropriate method for agencies to provide their service to the community? Were opportunities for improvement identified through this experience?

18.6 These questions are explored below.

Municipal Emergency Co-ordination

18.7 During the North East and Gippsland fires, the municipalities of Alpine, Indigo, Towong and East Gippsland established Municipal Emergency Co-ordination Centres (MECCs). The Inquiry believes that the effectiveness of these centres was reduced by the limited support provided by the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA).

18.8 DSE did not provide a liaison officer for any of the MECCs. The lack of effective liaison between the Incident Control Centres and Municipal Emergency Co-ordination Centres restricted the flow of information between these facilities and their communities and, in some situations, duplicated the processing of requests for resources.

18.9 We commend the work done by municipalities in establishing and operating MECCs while maintaining their own operational capabilities. In particular, the staffing of MECCs over such a protracted period was a challenge. In order to meet all their obligations, Municipal Councils had to be innovative in staffing and maintaining the co-ordination centres. The support of community volunteers was critical to ensuring councils maintained their obligations and capability.

18.10 A number of councils expressed concern at the difficulty of staffing and maintaining MECCs. They suggested that siting the MECC away from council buildings would remove some of the pressure without limiting the responsibilities of councils to play their legislated role.

18.11 Much of the information gathered by Incident Management Teams and MECC staff is fundamental to the management of recovery. It is also apparent that many recovery tasks need to be initiated as soon as it is safe and practicable to do so. The Inquiry is of the view that response and recovery are processes that should be implemented in parallel, rather than sequentially. The planning undertaken at municipal level should reflect this to ensure that emergency management planning and structures encourage and support concurrent response and recovery.

Recommendations

18.12 That Incident Control Centres and Municipal Emergency Co-ordination Centres be collocated, wherever practicable.

18.13 That DSE and CFA ensure that:

- When a Municipal Emergency Co-ordination Centre is established in response to a fire, an appropriately experienced, trained and briefed officer of the control agency is appointed as liaison between the Municipal Emergency Co-ordination Centre and the Incident Control Centre; and
- There are appropriate training regimes in place to provide officers with the skills necessary to perform the role of Emergency Services Liaison Officer in the Municipal Emergency Co-ordination Centre.

18.14 That DSE and CFA work in co-operation with the Municipal Emergency Response Co-ordinators to develop and conduct joint exercises that practise the skills and test procedures for operations of the Municipal Emergency Co-ordination Centre, Municipal Recovery Centre and Incident Control Centres.

Evacuation

18.15 Section 4.6 of the Emergency Management Manual Victoria explains the process to be followed for evacuation during emergencies. Under Victorian legislation, a person with a financial interest in a property cannot be forced to evacuate that property. The control agency for the emergency has responsibility for recommending that evacuation should occur where the magnitude of the event warrants it. Victoria Police then carry out the evacuation process in consultation with the control agency.

18.16 Both DSE and CFA have agreed that individuals must make their own decision to 'stay or go' based on plans they have developed for their property and their own personal safety. Analysis following fatal bushfires indicates that, for well-prepared individuals, fleeing at the last minute as fire approaches can be more dangerous than staying to protect the property. (We discuss this in the context of community preparedness in Chapter 13.)

18.17 DSE and CFA's position is that it is preferable for well-prepared and able-bodied people to take refuge in a well-prepared home, and to defend that home during the passage of the fire. People who believe they are not adequately prepared, or who feel they would not cope with the trauma of a bushfire, are encouraged to leave early when they become aware that a fire may impact on them.

18.18 The Inquiry supports the position of DSE and CFA on this issue and notes that other States and Territories have adopted this approach. The Victorian approach was also endorsed in the findings of the McLeod Report[1] into the Australian Capital Territory (ACT) fires.

18.19 The Inquiry was made aware of a small number of instances where, apparently on their own initiative, Victoria Police members encouraged some residents in fire-affected communities to evacuate, without any recommendation from the Incident Controller. These actions caused unnecessary concern and confusion among residents and, in one case, was contrary to the fire safety plan established by the residents and endorsed by CFA prior to the fire.

18.20 In Victoria these were isolated events. However, media coverage of the ACT experience and the different legislation applying to evacuation in other States could lead to further confusion. The issue is of sufficient importance to warrant some refresher training for police members.

Recommendation

18.21 That Victoria Police ensure all police members understand the Victorian legislation in relation to evacuation, and that any decision to recommend evacuation remains with the Incident Controller.

Divisional Emergency Co-ordination

18.22 The Victorian emergency management arrangements provide for the development of Divisional Emergency Response Plans and the establishment, when appropriate, of Divisional Emergency Co-ordination Centres. These are the responsibility of the Victoria Police Divisional Emergency Response Co-ordinator. A number of issues arise from the arrangements put in place to manage the 2002–2003 fires.

1 R. McLeod, *Inquiry into the Operational Response to the January 2003 Bushfires in the ACT*, 2003

18.23 Having said that, the efforts to establish effective co-ordination of the response, both in North East Victoria and Gippsland, deserve acknowledgement and praise. When considered in the context of responses to major emergencies in the past, there were relatively few difficulties that were not overcome. Credit for this is due in no small part to the efforts of senior agency personnel who established communication and liaison protocols, particularly the police Divisional Emergency Response Co-ordinators at Wangaratta and Bairnsdale.

Integrated Multi-Agency Co-ordination Centres

18.24 In order to establish appropriate joint co-ordination of their agencies' resources at a regional level, DSE and CFA established two Integrated Multi-Agency Co-ordination Centres (IMACCs) at Benalla and Traralgon. The IMACCs were established to resolve co-ordination problems identified during the bushfires.

18.25 The stated role of each IMACC (within its geographic area of interest) was to:

- Provide a strategic overview of all facets of the incident;
- Provide strategic resource co-ordination between incidents;
- Provide strategic incident modelling and predictions;
- Co-ordinate Incident Action Plans;
- Monitor Incident Management Teams; and
- Provide strategic reporting to State arrangements.

18.26 This was the first time DSE and CFA had established such facilities. The task of co-ordinating resources and overseeing broader strategy for the Incident Control Centres is normally undertaken at CFA Regional Emergency Co-ordination Centres and DSE Regional Fire Co-ordination Centres.

18.27 Three issues relating to the IMACCs are worthy of comment:

1. While the IMACCs were judged as effective by the combating agencies, the Inquiry believes the very need to establish such centres demonstrates a gap in DSE and CFA's planning for regional co-ordination.
2. An unintended consequence of these centres was a degree of confusion within DSE and CFA operational structures. More importantly, their existence created confusion within the wider emergency management arrangements: IMACCs were a new structure that the Police Co-ordinator and other supporting agencies had to accommodate, but were unfamiliar with.
3. The IMACCs did not form effective relationships and communication links with the Municipal Emergency Co-ordination Centres and this resulted in delays in information becoming available and, at times, confusion in the accountabilities for locating resources for fire suppression activities.

18.28 DSE and CFA's assessment is that such centres were required. CFA's submission to the Inquiry also promotes the development of permanent strategic co-ordination centres across the State. Given this, the Inquiry is of the view that a clear gap in current planning exists.

18.29 However, any development of such facilities or functions must be undertaken with consideration of existing emergency management arrangements. Consequently, any new structures should include the needs of all response agencies and the requirements of Divisional Emergency Co-ordination.

Recommendations

18.30 **That existing DSE and CFA regional co-ordination arrangements be reviewed and any changes, such as the continued use of Integrated Multi-Agency Co-ordination Centres, be reflected in the Victorian emergency management arrangements.**

18.31 **That Victoria Police, CFA and DSE review the relationship between fire service regional co-ordination arrangements and Divisional Emergency Response Plans and that any changes be formalised in the emergency management arrangements.**

State Level Co-ordination of Emergency Response

18.32 Currently, DSE, CFA, the Victorian State Emergency Service (VICSES) and the Metropolitan Fire and Emergency Services Board (MFESB), all maintain separate State Emergency Co-ordination/Operations Centres based in metropolitan Melbourne.

18.33 Large fire events managed by multi-agency Incident Management Teams may be co-ordinated at a regional level by an Integrated Multi-agency Co-ordination Centre, but managed separately at the State level.

18.34 The need to staff and operate the State-level centres, and to establish effective co-ordination between them, placed a significant burden on the combating agencies during their response to the North East Victoria and Gippsland fires. Effective communication relied on a complex process of briefings, teleconferences and liaison.

18.35 The Inquiry is of the view that the separation of key personnel at the State level does not provide for effective co-ordination of joint agency response. Furthermore, the duplication of resources to sustain these separate centres cannot be justified.

18.36 Maintaining separate facilities means the opportunity is lost for personnel from the various services to work together on a day-to-day basis and to take part in planning activities, joint training and exercises. Yet when an emergency arises, these personnel are expected to operate together for extended periods, often under stressful circumstances. Maintaining separate State-level operational facilities to manage resource deployment, strategy development and communication with key stakeholders, creates a number of problems.

18.37 First, the information technology systems employed by the agencies are different. This can restrict the ability of officers to access and share available data, and can hide any discrepancies in information. Given that this information is the basis of joint decision-making by the agencies, it can affect the quality of decisions taken.

18.38 Second, the ability to inform key stakeholders, especially the community and Government, on the status of an emergency becomes complex due to the need to ensure consistency of message across two or more response agencies. The accuracy and timeliness of information flow is at risk.

18.39 Finally, there is limited ability for key personnel in the decision-making process to resolve issues face-to-face. Agencies currently rely on teleconferencing or meetings (which require travel). This is inefficient and inhibits the effective process of communication and decision-making given that decisions often have critical timelines imposed by numerous external factors.

18.40 The extent and duration of the 2002–2003 fires placed a huge burden on the agencies responsible for managing these events. In particular, sustaining the staffing in Incident Control Centres, IMACCs and the State Emergency Operations Centres proved a huge challenge. Assistance was sought (and received) through the Victorian emergency management arrangements to source personnel from Victorian government departments who could assist at all levels of emergency management. This whole-of-government approach to resourcing the management of major emergencies was a significant factor in sustaining the effort for the duration of the fires.

18.41 The Victorian Government has already identified this problem and directed that a review of emergency operations centres be undertaken with a view to exploring opportunities to rationalise and reduce duplication.

Recommendations

18.42 **That a single state-of-the-art all hazards State Emergency Operations Centre be established for Victoria. This could, if necessary, be implemented in stages, initially incorporating DSE, CFA, MFESB and the State Aircraft Unit.**

18.43 **That the options of collocating the State Emergency Response Co-ordination Centre with the new State Emergency Operations Centre be explored.**

18.44 **That the State Emergency Operations Centre develop and maintain strong and close links with the State Emergency Response Co-ordination Centre if collocation is not possible.**

Co-operation Between Agencies

18.45 The relationship between DSE and CFA, and their ability to integrate their planning and firefighting operations, has been the subject of scrutiny over many years and has attracted attention in numerous reports. Provisions under section 16 of the *Emergency Management Act 1986* specifically address this issue.

18.46 There is a clear need to maintain a strong ongoing relationship between the two key agencies. The preparation and annual review of the DSE–CFA Co-operative Agreement is a response to this need. The Inquiry views the development of such an Agreement as a fundamental requirement for effective joint operations between DSE and CFA.

18.47 The evidence put before the Inquiry indicates that, overall, the working relationships between all agencies deployed in response to the fires, in particular DSE and CFA, were a significant improvement on past experiences. Numerous testimonials – in submissions and during public consultations; in discussions with DSE and CFA – praised the effective operations at Integrated Multi-Agency Co-ordination Centres, Incident Control Centres and on the fire line.

18.48 However, there were some instances where the working relationship between DSE and CFA personnel was not effective. In particular, information provided by personnel involved in the response to the Big Desert fire in December highlighted a number of occasions where communication between the two agencies was ineffective. Concerns were also expressed in South Gippsland about the management of the fire in the Mullungdung State Forest, where there were disputes in relation to the strategies applied; and in far-eastern Victoria, in relation to the management of the fire in the Deddick Valley.

18.49 These submissions highlight that the development and maintenance of effective working relationships between emergency management agencies is an ongoing priority. The Co-operative Agreement between DSE and CFA, the Incident Control System, the development of holistic Municipal Fire Management Planning and the Victorian emergency management arrangements provide the foundation for developing and maintaining these relationships.

18.50 There are, however, a number of specific initiatives that can be taken at both State and local level which will promote more effective co-operation between Victoria's emergency response agencies.

18.51 There is a need to further develop relationships between agency personnel and the volunteers of all fire agencies. Improving the understanding of the capabilities, principles and systems under which different agencies operate should be a priority for all involved. The Inquiry believes that, where practicable, CFA personnel (paid and volunteer) and, perhaps, MFESB firefighters, should be invited to take part in prescribed burns on public land. This will further develop understanding, trust and confidence among firefighters, fire ground supervisors and Incident Management Team members.

Recommendations

18.52 **That the *Emergency Management Act 1986* be amended to require the development of agreements that describe joint operational arrangements between emergency response agencies.**

18.53 **That, wherever possible, Incident Management Team members from DSE, CFA and MFESB who are likely to be deployed together to manage fire, should train and exercise together.**

Deployment of Metropolitan Fire and Emergency Service Board Personnel

18.54 The fires of 2002–2003 saw the most significant deployment ever of MFESB firefighters outside the Melbourne Metropolitan Fire District. MFESB firefighters and vehicles stepped up into CFA fire stations in the outer suburbs of Melbourne for an extended period to allow CFA officers and firefighters to undertake long-term deployments in North East Victoria and Gippsland.

18.55 Appropriately trained MFESB firefighters and officers were also deployed as members of CFA strike teams for a number of tours of duty and served in Incident Management Teams.

18.56 This level of co-operation had a number of important outcomes:

- Continuity in the provision of fire and emergency response capability for the whole of the State;
- Development of skills among MFESB officers and firefighters;
- Improvements in understanding between firefighters from MFESB and CFA in relation to their roles; and
- Strengthening of the bonds between the emergency services.

Recommendation

18.57 **That the MFESB continue to give priority to appropriate bushfire training for its firefighters.**

Deployment of Victoria State Emergency Service Personnel

18.58 VICSES volunteers were also extensively involved in the response to the fires, undertaking a number of traditional roles such as tree clearing, provision of support to Victoria Police and municipal co-ordination. VICSES also undertook a number of new roles including support on the fire ground, various roles within Incident Management Teams, and support to logistics and staging area operations. There were some initial difficulties in relation to these deployments in that insufficient VICSES volunteers had received training in bushfire safety prior to the 2002–2003 fires. CFA Training Officers provided the necessary training for approximately 100 VICSES personnel who were to be deployed, however, this placed a heavy burden on the trainers as the instruction was provided at the height of the fires.

18.59 VICSES support and involvement could have been much more extensive if more volunteers had received appropriate training prior to the fires.

18.60 There were also times when VICSES volunteers were mobilised to North East Victoria or Gippsland, then waited for significant periods of time before being deployed or tasked. While it is hard to be too critical, more attention needs to be given to ensuring that where volunteers are called and leave their employment to participate in an emergency, they are appropriately tasked as soon as possible and not required to wait for long periods at staging areas.

Recommendation

18.61 **That VICSES, with the support of the CFA, includes basic fire safety training as one of the competencies for the VICSES Volunteers.**

Conclusion

18.62 The fires of the North East and Gippsland were a significant test for Victoria's emergency management arrangements, and involved:

- Mobilising a significant response capability together with the support agencies necessary to manage the emergency;
- Maintaining this capability over an unprecedented period of time; and
- Maintaining an appropriate level of resources to respond to any other fire or emergency situation occurring concurrently in the State.

18.63 As is the case with any comprehensive post-event review, opportunities to further strengthen the existing arrangements have been identified. The Inquiry concludes that Victoria's emergency management arrangements are robust and provided the appropriate framework to co-ordinate the management of the 2002–2003 bushfires.

18.64 Recommendations are made in Part E for further systemic improvements to these arrangements.

Chapter 19
Did the Incident Control System Work?

Overview

19.1 A strong incident management system allows emergencies involving many agencies and organisations to be effectively managed. In this Chapter we reinforce recommendations made in our Interim Report (Appendix III) to improve the application of the Incident Control System in Victoria.

19.2 In particular, Chapter 19 focuses on issues and challenges relating to:

- Regional emergency co-ordination;
- The appointment of deputies to key roles in Incident Management Teams;
- Qualifications for Incident Management Team members;
- The location of Incident Control Centres; and
- The effective transfer of control from one Incident Control Centre to another.

Regional Emergency Co-ordination

19.3 The number of resources deployed by the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) to the North East and Gippsland fires created significant challenges for both organisations. The geographic spread of the fires also created major logistics and co-ordination problems. During the early days of the fire operation it became apparent that the usual co-ordination arrangements between the two agencies might be overwhelmed. The need for a region-wide, longer-term strategy for fire management and co-ordination also became evident.

19.4 As we discussed in Chapter 18, an Integrated Multi-Agency Co-ordination Centre (IMACC) was established at the DSE office in Benalla. Shortly afterwards, a similar facility was established at Traralgon. The IMACC collocated CFA and DSE regional staff and assisted in the supply of crews and strike teams to Incident Management Teams.

19.5 As we also noted in Chapter 18, the IMACCs created confusion in the minds of many CFA Brigades as to who had ultimate control of the fires. The IMACCs' role in broad strategic development for fire suppression across a number of Incident Control Centres and their role in co-ordinating the supply and deployment of out-of-area crews and strike teams – combined with the inexperience of some Incident Controllers – left firefighters with the erroneous impression that the fires were being managed elsewhere. This was both a failure to communicate and an inevitable consequence of implementing policy and organisational restructuring 'on the run'.

Recommendation

19.6 **That the emergency management arrangements be amended to require Police Divisional Emergency Response Co-ordinators, in consultation with other response agencies, to establish and document procedures and structures at regional level in order to ensure there is:**

- **Effective monitoring of Incident Management Teams;**
- **Effective strategic management of resources;**
- **Efficient management of information flow within and between agencies, and between the agencies and the community; and**
- **Liaison between the control agency and divisional and municipal emergency response co-ordinators.**

Structure of Incident Management Teams

19.7 When establishing joint Incident Management Teams, DSE and CFA have traditionally appointed officers from the control agency to the four key positions within the team: Incident Controller, Planning Officer, Operations Officer and Logistics Officer.

19.8 The appointments are made by DSE when the fire is predominantly on public land; they are made by CFA when the fire is predominantly on private land. Personnel from the supporting agency are then appointed as deputies to these four key positions.

19.9 This arrangement has often been difficult to achieve due to the number of qualified and endorsed personnel available. Nor does it always lead to the most effective use of available resources. This is especially so in long campaigns, given that most Incident Management Teams operate 24 hours a day for the duration of the fire.

19.10 The Inquiry heard suggestions that this practice may have limited the number of experienced fire ground supervisors available to work in the field because experienced personnel had been deployed to an Incident Control Centre.

19.11 Submissions, including those from DSE and CFA, suggest that providing a deputy from the supporting agency is not viable in longer campaigns. This is based on their experience during the fires of 2002–2003.

19.12 The Inquiry believes that a commitment by the agencies to greater integration in planning, training and co-ordination at regional and State level would make this practice obsolete.

Recommendation

19.13 That the practice of appointing Deputy Planning Officer, Deputy Operations Officer and Deputy Logistics Officer in an Incident Management Team be abandoned. This recommendation acknowledges the benefits of retaining a Deputy Incident Controller from the support agency (in accordance with section 4.2.6 of the Emergency Management Manual Victoria), to ensure that the command structure of that agency is preserved.

Qualifications for Incident Management Team Members

19.14 In comments to the Inquiry about the links between the Victorian emergency management arrangements and incident management, DSE noted that:

'AIIMS – ICS does not, and is not intended to, address overall co-ordination across multiple incidents – it is a system from 'Incident Controller down.'

19.15 The Inquiry acknowledges this principle and agrees that the purpose of the Incident Control System is to ensure effective and efficient management of a specific incident. Accordingly, knowledge of the Incident Control System is only one skill set required by members of an Incident Management Team. In order to ensure that all aspects of response to the incident are addressed, these officers – particularly the Incident Controller – must also have a sound understanding of the Victorian emergency arrangements and the relevant Municipal Fire Management Plan (as outlined in Part C).

19.16 There is an increasing expectation that the media will provide real-time, accurate and authoritative information to enable threatened and fire-affected communities to adopt safe behaviours. This will put an increasing pressure on Incident Controllers to provide information to the media. The Inquiry understands that CFA provides media training to all level 2 and level 3 incident controllers. DSE has no formal media policy, or training.

Recommendations

19.17 That the person appointed by DSE or CFA as Incident Controller for any incident should have formal qualifications and accreditation in the Incident Control System, be fully aware of the Victorian emergency management arrangements and have access to local fire prevention and response planning, including the Municipal Fire Management Plan.

19.18 That CFA and DSE provide media training to all Level 2 and Level 3 Incident Controllers.

Incident Control Centres

19.19 The location of Incident Control Centres (AIIMS–ICS)[1] – in particular, their distance from the fire front – was a frequent criticism in submissions to the Inquiry and during the Inquiry's tour of fire-affected areas. DSE and CFA, in consultation with Emergency Management Co-ordinators, pre-plan the location of Incident Control Centres across the State. A decision on their placement has often been a compromise between the need to be close to the fire and the need for adequate infrastructure.

1 Australasian Inter-agency Incident Management System. This is a nationally adopted structure to formalise a co-ordinated approach by all agencies involved in the management of an emergency. It is described in more detail in Chapter 15.

"By 4 pm [21 January] the Administration building had been taken over by Logistics and Resource units of the State Emergency Service and the Country Fire Authority. Other agencies including the Department of Sustainability and Environment and Parks Victoria (already on site as tenants) were quickly expanded so that by Wednesday 22nd the Administration building was totally taken over by these operations."
La Trobe University, *Buildings & Grounds Newsletter*, May 2003.

19.20 The Inquiry saw opportunities to make greater use of existing public infrastructure when determining the location of Incident Control Centres. At Beechworth, an agreement between DSE, CFA and La Trobe University enabled an effective centre to be established within the University's facilities. This Incident Control Centre was able to meet the needs of agencies managing the fires at Eldorado and Stanley with significant surge capacity. This facility readily accommodated expansion of the Incident Management Team, staging area and welfare needs of firefighters.

19.21 Clearly, there are significant benefits in using existing infrastructure as key operations centres during emergencies. To build centres specifically for the emergency services is not economically viable given they may only be used occasionally, even for training/exercising. Quality facilities in daily use – similar to the La Trobe University campus at Beechworth – already exist across the State. These facilities have similar telecommunications and computing infrastructure to that needed during emergencies.

19.22 In addition to using existing infrastructure for the development of future Incident Control Centres, opportunities exist to enhance the information flow and co-operation between Incident Control Centres and Municipal Emergency Co-ordination Centres. In some instances, there may be opportunities to collocate these two facilities. This offers advantages in the provision of technology, support staff and other resources.

Recommendations

19.23 That in the review of Incident Control Centre locations, DSE and CFA give due consideration to:

- Existing public infrastructure that may provide suitable facilities; and
- Opportunities for collocation with Municipal Emergency Co-ordination Centres.

19.24 That DSE and CFA review their joint planning for Incident Control Centres to ensure that, wherever safe and practicable, those Centres are located close to the fire area.

Transferring Control from One Incident Control Centre to Another

19.25 On 18 January, a new Incident Control Centre was established at Mt Beauty to more effectively manage the fires affecting that area and to allow the Incident Control Centre at Ovens to focus solely on the fires affecting the Ovens Valley.

19.26 The process of transferring control of a fire or complex of fires from one Incident Control Centre to another is, and was, complex. The change in fire management from the Ovens Incident Control Centre to the Mt Beauty Incident Control Centre created confusion among firefighters, fire ground commanders and the community.

19.27 Following investigation, the Inquiry supports the decision made by DSE and CFA to establish the Incident Control Centre at Mt Beauty, however, there are concerns about the rigour of the procedures and processes followed. The communication strategy to inform fire ground supervisors and the community about details of the changes proved inadequate.

19.28 There is no evidence that this change in control, or any other, had a detrimental impact on fire suppression. It did, however, cause unnecessary confusion and we have identified a need to do this better in future.

"First, we must improve the way that we direct and co-ordinate the diverse agencies and professional groups that come together from many locales and levels of government in a crisis. Within hours of the crisis in New York City, as in Oklahoma City 6 1/2 years ago, multiple fire crews, police officers, ambulances, and rescue workers converged, not only from all over the city, but from neighbouring jurisdictions on Long Island, and in New Jersey and Connecticut.

Such teams, which have never worked together and have no common operational method, must be productively co-ordinated. Otherwise they may be doomed to ineffectiveness or however inadvertently to endanger one another's lives. The "incident management system", developed initially for the fire service in California to deal with this problem, needs to be made standard practice"

Source Howitt, A. '*New York's Preparedness Should Inspire Other Cities to Act*' The Boston Globe, 17 September 2001.

Recommendation

19.29 That DSE and CFA develop an agreed process for the effective transfer of control from one Incident Control Centre to another, including processes for communicating this change to fire ground supervisors and local communities.

Conclusion

19.30 An incident management system is essential to allow for the effective management of large or multiple fires, and multi-agency events. The Inquiry notes that the effectiveness of any system is determined by the training provided for its users.

19.31 The Inquiry's Interim Report (Appendix III) made recommendations to better utilise local knowledge in the Incident Control System, and to integrate the CFA group structure with the Incident Control System.

19.32 The Inquiry's views have not changed and further recommendations about the application and refinement of the Incident Control System have been made here.

19.33 We found AIIMS–ICS, endorsed and introduced by the Australasian Fire Authorities Council members in the early 1990s, to be a sound incident control system and strongly support its continued use. A coroner's report following the Linton bushfire[2], discussed AIIMS–ICS at length and noted evidence that the system had not been completely accepted and adopted across the State. This mitigates against an incident being managed in the seamless and integrated way envisaged. CFA and its volunteer groups must work together to finalise the integration of AIIMS–ICS as a matter of urgency.

19.34 A final relevant point is that since the 11 September terrorist attacks in 2001, the United States has mandated that the response and emergency management plans of all agencies must include an appropriate multi-agency incident management system. This supports the Inquiry's view that the approach to incident management in Victoria is consistent with worlds best practice.

2 State Coroner's Office, 2002, p. 596 - 656.

Chapter 20
Development and Implementation of Fire Control Strategies

Overview

20.1 Development of strategy is the responsibility of the Incident Management Team, in particular the Planning Section, in consultation with the Operations Officer. The task of implementing the strategy and selecting tactics rests with the Operations Section. The Operations Section includes the Division Commanders, Sector Commanders and Strike Team Leaders.

20.2 On the evidence available, the Inquiry has formed the view that, overall, the strategies and tactics applied by the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) were appropriate in suppressing the fires. They achieved the objective of containing the fire as effectively and safely as possible, with no loss of life directly related to the fire and no significant injuries. Loss of private assets and damage to property was limited when compared to the scale of the fires.

20.3 However, the Inquiry identified a number of situations where difficulties in the development and successful implementation of fire suppression strategy and tactics occurred.

Application of the Fire Control Priorities to Incident Action Planning

20.4 Early in the response to the fires in the North East and Gippsland, the Chief Fire Officer, DSE and Chief Officer, CFA met and reaffirmed the 'Fire Control Priorities' discussed in Chapter 15, Part C. These priorities were applied by the agencies throughout the campaign by personnel working from the State Emergency Co-ordination Centres, Integrated Multi-Agency Co-ordination Centres and Incident Control Centres.

20.5 The priorities were confirmed as:

- Firefighter safety;
- Community and asset protection;
- Aggressive first attack on new outbreaks to extinguish fires;
- Ecological and environmental value protection; and
- Fire containment and control.

20.6 The Inquiry believes these priorities were appropriate and directly contributed to the positive fire outcomes.

20.7 However, as we noted in Chapter 15, the Inquiry believes these priorities were well known to those managing the fires, but less understood by the community. This may have directly or indirectly contributed to community anger in some areas during and immediately following the fires.

20.8 In at least one region, these priorities were modified – apparently without appropriate approval or consultation – and this led to confusion, anger and criticism of the firefighting strategies employed by CFA and DSE.

20.9 While we do not envisage that these fire control priorities will change significantly from year to year, the Inquiry believes they should be included in pre fire season community education and awareness material.

20.10 In analysing the record of the fire events, the Inquiry was able to identify many instances where these principles led to successful fire outcomes. For example:

- On Tuesday 21 January, new fires broke out near Beechworth at Eldorado and Stanley. These fires posed significant threat to private assets and the Beechworth, Stanley and Myrtleford townships. In accordance with the principles of community and asset protection and aggressive first attack on new fire outbreaks, resources were promptly redeployed from reserves and other going fires to contain the new outbreaks. Despite severe and erratic fire behaviour, these fires were successfully contained.
- On 13 February, a fire ignited on the side of the Princes Freeway between Morwell and Traralgon. This fire burnt through nearly 1,000 hectares of grassland and plantations and threatened private and commercial properties including a hospital. Firefighting resources, including reserves held at Bairnsdale for other fires, were able to quickly contain this fire.

Case Study: Yalmy Road

In the first weeks of February the IMT at Orbost developed a control line along the south east boundary of the Snowy River National Park, using Yalmy Road. The strategy was to contain the fire at Yalmy Road if other control lines to the north proved ineffective, thereby protecting forest, parks and communities to the south.

There has been extensive public and professional debate in relation to the appropriateness of the location and width of this line. In the end the break was not required as the fire was controlled to the north.

It has been alleged that trees from the Snowy River National Park, pushed over by bulldozers during the construction of the control line, were subsequently milled in contravention of Government policy.

The Inquiry formally wrote to the Secretary DSE, seeking advice. In response the Secretary has informed the Inquiry that:

"On 21 February 2003 the Department of Sustainability and Environment (DSE) initiated an investigation into the tree removal along the Yalmy Fire Control Line within the Snowy River National Park and the adjacent State forest. The investigation was launched following concerns raised about the works that were undertaken to prepare the Yalmy Control Line for backburning operations. These concerns related to the extent of tree removal, in particular the National Park, an assessment as to whether the works were excessive, consistent with prescriptions and achieved their prevention objectives.

The investigation report is currently in draft form. The Department has sought legal advice in relation to aspects of the report, and in relation to the possible offences. The report is currently receiving further consideration."

Given the public significance of this issue, the Inquiry believes that Government must urgently resolve this issue in a transparent and public manner.

Lessons Learnt

The apparent inappropriate application of the fire control strategies by the Incident Management Team at Orbost may have been avoided if the agreed fire control priorities had been applied in a more considered way.

Secondly, clear structures must be in place to supervise IMTs to ensure adherence to the fire control priorities and all other policy guidelines.

20.11 State-level Fire Control Priorities must be applied in a local context. These priorities should be an integral part of municipal and agency planning and assist in the joint development of contingency plans for fire suppression strategies in all communities. This planning, described in Chapter 14, should then be a key input into the development of Incident Action Plans for specific incidents by Incident Management Teams.

Recommendations

20.12 That CFA and DSE include agreed Fire Control Priorities in community awareness and education material provided to the community before each fire season.

20.13 That the fire agencies ensure Incident Action Plans developed by Incident Management Teams are consistent with, and built on, the agreed Fire Control Priorities.

Aggressiveness of Firefighting

Criticisms of DSE and CFA's Strategies and Tactics

20.14 Many submissions to the Inquiry were highly critical of the strategies and tactics employed by DSE and CFA in the management of the fires. These criticisms were made both by fire-affected communities and local CFA volunteers. (Chapter 17 discusses some of these concerns in relation to the initial response to the bushfires.)

20.15 The issues raised in these submissions were surprisingly consistent across all fires examined by the Inquiry, and fall into a number of areas:

- A perceived reluctance to undertake direct attack on fires due to concerns over firefighter safety following the Linton Coronial Inquiry recommendations;
- A perceived reluctance to undertake backburning as a method of consolidating control lines – in general, and for fear fires would escape, resulting in litigation;
- Staff at Incident Control Centres restricting the tactics that fire ground supervisors could employ;
- A perceived failure early in the campaign to deploy aircraft for fire bombing activities; and
- Concerns that many resources were not deployed to the fire line but were held in reserve when effective fire suppression could have been undertaken.

DSE and CFA's Responses to Criticisms

20.16 The Inquiry put these issues to DSE and CFA. They indicated that the following factors were considered in evaluating strategy options, particularly backburning:

- The dryness of the fuel and the number of backburns that escaped or produced large numbers of spot fires;
- The number of days of very high to extreme fire danger;
- The priority of firefighter safety;
- The availability of firefighting resources, both personnel and equipment, due to the size and geographic spread of the fire; and
- The availability of experienced fire ground supervisors to undertake backburning operations.

20.17 The need to include front line personnel in planning and decision-making was also highlighted in the operational debrief processes undertaken by DSE and CFA.

The Inquiry's View

20.18 The Inquiry believes no one factor is responsible for the concerns raised by both firefighters and the community. The likely explanation is one of interacting factors and events including:

- Failure to adequately use local knowledge (discussed in detail below);
- Incident Control Centres being established (in some cases), a considerable distance from the fire front;
- A failure on the part of the Incident Management Teams to communicate the reasons behind selected strategies to both firefighters and affected communities;
- Inexperience on the part of some Incident Controllers; and
- AIIMS–ICS being applied too prescriptively or inflexibly by some staff operating from Incident Control Centres.

20.19 The Inquiry has concluded there were days when local weather conditions and fire behaviour provided opportunities to safely and more aggressively attack sectors of some fires. A number of these opportunities were lost. Division Commanders, Sector Commanders and Strike Team Leaders report seeking approval from Incident Control Centres for direct fire attack or backburning operations and either being prevented from undertaking the operation, or receiving approval after the opportunity had passed.

20.20 The Inquiry believes these issues must be considered in the context of the importance of firefighter safety and the wider influences affecting DSE and CFA incident managers.

20.21 First, DSE and CFA have undertaken a major initiative in the past 18 months – the 'Safer Fire Fighting Project'. This project implements a number of changes recommended by the Victorian Coroner following the Linton inquest. These initiatives are in addition to enhanced training programs implemented by both DSE and CFA since late 1999. These programs stress the importance of understanding fire behaviour and firefighter safety.

20.22 This focus on firefighter safety is supported by the Inquiry and must be maintained.

20.23 Second, many of the concerns raised by firefighters may have been addressed if the briefings provided to fire ground managers during the campaign had included a clear explanation of the reasons for selected strategies and tactics.

20.24 Finally, more effective integration of local knowledge into the development of strategy and tactics would also have alleviated these concerns. We discuss this later in this Chapter.

20.25 The Inquiry concludes there were some opportunities where weather conditions, local fire behaviour and available resources could have justified a decision to undertake a more aggressive or direct attack safely on the fires during the campaign. While we can speculate on the difference this decision might have made to property damage and losses, it is not possible to objectively, or conclusively, assess the impact it might have had on the total area burnt by the fires. Nor is it possible to assess whether it would have reduced the impact of the fires on private property.

Recommendations

20.26 **That DSE and CFA continue to stress firefighter safety as their highest priority for incident managers and fire ground supervisors.**

20.27 **That DSE and CFA ensure that agreed strategy and tactics, and their rationale, be communicated to personnel involved in the fire fight and be included in briefings for fire line personnel.**

20.28 **That personnel assigned the roles of Division Commander, Sector Commander and Strike Team Leader on the fire ground are actively encouraged to provide input into the selection of strategies and tactics.**

20.29 **That personnel assigned the roles of Division Commander, Sector Commander and Strike Team Leader be given flexibility to alter tactics to take advantage of changed conditions on the fire ground.**

Consistency of Strategy

20.30 A consistent theme in written submissions and during public consultation was the number of unexplained changes in fire management strategy as the campaign progressed. Firefighters, fire ground managers and Incident Management Team members all expressed some frustration in relation to this issue.

20.31 DSE and CFA were asked to comment on this criticism and suggested a number of factors that influenced how strategies were determined. They noted that these factors change over time depending on such things as:

- Rapidly changing fire behaviour;
- Changes in fire development;
- Actual changes in weather;
- Forecasts for significant changes in weather;
- Fire moving from one vegetation type to another; and
- Changes in threatened topography and assets, as the fire progresses.

20.32 Some of these reasons are valid, however, others (such as vegetation, topography and weather forecasts) should be included in the strategic planning process at the Incident Control Centre.

20.33 All should be part of comprehensive two-way communication between those responsible for firefighting strategy and those responsible for tactical firefighting.

20.34 The Inquiry believes that implementing the recommendations under the earlier section of this Chapter, 'Aggressiveness of Firefighting Strategies', will address some of these concerns. However, it is apparent that different Incident Controllers addressed strategy development in significantly different ways. For example, there were clearly instances where strategy changes occurred when Incident Management Team shifts changed, or at the changeover following an Incident Management Team's tour of duty.

20.35 This suggests a need to change the way in which Incident Management Teams are monitored and guided. The Inquiry heard that the Integrated Multi-Agency Co-ordination Centres were responsible for overseeing the Incident Management Teams. Prior to their establishment, this role was undertaken at CFA Regional Emergency Co-ordination Centres and DSE Regional Fire Co-ordination Centres.

20.36 A State-level Strategic Plan was prepared for management of the fires. This plan was reviewed regularly and communicated to the Incident Management Teams via the Integrated Multi-agency Co-ordination Centres. DSE and CFA indicated this plan gave direction to the Incident Management Teams in their development of Incident Action Plans.

20.37 In their submission, CFA suggest the appointment of one Incident Controller for the duration of an incident. DSE does not support this view and has concerns in relation to the fatigue and welfare of the officers involved. The Inquiry believes the issue of consistency in strategy must be addressed.

Recommendations

20.38 That when Incident Management Teams implement significant changes to objectives and strategies, these are effectively communicated to firefighters, fire ground supervisors and affected communities, and are incorporated into broader organisational planning.

20.39 That the 'Incident Objectives' established for any response should reflect the endorsed Statewide 'Fire Control Priorities', and the relevant Municipal Fire Management Plan.

20.40 That CFA and DSE jointly develop procedures to ensure that a more consistent strategic approach can be maintained at shift and tour of duty changes.

Use of Local Knowledge

20.41 The use of local knowledge and integration of local firefighting personnel into the management of the fires was a major concern raised in submissions, during public consultations, and in the media. This concern was expressed before, during and after the fires.

20.42 The Inquiry considered this to be an issue of significance that could, and should, be addressed before the next fire season. Accordingly, it was one of the recommendations made in the Inquiry's interim report (Appendix III)[1]. Our recommendations were:

Recommendation 2 from Interim Report

That, in preparation for the coming fire season, the CFA:

- *Modifies its operational procedures to ensure that local knowledge is flexibly and appropriately incorporated into tactical and strategic fire management;*
- *Modifies its operational procedures to allow for more flexible management of strike teams; and*
- *Continues to work with its Brigades to complete the integration of AIIMS–ICS with the group structure.*

Recommendation 3 from Interim Report

That DSE reviews procedures to ensure that all Incident Controllers and Incident Management Teams have full access to those Departmental, Parks Victoria or appropriately experienced and qualified community members who can provide local knowledge and expertise in the development of fire suppression strategies and that advice from the fire ground is incorporated into decision making.

20.43 Like all issues raised with the Inquiry, there were instances where local firefighting personnel were integrated into the Incident Management Teams and where local knowledge was used very effectively. Incident Management Teams at Corryong, Swifts Creek and Beechworth all had significant input from local personnel from both DSE and CFA.

20.44 Many factors influenced the ability of DSE, CFA, and the Incident Management Teams, to access local personnel for this role. These included:

- The duration of the fires and the time that volunteer personnel were able to devote to firefighting operations;
- The need for local volunteers to undertake protection of their own properties;
- The willingness of local personnel to undertake roles in Incident Management Teams;
- The smaller number of people living in some regional areas; and
- The need to manage fatigue among senior fire ground supervisors and Incident Management Team members.

20.45 A key factor influencing the willingness of Incident Management Teams to utilise local knowledge is the limited understanding local people may have of broader issues impacting on the firefight. For example, the suggestion by local personnel to undertake a backburn at a particular point on the fire ground may compromise the safety of firefighters operating elsewhere. The Incident Management Team has a responsibility to maintain the overview of the whole of the fire and, consequently, may have very valid reasons for not pursuing a strategy recommended by local personnel.

20.46 This is a communication issue and not insurmountable. If the appropriate and necessary communication strategies are in place, it should be possible to overcome these obstacles.

1 Appendix III, p. 10.

Case Study: Tom Groggin – Mid January 2003

On 17 January 2003, the Pinnibar fire was burning to the north west of Tom Groggin. Tom Groggin Station is located in Victoria on the border between Victoria and NSW at the headwaters of the Murray River. A fire control strategy was agreed between the IMTs at Corryong in Victoria and Jindabyne in NSW. The broad strategy was to halt the southerly spread of the fire by containing it north of Tom Groggin in Victoria and the Alpine Way in NSW through the construction of control lines and backburning.

The weather on 17 January was severe and fire behaviour was intense and erratic. There were major runs of the fire on this day which overran most of the control lines to the south. During the day firefighters from NSW commenced a backburn in NSW immediately north east of Tom Groggin Station, which burnt vigorously up slope from the ignition point. It appears the fire subsequently burnt back into Victoria in the northern end of the Station, burning out grazing land.

The tactics employed by backburning under severe weather conditions to contain the fire were questioned by the manager of Tom Groggin station and local firefighters but these concerns were not heeded. While strategy was agreed between the NSW and Victorian IMTs, there are reservations about the tactics employed to implement the strategy, and their timing.

Communication between the IMT at Corryong and Tom Groggin Station was undertaken on a regular basis. The family at Tom Groggin were actively engaged in fire suppression on and off their lease for an extended time and protected community assets in NSW. They were a partner in the suppression works as their equipment was used to undertake the construction of fire control lines in conjunction with equipment deployed by the IMT at Corryong. However Tom Groggin Station was left as a passive recipient of decisions

Lessons Learnt

This Case Study underlines the importance of effective communication and the establishment of partnerships between all personnel involved in responding to a fire. In determining what tactics to use, Incident Management Team members and fire ground commanders need to heed the advice provided by local fire agency personnel and landowners to ensure that the tactics applied are effective and will deliver the desired outcomes.

In this case those at Tom Groggin were informally part of the fire control structure because of their isolation as well as being the community. Open and frank discussions on tactics across borders must also occur and it is clear that while strategies at the IMTs were agreed, tactical implementation was not agreed or discussed with the other 'fire ground commander' on the spot and therefore local knowledge was ignored.

20.47 There is still a need to address those instances where local knowledge could and should have been used more effectively, namely:

- The failure of some Incident Management Team personnel, deployed from outside the fire area, to seek or utilise advice from local DSE and CFA officers; and
- The difficulty in ensuring that local officers were integrated into the Incident Management Team.

20.48 These situations had detrimental effects in specific areas, including:

- Alienation of local personnel;
- Frustration and isolation of local communities;
- Loss of confidence in the Incident Management Teams at community level;
- Gaps in information used to make both tactical and strategic decisions; and
- Failure, on some occasions, to take advantage of opportunities for fire containment brought about by lulls in the weather and fire behaviour.

20.49 In recommending that local knowledge be better utilised, the Inquiry recognises that local staff and volunteers will also have to adjust. Instead of staffing the local fire appliance, local staff and volunteers may need to blend with strike teams from other areas who need local knowledge. They may need to be positioned in Incident Control Centres, not at the fire front.

20.50 Accordingly, the Inquiry restates the concerns discussed in the Interim Report and stresses the importance of the recommendations made there.

Information Gathering

20.51 On a number of occasions, Incident Management Teams found it difficult to develop an accurate understanding of the fire's location and behaviour. At the time of response, the reasons often given were the lack of aircraft reconnaissance capability due to smoke logging and the lack of airborne infrared line scanning capability. These comments contrast with submissions made to the Inquiry that indicate Incident Management Teams were, in some instances, reluctant to accept information about fire location and behaviour provided by personnel on the fire line or members of the community.

20.52 It has been suggested that locating Incident Control Centres some distance from the fire contributed to this problem. In particular, this practice limits the ability of Incident Management Team members to personally brief, and gain direct feedback from, fire ground supervisors. It can also result in the filtering of information about fire location and behaviour, and a lack of confidence in such information. The issue of where Incident Control Centres should be located is addressed in Chapter 19.

20.53 In their response to a question put by the Inquiry on this issue, DSE indicated they place importance on gathering information from all possible sources. They did acknowledge there were gaps in the flow of information within the Incident Control Centres that impacted on the effective use of some intelligence gathered. CFA's response indicated a commitment to striking the appropriate balance among the various sources of intelligence. They also noted the importance of being able to validate information to ensure its accuracy.

Recommendation

20.54 **That DSE and CFA review methods of gathering and processing fire information to ensure all methods are pursued to greatest effect.**

Cross Border Liaison and Strategy Development

20.55 The North East and Gippsland fires directly impacted on over 120 kilometres of border between Victoria and New South Wales. The fire in the Big Desert National Park affected a small section of the border between Victoria and South Australia. The incidence of fire impacting across State borders is common and presents a number of co-ordination problems for managing resources and establishing effective strategy for fire containment.

20.56 To maintain effective liaison and consistency of strategy between the Incident Management Teams in New South Wales and Victoria, a Victorian Liaison Officer was appointed to work out of the New South Wales Rural Fire Service Incident Control Centre at Jindabyne. Incident Controllers also took part in regular teleconferences to discuss strategy for managing the border fires.

20.57 Submissions made to the Inquiry suggest that the co-ordination and implementation of strategy between Incident Management Teams traversing the Victorian–New South Wales border was not always effective. It was submitted there were occasions when New South Wales tactical operations and their timing (at the direction of the Incident Management Team at Jindabyne), while consistent with agreed strategies, resulted in unplanned outcomes.

20.58 Recommendations in relation to interstate liaison were made in Part C, Chapter 15.

Briefings

20.59 Firefighters and fire line supervisors from both DSE and CFA expressed concerns to the Inquiry about the nature of briefings provided to them and the varying quality of documentation provided. Mapping made available to fire ground managers has improved significantly in recent years with the development of Geographic Information Systems. However, a number of personnel who provided submissions to the Inquiry indicated that the detail on these maps was often far in excess of what was required, and made map reading difficult. In some instances, the only maps provided to fire ground supervisors and crews were poor quality photocopies.

20.60 The operational debriefing process conducted by DSE and CFA identified a concern among some firefighters that, on occasion, briefings for DSE and CFA personnel were conducted separately. There were also occasions when the information provided during briefings was inconsistent. The Inquiry is of the view that to enable effective joint operations, joint briefings of all responding agencies are critical.

Recommendations

20.61 That DSE and CFA review the standards and protocols for documentation, including mapping, provided to fire line managers as part of their briefing notes, to ensure these are concise and appropriate.

20.62 That operational briefings in multi-agency fires should, wherever possible, be joint briefings of all agencies involved.

'No Go Zones'

20.63 In Chapter 14 we commented on the need for holistic planning for fire and emergencies. As part of that planning we recommended that DSE and CFA work with communities to identify areas where the safety of firefighters may be compromised during severe fire behaviour.

20.64 During the fire campaign there were a number of occasions when Incident Management Teams and fire line supervisors determined that some areas were unsafe for firefighters to enter or remain, due to the nature of the fuel loads, problems with access and egress or the intensity of fire behaviour at the time. These determinations were in addition to areas in existing pre-incident plans already identified by DSE and CFA regional personnel as too dangerous for the deployment of firefighting personnel during severe fire behaviour.

20.65 Examples put forward by CFA and DSE include:

- The upper reaches of the Buckland River Valley where access and egress for firefighters was of concern due to both the density of the forest and the nature of the access road;
- The Anglers Rest area on 26 January where the fire intensity was so great that firefighters could not safely negotiate the road into the area; and
- The Wulgulmerang and Suggan Buggan areas on 30 January where fire intensity and the danger of falling trees over the only access route presented a risk to firefighter safety.

20.66 While the Inquiry supports the primary focus on the safety of firefighters at all times, there is a need to ensure a clear process for making and, where appropriate, documenting and communicating such a determination.

Recommendation

20.67 That DSE and CFA ensure that:

- A clear process is established for determining whether a specific location is, or is no longer, a 'no go zone' or an area into which it is too dangerous to deploy resources, and that affected communities are advised as soon as possible of the determination, the reasons for such determination and what actions they should take as a result; and
- Where the Incident Management Team, Division Commander, Sector Commander and/or Strike Team Leader identify an area as a 'no go zone' or an area into which it is too dangerous to deploy resources, the reasons for that designation are recorded by the Incident Management Team in the incident log.

Use of Bulldozers

20.68 In their submissions to the Inquiry, a number of landowners and community members questioned the use of bulldozers for construction of fire control lines. In particular, the environmental impact of this work in sensitive soil and vegetation types on both private and public land was cause for concern, along with the difficulty of rehabilitating the affected areas after the fire.

20.69 Conversely, concerns were also expressed about the apparent reluctance to deploy bulldozers in sensitive areas because of the potential damage to the environment. A number of fire ground supervisors expressed some frustration at the restrictions they felt Incident Management Teams had imposed on their use of bulldozers.

20.70 The Inquiry was provided with sufficient evidence to conclude there were a number of cases where the decision to deploy bulldozers was not the most appropriate tactic. In addition, the way in which the control lines were constructed demonstrated a lack of supervision or lack of experience on the part of some bulldozer operators. There is also evidence to suggest that opportunities to deploy bulldozers to build mineral earth breaks to contain the fires may have been missed. Given the clear divergence of views on this matter, the Inquiry believes that clarification for Incident Management Teams is required.

Recommendations

20.71 That DSE and CFA work co-operatively to review the management and application of bulldozers in fire suppression operations to ensure they are used effectively, appropriately and are adequately supervised.

20.72 That quality control or performance assessments are routinely completed post fire season, to ensure that contractors who have not performed to an agreed standard are not re-engaged for the consequential rehabilitation works.

Conclusion

20.73 The Inquiry reviewed both the development of strategy and the execution of strategies through tactical response.

20.74 We found that the high-level and local-level strategies developed to control and suppress the fires were overall sound and appropriate. There are some instances where these could be questioned and have been.

20.75 The Inquiry is less satisfied that the tactics developed to implement the strategies were both flexible and responsive to the changing conditions on the fire ground and, as such, opportunities were missed to more aggressively attack the fire.

20.76 More importantly, however, the Inquiry found that the strategic decisions taken were not effectively communicated to those on the ground and those in intermediate control and supervisory positions. If the front line is not fully informed of the strategy and its planned outcomes then tactical decisions are more open to question (and they were). Such failure to communicate disempowers those on the fire ground to actively participate in tactical decision-making.

Case Study: Gelantipy and Wulgulmerang – 30 January 2003

DSE and CFA conducted a briefing for the community in the Gelantipy, Wulgulmerang district on 24 January. At that time it was acknowledged that the fire was likely to impact on the district at some time during the following weeks. Plans for the protection of homes and other assets were developed and implemented by both DSE and residents.

The IMT at Orbost established a Divisional Command Point at Karoonda Park, Gelantipy on 28 January. Resourcing was minimal; 16 fire fighting vehicles from CFA and Queensland Fire and Rescue Service allocated to the Division on 29 January and a number of local DSE slip-ons and bulldozers also working in the area.

A Total Fire Ban was declared on Wednesday 29 January for Thursday 30 January. Fire behaviour experts predicted that, as a worst-case scenario; the fire could impact on Wulgulmerang and Gelantipy late in the day of 30 January but more likely 3 days later on Sunday 2 February.

Early morning 30 January information about the fire behaviour experienced the previous night and early that morning in the area east of Benambra was available from the IMT at Swifts Creek and was passed on to the IMT at Orbost. It appears this intelligence was not forwarded to the Divisional Command Point at Gelantipy. Local residents and a Parks Victoria officer who observed an increase in fire intensity on the morning of 30 January provided this advice to the Divisional Command Point. What weight was given to this information by the personnel at the Divisional Command Point is unclear.

When it became apparent that fire was impacting on the Wulgulmerang area, firefighters were deployed from the Divisional staging area at Gelantipy back to Wulgulmerang.

They travelled through forested areas where high winds were bringing down trees and other debris, and spot fires were being ignited and burning fiercely around them. Some of the firefighting vehicles arrived at Wulgulmerang but had to take refuge at a safety zone* due to the intensity of the fire. Other vehicles, including a number from Queensland Fire and Rescue Service, were caught on the road by falling trees. Action by local landowners and a Parks Victoria officer assisted their escape to safe ground. This event had a significant impact on the firefighters, in particular those who had not had any exposure to extreme bushfire behaviour, and were clearly traumatised by their experience.

Due to the extreme weather and fire behaviour, the IMT at Orbost had issued a directive to all resources in the Gelantipy Division to go to a safety zone and remain until otherwise advised. Following the passage of the fire, local residents approached the firefighters seeking their assistance. The strike team leader was unable to gain approval to move from the safety zone to undertake firefighting operations from the Orbost IMT.

The Inquiry has formed the view that there was systemic communication failure within the fire services, particularly at and between the IMT at Orbost and the Divisional Command Point at Gelantipy. Secondly, staff at Divisional Command Point at Gelantipy did not receive the support they needed nor did they have the resources or information to deal with the circumstances that confronted them. Such a finding regarding support could be made in respect to the Orbost IMT however it is also clear that they were completely overwhelmed with the task at hand and had become cautious.

Finally, the actual conditions observed by the strike team leader on the fire ground after the passage of the fire front was not given due weight by the IMT and the Division Command Point. It is the finding of the Inquiry that the severity of the weather and the intensity of the fire that burnt through Wulgulmerang on 30 January, which has subsequently been shown by fire intensity mapping to be the most severe of any that occurred throughout the summer, overwhelmed the firefighters, incident managers and the community.

Lessons Learnt

Lessons from this case study include the importance of passing on information in an accurate and timely manner and that such information must be processed immediately and acted upon. Fatigue appears a factor here.

Secondly, local knowledge was not fully incorporated into decision making either prior to or after the firestorm. The IMT at Orbost was too cautious after the event and failed to act on the advice of those on the fire ground.

Finally, strategy and the guiding principles for managing a fire rest with the senior members of the IMT, but determining the tactics to implement those strategies must be left to fire ground commanders. This did not happen on this occasion.

* The directive issued by the IMT at Orbost indicated that crews should take refuge at an anchor point, however DSE have indicated that the appropriate term to describe the locations where the crews took refuge is Safety Zone. The Inquiry is of the view that the terminology used did not affect the outcome.

Chapter 21
Other Response Issues

Overview

21.1 The fires that occurred during the 2002–2003 summer tested all aspects of the State's response capability including firefighting equipment and the many systems developed by the Department of Sustainability and Environment (DSE) and Country Fire Authority (CFA) to manage the response to fire.

21.2 This Chapter notes a number of concerns relating to response to the fires that were raised with the Inquiry through submissions and during public consultation. In particular, it looks at:

- The effective deployment of firefighting personnel and equipment, including privately-owned firefighting vehicles;
- The systems to track vehicles and personnel when they have been deployed to a fire; and
- Communications facilities used by DSE and CFA during firefighting operations.

Keeping Track of Firefighting Resources

21.3 Submissions from DSE and CFA, and input from incident managers and firefighters, highlighted the need for improved resource tracking capability, both at State and incident level. DSE and CFA have different systems for tracking the deployment of resources once they are allocated to an Incident Management Team.

21.4 DSE use a computer-based system (IRIS); on occasions, a manual, card-based system is used as backup. CFA also have a computer-based system for State and regional level resource tracking. The Incident Management System[1] is not used at Incident Control Centres. A paper-based 'T card' system is currently in use by CFA and also used by field commanders to manage resources. This system has been supplemented in recent years by a bar coding system which is still under trial.

21.5 The Inquiry was told of occasions during the fires when it became difficult for incident managers to maintain an overview of the location and tasking of the forces under their control.

21.6 At State level, a number of different systems are in place for resource tracking. Emergency Communications Victoria also maintains a sophisticated computer-based system for the deployment of Metropolitan Fire and Emergency Services Board (MFESB), CFA, Ambulance, Police and Victorian State Emergency Service (VICSES) resources within the greater Melbourne metropolitan area. However, once these resources are deployed to an incident and under the control of an incident controller, tracking the precise location and tasking becomes the responsibility of the Incident Management Team.

21.7 While DSE and CFA computer-based systems provide some resource tracking capability on a Statewide basis, they require labour-intensive manual systems to support them at various levels of operational management.

Recommendation

21.8 **That DSE, CFA, MFESB and VICSES work co-operatively to establish a common system for resource tracking during major fires and incidents.**

Management of Firefighting Resources in the Field

21.9 The firefighters and support agencies – both paid and volunteer – who were deployed during the 2002–2003 summer, were extremely dedicated. They worked hard to protect communities who were threatened or affected by fire. Their work was frequently undertaken in the most difficult of weather and terrain and they were often confronted by very erratic and unpredictable fire behaviour.

21.10 While most Victorians would acknowledge their contribution and sacrifice, a number of submissions raised concerns about the management of some firefighting resources. Sufficient evidence was provided for the Inquiry to conclude that, in particular, the management of shift changes for firefighting crew, and the management of strike teams could be improved.

1 A computer based information system developed by CFA to support management of emergencies at Regional and State level.

Shift Changes

21.11 On a number of occasions the change of shift took up to three hours to complete. This process included the feeding of crews, briefings, and travel time from staging areas to the fire line. The reasons for any particular delay in changing shift varied significantly. However, the key issue that emerged was how well prepared the responsible Incident Management Team was. More attention to this aspect of resource management is required.

Strike Team Protocols

21.12 The protocols for management of strike teams, specifically within CFA, require clarification. The Inquiry heard numerous accounts of strike team leaders maintaining very rigid control over the resources under their control. On some occasions this was to the point where crews were not permitted to operate out of the strike team leader's sight. We discussed this issue earlier in Part D, and note that it is already being addressed by the CFA. However, it is clear that CFA strike team leaders need to be briefed more thoroughly on their role. They must also be flexible in how they manage the resources they are responsible for, while recognising the need for firefighter safety.

21.13 Additionally, Incident Controllers should also consider the need, in some situations, for deployment of individual resources to effectively implement their strategies, rather than strike teams. They should source these accordingly.

Recommendation

21.14 That DSE and CFA review the management of personnel deployed ensuring that:

- Shift changeovers of fire line personnel and fire line supervisors are conducted in such a way that the fire line is not left inappropriately unattended;
- Management protocols for Strike Teams are made more flexible; and
- Strike Team Leaders and Task Force Leaders undertake refresher training in the management of resources under their control.

Management of Privately-Owned Firefighting Resources

21.15 Within the farming communities of regional Victoria, unplanned fire is a fact of life. Many farmers and residents have a strong connection with the land and an appropriate respect for, and understanding of, the fire threat. As part of their response, many property owners have purchased or developed their own firefighting capability to protect their properties. This equipment may include purpose-built firefighting tankers, decommissioned CFA tankers, or trailer-mounted tankers. When threatened by fire, community members support their friends and neighbours, often using privately-owned firefighting equipment.

21.16 The fires of 2002–2003 were no exception and there were many occasions when privately-owned firefighting equipment was deployed in support of DSE and CFA resources. On some occasions, privately-owned equipment was the first to arrive at the fire and, due to the heavy commitment of DSE and CFA resources, fought the fire for some time before DSE or CFA crews arrived.

21.17 A number of challenges are posed by the presence of this type of firefighting equipment at fires. Most important is the safety of those people operating the equipment. Other challenges include the appropriateness of privately owned firefighting equipment for the task, and the ability of the incident and fire ground managers to communicate with the people involved and integrate them into the broader strategy for safely controlling the fire.

21.18 Residents of regional communities will always work co-operatively to support each other in times of crisis. Accordingly, the Inquiry understands that privately-owned firefighting equipment will always be part of the response to fires in Victoria. It is vital that all involved are able to operate in as safe an environment as possible, and in a co-ordinated manner.

Recommendation

21.19 That, as a matter of urgency and in consultation with stakeholders, CFA and DSE develop and communicate clear guidelines on how and when privately owned firefighting equipment should be integrated into the fire response.

Firefighting Vehicles

21.20 Based on submissions to the Inquiry, the firefighting equipment operated by DSE and CFA functioned reliably and was generally suitable to the task. However, during the fire campaign, DSE placed an order for a number of additional slip-on firefighting units to supplement their established fleet. This type of equipment is particularly appropriate for firefighting in remote and rugged terrain. Several of submissions also supported an increase in the number of this type of vehicle in the CFA fleet.

Recommendation

21.21 That CFA, having regard to terrain, continue to review the mix of firefighting appliances currently in service. In particular, consideration should be given to the number and distribution of smaller 'slip-on' type equipment.

Communications Facilities

21.22 Previous Inquiries into bushfire events have invariably identified communication as a significant problem, particularly communication between resources on the fire ground, and between the fire ground and the Incident Control Centre.

21.23 While the Inquiry was made aware of instances where radio communication networks did not meet all the needs of firefighters, these concerns were not as widespread as might have been expected, given the terrain in which the fires were burning. There were a number of remote mountain valleys where radio communication between the fire ground and Divisional Command Points or Incident Control Centres was problematic. In most cases, the DSE Incident Communications Channel system appears to have overcome many past problems. A number of firefighters who spoke to the Inquiry noted the system's positive performance.

21.24 Similarly, the value and effectiveness of Ultra High Frequency (UHF) and Citizen Band (CB) radios during the fires was raised by a number of individuals and firefighters.

21.25 Firefighters are concerned that open channel radio systems have the potential to become overloaded with competing messages. Inconsistent radio discipline on the part of firefighters appears to be a significant contributing factor to this problem. In his 2003 report[2], the Auditor-General recommended that 'the DSE and the CFA introduce a requirement for pre-season, hands-on refresher training in radio use for on-the-ground communications training'.

21.26 Comments made during DSE and CFA's operational debriefs, indicated that these concerns were valid. The Inquiry supports the Auditor-General's recommendation and commends the recommendation to DSE and CFA for immediate response for the forthcoming fire season.

Radio Infrastructure

21.27 CFA were also able to deploy a number of portable radio repeaters to address gaps in radio coverage on the fire ground. Although this is seen by CFA as an interim measure and not one that can be used in shorter duration incidents, it is a significant improvement on previous arrangements.

21.28 CFA have raised a number of concerns about the current viability of the existing radio systems to support effective incident management. They have identified a number of 'black spots' across the State where radio reception from fixed transmitters is marginal or non-existent. CFA have investigated this issue and put proposals to Government. It was not possible for the Inquiry, in the time available, to determine an appropriate technical solution.

21.29 Radio communication between interstate agencies continues to be problematic with an array of systems, frequencies and protocols. Fire ground supervisors endeavouring to co-ordinate resources from multiple agencies and multiple jurisdictions can become confused and frustrated. The Inquiry believes this is an issue that requires ongoing study and negotiation on the part of the agencies.

2 Auditor-General Victoria, *Fire Prevention and Preparedness*, Government Printer, May 2003.

21.30 The Inquiry wishes to acknowledge the number of positive comments received from both the public and the firefighting agencies on Telstra's performance during the fire response. On a number of occasions, emergency service personnel offered unsolicited praise for the efforts of Telstra staff in providing the necessary telecommunications infrastructure and surge capacity to enable a co-ordinated response.

Recommendations

21.31 That DSE and CFA work with the Bureau of Emergency Services Telecommunications to ensure that rural communication issues are appropriately addressed in the Statewide Integrated Public Safety and Communications Strategy, and that priorities and business cases are agreed for critical issues.

21.32 That CFA develop protocols to integrate Ultra High Frequency and Citizen Band radios into their communication structures.

Helitack - Medium Helicopter fitted with belly tank for water and foam drops.

Chapter 22
Aircraft Operations and the State Aircraft Unit

Overview

22.1 Aircraft are an important element of the mix of resources used to suppress bushfires. They do not replace on-ground firefighters but, rather, complement ground attack. However, it is critical to bear in mind the limitations affecting their operation including weather conditions, visibility and the terrain in which the fire is burning. In the *Australasian Fire Authorities Council's National Aerial Fire Fighting Strategy*[1], the fire agencies acknowledge that, 'aerial fire suppression is indeed a safe, effective and efficient tool in many situations'.

22.2 However, that endorsement is subject to the following qualifications.

- Aerial suppression is not always appropriate for reasons of effectiveness and safety. Expectations need to be managed.
- Optimum returns come from rapid attack on incipient fires. Aircraft need to be readily available for this, and there is a direct correlation between the time taken to carry out the first drop and the degree of effectiveness in suppressing the fire.
- Aerial suppression must be integrated with other fire operations and is generally ineffective if used in isolation.

22.3 The Inquiry agrees with these views. We also acknowledge that the financial commitment by the State to an aerial firefighting capability is significant. Accordingly, it is important to determine the effectiveness of this resource.

22.4 The Inquiry commissioned an independent consultant, 'AVISE', to report on this subject. The resulting document – '*A Report on Aerial Fire Fighting Resources*' – was prepared by Captain Nick Le-Ray-Meyer AM, ATPL, and reviewed by Dr Bob Dannatt DBA, MBA, F Dip. Com Eng., AAvPA, ATPL. The full report is at Appendix VII.

22.5 This Chapter summarises the report findings.

Integrated Firefighting Aircraft Resource

22.6 In 1989, the former Department of Natural Resources and Environment (NRE), and the Country Fire Authority (CFA) reached agreement that they would:

'as far as is practicable, standardise procedures and systems for management and support of all aircraft operations between the two agencies… to avoid duplication of resources and effort with an aim to maximise safety, effectiveness and efficiency of aircraft operations'.

22.7 This initiative was formalised in the Integrated Firefighting Aircraft Resource (IFAR) agreement, signed by both parties.

22.8 The IFAR arrangements can be broadly split into two categories:

- Provision of specialised aircraft resources for firefighting along with the associated operational administration and support arrangements; and
- Operational procedures for use of aircraft in firefighting activities, with a view to ensuring that procedures are standardised and safety of operations is enhanced.

22.9 On 1 August 2000, the CFA and DNRE Position Paper *'Safe Forest Fire Fighting'* was jointly signed. The most significant advance from this process was the establishment of a State Aircraft Unit. This was reconfirmed in the Co-operative Agreement jointly signed by NRE and CFA in September 2002.

22.10 In October 2002, subsequent to DNRE becoming the Department of Sustainability and Environment (DSE), a revised Co-operative Agreement between CFA and DSE superseded the previous agreements. Although the substance remained essentially unchanged, the new agreement introduced the term 'State Fleet Aircraft'. Ongoing aircraft contracts established under the IFAR agreement were not subject to renegotiation as a consequence of the name changes. Accordingly, for the purpose of this report, the terms IFAR and State Fleet Aircraft should be considered synonymous.

1 Australasian Fire Authorities Council, 2002, *National Aerial Firefighting Strategy*, Melbourne.

Assessment of Aircraft Requirements for the 2002–2003 Fire Season

22.11 The Chief Fire Officer, DSE and the Chief Officer, CFA are jointly responsible for determining the resources to be provided in the coming fire season. By September 2002, as in previous years, the State Aircraft Unit was consulting with specialists from NRE/DSE and CFA to determine what, if any, changes were required to the total aircraft numbers and types for the 2002–2003 fire season.

22.12 The number and mix of aircraft (base load resources to meet Victoria's 'normal' fire situation) contracted for the 2001–2002 season[2], were:

- Six light helicopters;
- Five medium helicopters;
- Ten fixed-wing bombers; and
- Three other specialist aircraft
  - One linescan fixed-wing aircraft
  - One light fixed-wing aeroplane
  - One Erickson S64 crane heavy helicopter.

22.13 Specialist advice indicated a higher risk of bushfire for the 2002–2003 season. Based on that advice, the State Aircraft Unit considered that if the 2001–2002 fleet was supplemented by one medium helicopter, and one light helicopter, it should be adequate to meet the 'normal fire situation'. The respective Chief Fire Officer DSE, and the Chief Officer CFA, approved this fleet.

22.14 The proposed aircraft mix provided core capability for:

- Reconnaissance and control (the light helicopters and linescan aeroplanes);
- Rappelling and movement of ground personnel directly into or from fire areas; and
- Fire bombing.

22.15 Based on previous State Aircraft Unit experience, this constituted an affordable and flexible rapid response, and effective capability.

22.16 The State Aircraft Unit acknowledged there is always a risk of higher peak demand on some occasions. The normal 'staged' movement of fire seasons across the country is from north to south. There was an expectation that additional medium and high-capacity aircraft, including the S64 cranes being contracted by New South Wales, could be available to meet such an event. This view was in accord with the Australasian Fire Authority Council's proposed *National Aerial Firefighting Strategy*.

Review of the 2002–2003 Aircraft Type/Mix Assessment

22.17 Our attempts to determine the validity of this assessment of aircraft requirements were hampered, to a large extent, by the paucity of collated, qualitative information. Information from previous fire seasons on the effectiveness of the 'base fleet' would have helped in this regard. (We discuss the lack of this information later in this Chapter.)

22.18 Nevertheless, two documents were located and provide a useful basis for, at least, a subjective assessment. They are *'Model of Fire Cover for Fire Suppression*[3]*'* and a draft report from the Forest Science Centre[4]. These are discussed further in Appendix VII.

Identification and Use of Other Firefighting Aircraft Resources

22.19 State Aircraft Unit management advised the Inquiry that they would consider the introduction of additional aircraft types when assessing the appropriate size and mix of aircraft resources.

22.20 For example, having participated in the March 1996 evaluation of the CL415 'scooper' specialist firefighting amphibian, they were well aware of its capabilities. Its addition to the 2002–2003 fleet was not considered either necessary or viable for a number of reasons including:

- Load factor compared to the S64;
- Availability of 'refill' sources given the prevailing low capacities of suitable water sites (large reservoirs, lakes); and
- Contractual difficulties including costs vis-à-vis other comparable types such as the S64.

22.21 In accordance with its assigned operating principles, the State Aircraft Unit did not consider the use of helicopter or fixed-wing operators who had not demonstrated a level of operational competency to State Aircraft Unit standards. The State Aircraft Unit contends that mixing unknown operational performance competencies can be detrimental to overall safety and counter productive. They also indicated that the use of light helicopters to carry small capacity buckets is generally ineffective – both from a suppression and cost basis.

2 We have not included aircraft contracted solely for transport of personnel to, from and within fire regions.
3 DNRE, September 2000.
4 Draft Research Report No 52 – *The Effectiveness of Aircraft Operations in Fire Management*, July 2003.

Findings

22.22 Based on documentation available to the review and discussions with aerial firefighting participants (including ground personnel, air attack supervisors, pilots and contractors), we conclude that:

- A review of the fire danger for the 2002–2003 fire season was conducted;
- A subjective assessment of aircraft requirements to meet the assessed threat was conducted;
- Despite the lack of either significant qualitative or objective assessment of the effectiveness of the 2001–2002 aircraft fleet, the numbers and mix of aircraft agreed by DSE and the CFA for the 2003–2003 fire season was reasonable (given the assessed threat, budget constraints and contractual obligations); and
- The location of existing nominated operational bases satisfies basic strategic requirements but has not been periodically reviewed using quantitative post fire season data.

State Aircraft Unit and Management of the State (IFAR) Aircraft

General and Operating Principles

22.23 In establishing the State Aircraft Unit, NRE/DSE and CFA ('the Parties') specified the general principles under which the Unit would operate. While all are important, several are key to this review:

- Safety is the paramount consideration in all operations;
- Aircraft and resources will be shared;
- Common standards and modes of aircraft operation will apply;
- All aircraft resources will be effectively, efficiently and professionally managed;
- Relevant data and information held by CFA and NRE/DSE will be freely available and exchanged; and
- There will be a commitment to continuous performance improvement.

22.24 Additionally, in consultation and agreement with the Parties, the State Aircraft Unit was to establish:

- Standards;
- Operational Protocols; and
- Business Protocols.

22.25 Using the fundamentals developed by its predecessor, the State Aircraft Unit has established a set of clear and unequivocal personnel, equipment and aircraft standards as well as general operating procedures. These are published in the Air Operations Manual.

Management

22.26 Our review established that State Aircraft Unit management of joint aircraft operations is essentially that of a 'service provider'. That is, it ensures that aircraft assets and competent operational staff are available to the joint agencies.

22.27 The State Air Desk acts solely as the dispatch agency. It has no role in determining the number or type of asset to be dispatched. Once dispatched, the control and use of the asset is assumed by the requesting agency.

22.28 While the State Aircraft Unit is permitted to offer advice on the use of aviation assets to the respective State Co-ordinators, it does not have a direct command and/or control role. However, dispatch can be denied on flight safety grounds, such as inadequate in-flight visibility or unacceptable levels of turbulence. Even then, the State Aircraft Unit relies on the aircraft pilot for advice as the aircraft pilot is the final authority on flight safety.

Integration: Serving both DSE and CFA?

22.29 The review was confronted with an element of disquiet, bordering on discontent in some instances, concerning the State Aircraft Unit's management of its role. Several persons actively involved in firefighting for a number of years, expressed the view that, rather than being a joint unit serving both DSE and CFA, the Unit favours DSE activities and personnel. Formal submissions to the Inquiry also raised this concern. In essence, integration was claimed to be unbalanced.

22.30 We suggest that these comments have probably resulted from the rapid establishment of the State Aircraft Unit and the State Air Desk. Moreover, actions that are seemingly rational to the State Air Desk staff involved – such as the use of an AAS already airborne who became available after the 'callout' of another AAS – were open to claims of bias simply because little, if any, explanation was offered.

22.31 A 'snapshot' examination of air desk logs established no instances to support claims of bias. Moreover, the State Aircraft Desk's activities are co-ordinated by the State Aircraft Co-ordinator with the respective DSE or CFA State Co-ordinators. In the event that there are any conflicting requests:

- Solely within DSE or CFA, the CFA State Co-ordinator determines CFA priorities and DSE State Co-ordinator determines DSE priorities; and
- Inter-agency, the DSE and CFA State Co-ordinators confer and determine the priority. In the event that they cannot agree, the matter is referred to the Chief Fire Officer, DSE and the Chief Officer, CFA for determination.

22.32 Since the activities of the State Air Desk are supervised by both agencies internally and externally, the opportunities for officers to exercise any bias – even if so inclined – appear limited. We therefore conclude that the complaints probably reflect poor communication of the new functions and their modus operandi.

Operational Reporting

22.33 The Australian Inter-service Incident Management System (AIIMS) and agency procedures require that reports be furnished for various activities. Despite excellent departmental IT systems, there is a paucity of readily available aircraft operational data that is collated, qualitative and objective.

22.34 The purpose of a constructive reporting system should be to (at least):

- Record the events that have occurred and, plans and decisions taken;
- Provide a basis to assess effectiveness; and
- Provide a basis for future action.

22.35 We found that Incident Management Team reporting seldom recorded aircraft activity and/or intentions. Further, reports from Aerial Attack specialists and Aircraft Operations Managers varied from complete and informative to incomplete and/or lacking in any useful operational information. In some instances fire-scene reports could not initially be located; they had either not been submitted or had been misplaced. State Aircraft Desk operating procedures are discussed in more detail in Appendix VII.

Findings

22.36 The independent consultant fount that:

- The conduct of aerial firefighting in Victoria is generally well structured – and has no peer in Australia.
- State Aircraft Unit business protocols are generally soundly based, especially contractual arrangements. However, fleet assessment and mix should be based on quantitative and objective data. Further, a compliance audit program of all contractors should be considered.
- Establishment of the State Aircraft Unit has resulted in some integration issues. Primarily, these are communication rather than cultural problems. While maintaining overall competency standards, there must be some acknowledgment that CFA relies substantially on volunteer support. Training programs and opportunities as well as communication of change must be mindful of this at all times.
- Timely and useful collated operational reporting is incomplete and, in some instances, not available. Further, there was no apparent concern at its absence.

Deployment of Aircraft During Operations

Aggregate Flying Hours

22.37 Data made available to this review shows that some 3,335 flying hours were used in support of the North East and Gippsland fires. Excluding training, aircraft deployed by the State Aircraft Unit flew just over 5,000 hours on fire operations during the 2002–2003 season. Of this total, some 3,300 hours were used in the Alpine fires.

22.38 In the period 8 to 18 January nearly 900 hours were flown. Of this total, fire bombing was conducted for nearly 500 hours.

22.39 By way of comparison, the aggregate totals for the 2000–2001 and 2001–2002 fire seasons were approximately 1,250 hours and 750 hours respectively. The previous flying hour peak, of some 2,750 flying hours, occurred in 1997–98. Therefore, the aggregate 2002–2003 flying hours represents almost a 500 per cent increase over the prevailing annual average.

Aircraft Availability

22.40 The full complement of State Aircraft Unit/IFAR aircraft was generally available for deployment throughout the campaign. Data to hand indicates that – with the exception of 8 January – the entire State Aircraft Unit/IFAR aircraft fleet was available for deployment to the Alpine fires area. On 8 January , records show that only five of six light helicopters and two of five medium helicopters were available. No records have been located to indicate the reason for this.

22.41 On days of Total Fire Ban, some firefighting aircraft were held as strategic reserve. For example, the fire bomber at Horsham was kept in reserve in the event of further outbreaks in the far-West region, and a medium helicopter (HT 334) was kept at Bacchus Marsh as protection for Melbourne.

22.42 These aircraft were, in turn, deployed to other areas and replaced by available aircraft. This strategic reserve requirement did not affect overall availability of sufficient resources given the pre-season planning for 'call when needed' aircraft.

22.43 While aircraft availability was high, actual usage varied. For example, in the first few days of the North East and Gippsland fires, the ratio of reconnaissance flight hours to actual 'bombing' hours varied considerably. On 8 January, some 12 hours of reconnaissance was flown while 'bombing' was only some 22 hours. By 10 January, reconnaissance was 19 hours to some 70 hours 'bombing'. This suggests that, initially, the focus was to establish the extent of fire outbreaks before initiating concentrated suppression.

22.44 Additional aircraft also became available through the State Aircraft Unit's 'call when needed' provisions. The fleet was further reinforced late in January with the arrival of a supplementary S64 aircrane.

22.45 As the smoke pall intensified and became more widespread, in-flight visibility was reduced. On some occasions, this was exacerbated by the prevailing meteorological conditions – low-level temperature inversions preventing smoke dispersion. Operations from the Benambra and Corryong bases (both located in valley areas) were restricted by smoke quite early in the campaign. Timely redeployment of aircraft avoided unnecessary groundings (known as being 'smoked in') and ensured aircraft were available to be deployed to other areas in the event of new outbreaks. However, operations on particular fire fronts were still thwarted and, despite the best efforts of all concerned, some 'smoked in' days did occur.

22.46 We located no documentation or reports indicating that requests for aircraft assistance were rejected because of a lack of aircraft availability. However, there is some anecdotal information that requests for additional aircraft may have been withheld or not submitted because all known assets were already deployed.

22.47 If this is the case, this practice is counter-productive and should be discouraged. The reporting system needs to record instances where demand has outstripped supply so that post-season analysis can determine what, if any, changes to the size of the fleet, dispatch of aircraft and/or redeployment procedures are required.

Use of Non-State Aircraft Unit/IFAR Fleet Aircraft

22.48 Aircraft additional to the State Aircraft Unit/IFAR fleet were required during the fire season. This was because the number of on-going fires and asset protection activity sometimes exceeded aircraft availability. A replacement fire bomber was also required following the loss of a fire bomber in an accident. The first 'call when needed' was initiated on 13 January and the last on 24 February. The period of use varied from as short as seven days to a maximum of 50 days; the average was 30 days.

22.49 'Call when needed' aircraft included:

- One medium B412 helicopter – fire bombing;
- Two BK 117 helicopters – fire bombing;
- Four fixed-wing bombers;
- Five light helicopters – reconnaissance and Air Attack Supervisor (ASS); and
- One light fixed-wing – reconnaissance.

22.50 Through contract consultations and provisions, IFAR contractors are aware of the 'call when needed' requirement and keep the State Aircraft Unit informed of their capacity to meet a request. This generally ensures that 'call when needed' requests can be actioned without undue contractual negotiations and delay; response time is therefore optimum. The use of IFAR contractors also ensures that only known competent assets are used. This ensures overall safety and effectiveness standards are not compromised.

22.51 In early January, an additional S64 Erickson Crane heavy helicopter was requested. This followed the inability of New South Wales to release one of its two S64s due to ongoing fires. The aircraft (Helitack 144) was arranged through the State Aircraft Unit contract system and arrived at Avalon airport on 28 January (accompanied by an additional S64 requested by New South Wales agencies). It entered service on 29 January.

Effectiveness of Aircraft Deployment

22.52 Performance indicators for effectiveness of aircraft operations can be varied. For example, primary performance indicators might include response time, success of fire suppression or success in protecting assets. Whatever the type of indicator used, the measure of effectiveness must also reflect the intended objective – for example, suppression, fire protection, or containment.

22.53 Readily available records indicate that few AAS collect or collate effectiveness data such as number of loads delivered, and accuracy and overall success in achieving the Incident Controller's objective. Similarly, while the Incident Controller's strategy can be gleaned from the Incident Action Plan (for example, this might be firefighter and asset protection), we were unable to locate complementary documentation as to exactly how the aircraft were committed to achieve these strategies. No other reporting system was found to provide usable data to measure or assess aircraft effectiveness.

22.54 Accordingly, our review was unable to readily establish an assessment of aircraft effectiveness during the 2002–2003 fire season, based on normal parameters.

22.55 Having said that, State Air Desk records reveal that the time interval between requests for air support and the issue of dispatch orders was within the intended guideline parameters. The Inquiry was able to establish an assessment that suggests the overall effectiveness should have been satisfactory by using a comparison of:

- Aircraft type flying hour data – extracted from Flight Operations Return records;
- Broadly-assigned role data – for example, fire bombing;
- The number of aircraft available for delivery of suppressant; and
- The number of aircraft used for AAS tasks.

22.56 However, in reviewing aircraft operations we were able to establish a very rough assessment that suggests overall effectiveness should have been satisfactory. In making this assessment, we were mindful that the highest priority in bushfire operations is firefighter safety. Given the widespread intensity of some fires, the fact that no on-ground firefighters were lost as a direct result of fighting the fires would suggest that aircraft support was effective.

22.57 Despite the lack of documentation, some reporting did show that aircraft materially assisted in the protection of assets. For example, two teams (fire bombers and the S64 Crane) carried out a joint air attack at Buckland Gap. A fire bomber en route back to Wangaratta reported a spot fire along the road that was endangering two houses. While the S64 continued to attack Buckland Gap, two fire bombers and an AAS diverted to the spot fire and effectively stopped the fire spread, which arriving ground forces then suppressed.

22.58 The Inquiry contends that a measure of aircraft effectiveness should be available as one of the parameters to determine, among other things, future numbers and the appropriate mix of aircraft. Consideration should be given to introducing an appropriate system of performance indicators and complementary data reporting.

Findings

22.59 The independent consultant found that:

- The aggregate flying hours flown in the 2002–2003 fire season surpass the previous peak by a factor of two, and the average aggregate by a factor of five;
- Aircraft availability throughout the fire season was satisfactory with no evidence of untoward levels of unscheduled maintenance, pilot unavailability or fatigue;
- Instances may have occurred where demand exceeded availability and a request for services was not submitted. Procedures need to be developed to encourage personnel to lodge requests – regardless of known or assumed unavailability;
- Aircraft numbers and aircraft mix were increased through the 'call when need' provisions available from existing IFAR contractors;
- An additional S64 crane was obtained late in the fire season after it became apparent that the expected release of a New South Wales-contracted S64 would not happen;
- There is no structured performance assessment system. This lack of data from suitable collated documentation prevented the Inquiry from assessing aircraft effectiveness and aircraft suitability;
- Specific training in the matching of preferred aircraft/load capability to fire characteristics and/or strategy needs to be extended;
- No documentation reports were located showing a request for aircraft assistance was denied due to lack of available aircraft;
- While one fire bomber was destroyed in a flying accident, the overall level of flight safety was excellent given the high number of flying hours expended and the operational conditions; and
- The establishment of an extended air transport service contributed meaningfully to the overall effectiveness of the firefighting force.

Recommendations

22.60 That the joint agencies introduce a system of performance measures for reporting the effectiveness of aircraft in firefighting operations.

22.61 That instances where demand for air support outstrips the supply of State Fleet Aircraft available are recorded.

22.62 That after each fire season, measures of the effectiveness of aerial firefighting be collated, analysed and used for the assessment of the State Aircraft Fleet composition and the adequacy of Training and Accreditation programs.

22.63 That a systematic performance audit of State Aircraft Fleet contractors be conducted jointly by agency and SAU personnel.

22.64 That aviation contractors be required to submit a copy of their annual independent regulatory compliance audit prepared for Civil Aviation Safety Authority to the State Aircraft Unit.

22.65 That training and competency programs for Incident Controllers should include aircraft firefighting capability training.

22.66 That more emphasis should be given to communication and discussion in regard to State Aircraft Unit's roles, responsibilities, practices and procedures.

Conclusion

22.67 This Chapter draws some positive conclusions about Victoria's aerial firefighting capacity and performance during the 2002–2003 fires: the numbers and mix of aircraft were reasonable given the assessed threat, budget constraints and contractual obligations; aircraft availability was satisfactory with no evidence of untoward levels of unscheduled maintenance, pilot unavailability or fatigue; the overall level of flight safety was excellent given the high number of flying hours expended and the operational conditions.

22.68 However, the Inquiry's commissioned review found no structured performance assessment system in place within the State Aircraft Unit. Data is not being kept or collated that would allow a more objective assessment of aircraft effectiveness and suitability around clear performance indicators. We conclude, then, that there is significant room to improve the assessments, audits, and record keeping and reporting around aerial firefighting performance.

Chapter 23
Communication with the Community

Overview

23.1 In general, the efforts of the Department of Sustainability and Environment (DSE) and the Country Fire Authority (CFA) to keep the community informed of the 2002–2003 summer fires established a new standard in emergency response in Victoria. Importantly, the agencies advised communities on how to prepare for the passage of fire, as well as informing them of the progress of the fires.

23.2 Community meetings, community telephone trees, call centres and the support of the Australian Broadcasting Corporation's radio and other media outlets all resulted in a heightened level of community preparedness. This contributed greatly to a lower level of loss than might otherwise have been expected. (Chapter 4 in Part A lists the wide-ranging communication approaches adopted by the agencies.)

23.3 In surveys commissioned by the CFA[1] and conducted in May 2003, 96.3 per cent of respondents felt they were 'well prepared' or 'very well prepared' by the time the fire was a threat to their property, as detailed in Chapter 13.

23.4 Setting up Community Information Units within Incident Management Teams was an effective way to provide accurate and timely information to communities that could be affected by the passage of the fires. Community members were briefed by senior members of the Incident Management Team and were able to question them directly.

23.5 The Inquiry found that the DSE and CFA's use of the Internet as a means of informing the wider community about the progress of the fires and their efforts to contain them, was a significant advance that should be further developed. The scope for Internet-based systems to link users to other useful information was also noted.

23.6 This Chapter describes how we can build further on these communication successes.

The Challenge: Maintaining Communication with *All* Fire-Affected Communities

23.7 Despite a generally positive assessment, a small number of community members made critical comments in submissions to the Inquiry and during public meetings. These comments were based on personal experiences; respondents suggested more information was needed, particularly about the location of the fire and what the fire agencies were doing to contain it.

23.8 These criticisms demonstrate how hard it is to establish and maintain effective communication with all affected communities during emergencies.

23.9 These difficulties include:

- The potential for the fire situation to change rapidly;
- The remoteness of some communities where access is difficult;
- Marginal or nonexistent radio and television reception; and
- Dispersed properties.

23.10 The fires of 2002–2003 significantly tested current arrangements to communicate with communities affected by fire or, for that matter, other emergencies. Not surprisingly, the scale, location and duration of the fires have highlighted opportunities to further improve community information and community awareness policies and procedures.

23.11 CFA in particular, but also DSE, need to address the additional information needs of community members who are willing to become partners in the response to emergencies but may not have access to current communication strategies and networks.

Equity Considerations

23.12 It is also important to consider those who have special needs, in particular, the hearing impaired and those who do not speak English as their primary language.

1 CFA, North East and Gippsland Fires 2003, Community Safety Post-Incident Analysis.

23.13 In correspondence to the Inquiry, the Australian Communications Authority (ACA) raised this issue in relation to the hearing impaired and described the experience of a deaf person during the Canberra bushfires. ACA asked that we consider this issue in our final recommendations.

23.14 ACA made a number of suggestions that would make emergency communication more accessible and equitable. These include:

- Using captioning or crawler messages on television material;
- Setting up outbound text messages on the telephone typewriter available in most emergency communications centres; and
- Publicising the 1300 or 1800 general hotline.

23.15 They also proposed that a list of people be established who wish to pre-register to receive messages containing emergency information via the telephone typewriter system.

23.16 These ideas are supported by the Inquiry, and are in accord with moves in Victoria to further improve emergency warning systems for all community members.

Lead-in Times and Advice to Communities

23.17 Another critical issue is the lead-time between emergency response agencies becoming aware of the location of a fire and the arrival of the fire front within a particular community. Because of the protracted nature of the North East and Gippsland fires there were often a number of days between the development of a threat to a community and the arrival of the fire.

23.18 This is most often not the case. Historically, in many (if not most) of the fire emergencies that impact on communities in Victoria, there is very little lead-time between ignition and the impact on a community. This means that DSE and CFA must ensure their models of community advice and warning accommodate both long lead-time and short-duration, rapidly escalating incidents.

23.19 Having community information units effectively integrated into Incident Management Teams is also critical to ensuring communication is effective during a more protracted fire event.

23.20 We also recommend that community information models developed by the CFA should be able to be used by other emergency response agencies, especially the Metropolitan Fire and Emergency Services Board and the Victoria State Emergency Service.

Recommendations

23.21 That in relation to the provision of information to communities affected by fires and other emergencies, DSE and CFA ensure that:

- Incident Management Teams understand that one of their primary responsibilities, in co-operation with the Municipal Emergency Response Co-ordinator, is to keep the community informed as to where the fire is and its likely path, what is being done to combat the fire and any preparations the community should undertake;
- Community Information Units are effectively integrated into the Incident Management Teams; and
- They continue to develop a joint Internet-based communications tool to provide information and advice to both affected and broader communities during fires.

23.22 That the model of community engagement developed by DSE and CFA and applied during the 2002–2003 fires is further developed and refined, particularly in regard to short-duration, rapidly escalating incidents.

23.23 That relevant Government agencies including Emergency Communications Victoria, the Bureau of Emergency Services Telecommunications and the Victoria Police Media Unit, evaluate the proposals put forward by the Australian Communications Authority with respect to the hearing impaired.

Radio Coverage in Rural Victoria

23.24 Radio reception remains limited in some parts of the North East and Gippsland, particularly in the steeper valley communities. Further, atmospheric conditions can also cause changes in the strength of the signal. This situation may also occur in other areas of the State.

23.25 The role played by the Australian Broadcasting Corporation, particularly Regional Radio, during the fires received consistently positive comment from both the fire agencies and the community. The Inquiry found that the Australian Broadcasting Corporation provided accurate, credible and timely information to threatened communities. Their efforts to build effective and constructive relationships with key agencies (and with Incident Controllers in particular), gave a human face and voice to critical messages about the progress of the fires and the actions necessary to protect lives and property.

23.26 While radio is only one form of media for the broader rural community, it remains a principal and ready source of local and up-to-date information. Those that have access to the public broadcaster, either directly or through feeder stations, trust it to provide timely and accurate advice. Other forms of media – papers, newsletters, and facsimiles – also have their place, but immediacy and currency of information can be problematic. Some communities were provided with information that was one or several days old.

Mixed Messages Across the Border

23.27 Communities at State borders, or within the coverage of several radio stations, may gain conflicting information (for example, about fire and weather), based on the origin of the signal. There is a need to ensure that communities in these locations gain a consistent and accurate picture of the state of the emergency. In these situations, relevant authorities should work more effectively to develop joint information for broadcast. CFA advised the Inquiry that during a recent cross-border liaison meeting with New South Wales, both parties agreed to exchange relevant information. This will ensure broadcast messages are consistent.

Local Accuracy for Emergency Announcements

23.28 The heightened fear of impending impact, whether real or perceived, will increase the level of stress in and on a community. Effective communication should therefore use local knowledge and key landscape reference points to give specific information and advice. These reference points may be access roads and tracks; they may be local fire and wind behaviour, patterns and effects. Accurately defining the location and behaviour of a fire reduces angst within the community. Accurately defining the location and behaviour of a fire also allows householders who are considering evacuation to make informed decisions.

Australian Broadcasting Corporation

23.29 The Inquiry notes that the Australian Broadcasting Corporation, through its network, is the only radio provider with statewide coverage. However, there are still some 'black spots' where communities cannot receive a signal. The Australian Broadcasting Corporation has indicated they are prepared to work with the emergency agencies to identify areas with reception problems, and develop options to extend coverage.

Recommendations

23.30 That consideration be given to formalising Australian Broadcasting Corporation Local Radio as the official emergency radio station for Victoria, given it is the only radio station that can cover the whole of the State.

23.31 That the Victoria Police Media Unit co-ordinate work with the Australian Broadcasting Corporation and the emergency service agencies to implement this arrangement.

23.32 That CFA and DSE work with Australian Broadcasting Corporation Local Radio to identify black spots, and explore opportunities to further improve coverage for broadcasting emergency information.

23.33 That opportunities be explored to use community radio to complement other methods of communication with isolated communities.

23.34 That Interstate Agreements prepared by the fire agencies be reviewed to include protocols for the joint release of consistent and appropriate information relating to fires burning across State borders.

Conclusion

23.35 Community expectations have changed significantly, both in terms of the service communities expect from Government, and in terms of the information they demand from Government during emergencies.

23.36 Experience in Victoria during the Longford Gas Crisis and in New York following the 11 September 2001 terrorist attacks, highlights the importance – and value – of providing authoritative, realistic and accurate information to threatened or affected communities. This information can assist a well-prepared community to adopt the safe behaviours necessary to survive an emergency such as bushfire.

23.37 The Inquiry commends agency efforts to keep the community regularly and accurately informed throughout the 2002–2003 fires and notes that further improvements and innovations are likely to follow.

Chapter 24
Social, Business and Environmental Recovery

Overview

24.1 Community recovery continues long after the fire has passed. This was illustrated in stark terms as we visited fire-affected communities and spoke with over 400 people. Many of those communities had been affected by the rural economic downturn, changes to forestry policy, and six consecutive years of drought. They had then faced bushfires of a scale and duration that is, thankfully, infrequent.

24.2 This Chapter is premised on the view that recovery is not a post-event process but a parallel one. Response and recovery can, and should, be integrated.

24.3 Chapter 24 provides an overview of recovery efforts during and following the 2002–2003 bushfires and discusses the importance of having predictable, equitable and consistent models of financial relief. We also suggest a case management approach to recovery to address the frustration of communities as they access relief and support.

24.4 While we make a number of recommendations here for improved policies and communication, there are some positives to note. Whilst there were losses, fire suppression activities injected $117 million into the Victorian economy through additional wages and the purchase of supplies and services. Many small businesses in rural Victoria were the direct beneficiary of this expenditure.

24.5 The Inquiry's Interim Report (Appendix III) passed on comments concerning recovery to Government and made specific recommendations in respect to restoration and replacement of boundary fencing between public and private land, and the rehabilitation of damage to private property as a result of approved fire suppression activity.

The Ministerial Taskforce on Bushfire Recovery

24.6 In January 2003, the Victorian Premier established the Ministerial Taskforce on Bushfire Recovery to assess the impact of the fires that were still raging and to promptly put in place a range of recovery arrangements. The Hon. John Brumby, MP, chaired the Taskforce. An interim report was released on 28 February and the final report in April 2003. In that report, the Taskforce recognised the efforts and sacrifices of both communities and firefighters.

24.7 The Taskforce report also announced a range of specific initiatives focused on water, land and environmental restoration; and assistance to farmers, industry and the wider community.

24.8 In total $76 million has been allocated to these initiatives including $13.9 million committed in the interim February report.

24.9 The Ministerial Taskforce used the infrastructure, procedures and processes in the State Emergency Recovery Plan as the basis for its work. The Department of Human Services (DHS) is responsible for establishing and maintaining the Plan and, under the *Emergency Management Act 1986*, a senior officer of DHS is appointed as the State Co-ordinator for Emergency Recovery.

Overview of the Recovery Process

24.10 Governments of all levels were committed to an effective and speedy recovery process. As the following overview shows, action – overall – was timely and effective.

Municipal Councils

24.11 Municipal Councils responded swiftly to establish effective communication processes for their communities. Telephone information lines or call centres were set up. These provided up-to-date information and advice, and assisted in recovery. Some Municipal Councils also provided maps of the progress of the fire while others set up 'fax trees' to reach those in remote areas.

24.12 Recovery centres were established to assist the community and many provided a 'one-stop-shop' for assistance. For some communities only one location was available, given that municipalities were also fully engaged in suppression activities, managing their own operational responsibilities and running the Municipal Emergency Co-ordination Centres. Overall, the recovery centres received praise and were seen as providing valuable assistance.

24.13 The Municipal Emergency Co-ordination Centres became a focus for volunteers wanting to assist with emergency and community support. The Alpine Shire Council established and maintained a register of trained volunteers to assist the community. Those volunteers also helped Council with the multitude of extra administrative and support tasks they faced during the fire event. The Inquiry supports the idea of a register of trained volunteers and recommends it to other Municipal Councils.

Due to the heat of the fires that burnt through Alpine Ash forests in North East Victoria, the seed banks on the trees and in the soil were destroyed. The fires created a small time frame when seed could be spread in ideal soil and climatic conditions. This meant the Department of Sustainability and Environment collected some 1,580 kilograms of seed and have sown this over 1,600 hectares.

Plans for the next two years include the collection of another 1,800 kilograms of seed to be sown over 2,000 hectares.

DSE Forest Management

Assistance to Farmers

24.14 The Department of Primary Industries (DPI) received significant praise for the speed with which they contacted farmers whose stock were distressed, injured or dead as a result of the fires. Led by senior veterinarian officers, the Department's Agriculture Recovery Officers and other professionals speedily assisted with remedial advice and helped to identify stock suitable for sale to the abattoirs. They also assisted with stock disposal. Such tasks need to be done with speed and sensitivity. The Inquiry noted that, in some areas of the State, farmers did not appear fully conversant with this service and acted on uninformed advice – which they later regretted.

24.15 The Inquiry recommends that DPI promote an awareness campaign for the farming community in relation to this service.

Rehabilitation of Public Land and Water Catchment

24.16 The Department of Sustainability and Environment immediately commenced rehabilitation works following the passage of the fire. These works included actions to stabilise land, restore mineral earth breaks, protect catchments to minimise effects on water quality and, revegetate where necessary, for example, reseeding of Alpine Ash forest areas. A priority was to ensure the roads were open as soon as possible and were protected from landslip. Such works commenced when the organisation was still heavily committed to fire suppression.

The Importance of Roads

24.17 Both Municipal Councils and VicRoads appear to have reopened and repaired roads with efficiency. However, there were complaints that this work should have been completed sooner. The Inquiry recognises the inherent tension between safety and access, particularly for the transport of critical supplies such as fodder. However, we note that the ability to access the municipality early in the recovery process provides a critical foundation for effective recovery.

Centrelink: Access and Eligibility Issues

24.18 In some cases, road closures affected people's eligibility for Centrelink support.

24.19 For example, the access road to Falls Creek closed for some days during the peak of the fire. This affected electricity and other communications. The local community were fully engaged in the firefighting effort. When the road was reopened and individuals went to register for income support, they were unable to seek recompense for the full period because they had been unable to access the appropriate Centrelink office and forms.

24.20 The Inquiry believes the Commonwealth Government should review eligibility criteria and registration processes for those without employment who are engaged in an emergency response and unable to access the appropriate Centrelink office. The Inquiry also asks that eligibility criteria be communicated to communities at community briefings.

24.21 Eligibility for Centrelink payments was an area of frequent concern among volunteer firefighters and other community members. Centrelink claims are only paid from the date of registration, and that registration must be completed in person. The Inquiry fully understands the reason for this. However, during the North East and Gippsland fires, many of those engaged in casual and even permanent employment were left without income due to the effects of bushfire on local industries (including a general decline in local amenity that severely affected tourism).

Community Development and Financial Support

24.22 The North East and Gippsland fires burnt across land deep in drought, placing additional stress on many farmers, small businesses and tourism operators. The fires drove tourists away with the result that secondary incomes (and sometimes primary incomes) for many rural families were affected.

24.23 Many of these people are volunteers for the Country Fire Authority, Victorian State Emergency Service, Red Cross, Country Women's Association and other support groups. As a consequence some of these people have also lost income due to their involvement in response activities.

24.24 We discussed these concerns with DHS and recommended that the funding available to Municipal Councils for community development officers be available for as long as a demonstrable community need exists. Financial counsellors were also in high demand. The Inquiry is confident that DHS is fully aware of these issues.

24.25 Many individuals and families need emergency and relief support for items that don't fall within existing programs. For example, many families suffered direct and indirect hardship through the loss of a second income. Many were ineligible for disaster relief payments. The Inquiry formed the view that Municipal Councils should be in receipt of untied monies from Government to assist with support in these situations.

24.26 It was evident that the relationship between those seeking support and those providing it is a fragile one, easily disturbed. Many of those requiring support did not initially recognise their own needs, while others were reluctant to ask for help or seek support from a local person, due to concerns about privacy. We therefore suggest that community development officers have flexible funding so that specialist services can be purchased or brokered. Services offering support, advice and guidance could be sourced through a range of organisations and providers. We have raised this matter with a number of professional associations and lobby groups. The Inquiry notes that Government should not be viewed as the only source of community support.

The Role of Ministerial Taskforces in Recovery from Major Emergencies

24.27 In recent years, Ministerial Taskforces have been established to oversee social, infrastructure and economic recovery following a number of major emergencies. This recognises the importance of assisting communities to return to normal functioning. It is also a recognition of the scale of recovery work.

24.28 However, each Taskforce has been established on a case-by-case basis and this consumes valuable time: terms of reference need to be agreed to and the necessary administrative processes and administrative support set up. The value of such Taskforces has been clearly established, and there are efficiencies to be gained by formally recognising their establishment as one of the co-ordination options open to Government. This would allow for preplanning and any necessary arrangements to be put in place. This, in turn, would ensure a more timely response to community needs in extreme or large-scale emergency events.

Recommendations

24.29 **That Municipal Emergency Resource Officers develop registers of volunteers willing and available to provide assistance and support during the response to, and recovery from, emergency incidents.**

24.30 **That DPI actively promote as widely as possible within the community, the agricultural recovery service available during emergencies to ensure all farmers are aware of the services provided.**

24.31 That VicRoads and Municipal Councils review procedures and processes to ensure that the identification and delivery of remedial works on State and Council roads following emergency events are as efficient as possible.

24.32 That the Victorian Government recommend to the Commonwealth Government that it reviews eligibility for those without employment who may or may not be engaged in an emergency response, and are unable to access the appropriate infrastructure to register for financial assistance.

24.33 That Government funding for Community Development Officers engaged in community support and rebuilding incorporates flexible resources to enable the purchase of services from a range of providers to ensure choice for those requiring support.

24.34 That the *Emergency Management Act 1986* be amended to include a provision that, on the recommendation of the Minister for Police and Emergency Services as Co-ordinator-in-Chief of Emergency Management, or of another Minister, the Premier establish a Ministerial Task Force to oversee recovery in situations of extreme natural disaster or other emergency events.

Response and Recovery: Two Sides of the Same Coin

24.35 While the Inquiry heard many positive comments about recovery efforts, there were also criticisms. Many community members and agency representatives expressed concern at delays in initiating and delivering recovery support. In part, this could be due to the protracted nature of the fire which meant that response and fire suppression activities continued for a number of weeks, diverting resources and attention.

24.36 Nevertheless, the Inquiry believes it is important for recovery to commence when the fire event (or any other emergency) commences. Recovery is not a post-event process but a parallel one; response and recovery can, and should, be integrated.

24.37 This ability to respond quickly to the recovery needs of communities relies on comprehensive preplanning and an ability to commence work while an emergency response is still underway.

Planning for Programs and Entitlements

24.38 If recovery efforts are to be timely and appropriate they need to be delivered as soon as practicable after the passage of the fire front. This was the intent of the Ministerial Taskforce on Bushfire Recovery. In hindsight, time was lost establishing programs and entitlements rather than delivering them. Those providing support, information and awareness programs first had to be trained in a set of new rules. This took time and caused frustration within communities.

24.39 Even so, the Inquiry is of the view that the Ministerial Taskforce acted as a focal point for Government and agencies, galvanising Departments into action and response, and providing a focus for information sharing and problem solving. The Taskforce successfully linked Government and the community.

Planning for Infrastructure

24.40 Effective recovery requires supporting infrastructure – a point that may not be widely understood.

24.41 For example, additional infrastructure is established for suppression activities but is soon removed once the emergency response has concluded. A clear example is Telstra's excellent work in supporting agencies and the community with additional capacity and services and the speedy restoration of telecommunications services. However, once the emergency had passed, the additional capacity was removed at the very time many people were returning to their communities and seeking to rebuild their lives. Communication is as critical at this point as it was the day before. This example is not intended as a criticism of Telstra but shows how response and recovery are parallel events.

24.42 All agencies need to ensure they have contingency planning in place for adequate surge capacity for recovery operations. This applies both to Municipal Councils, utilities such as electricity supply companies, and DHS.

Effective Recovery Planning: Positive Models

24.43 Effective recovery planning creates positive impacts.

24.44 The efforts of land managers in Gippsland illustrate this point well. The Divisional Emergency Response Co-ordinator convened a briefing for land managers and utilities at Lakes Entrance on 24 January to emphasise the potential impact on communities of the fires burning at the time. One of the briefing outcomes was a concerted effort on the part of those agencies to prepare for the possible consequences of bushfire. Measures were put in place that allowed a prompt recovery effort after the passage of the fire, thus mitigating the impact of fire on the community. We commend this model to all those involved in emergency response and recovery.

24.45 In order to implement effective concurrent and integrated response and recovery activities, personnel involved in recovery should be located in, or adjacent to, the Municipal Emergency Co-ordination Centre. Close links between this facility and the Incident Control Centre are essential to ensure the flow of accurate and timely information.

24.46 Operating the Municipal Emergency Co-ordination Centre beyond the response phase and into the recovery phase appears to be the most logical arrangement. The infrastructure is in place, the community knows where the facility is located and how to make contact, and much of the information needed to progress recovery activities will already be available.

Recommendations

24.47 That recovery is recognised as commencing at the same time as response and that recovery planning and delivery is an integral part of the operations of the Municipal Emergency Co-ordination Centres.

24.48 That all Departments, statutory authorities, utility providers and Local Governments be made aware of the need to develop contingency plans for recovery activities, and that such plans, and associated public education and information strategies, are included in the Municipal Emergency Management Plans.

24.49 That all agencies engaged in recovery participate in community briefings prior to and during emergency events, to ensure recovery issues are reinforced and communities are informed of the processes established to assist individuals – including matters that are not the responsibility of Victoria, such as Centrelink payments.

Relief and Recovery – Predictable, Equitable, Consistent

24.50 We have argued that effective recovery is built on immediate response. To facilitate this, well-publicised guidelines for entitlements must be in place prior to any emergency event. Significant tensions exist within some sections of the community because people believe the current financial assistance provided to communities by Government is less than that provided after fires in previous years. The most frequently quoted example is fencing.

24.51 The Victorian Government provides financial assistance to households and small businesses affected by natural disasters within the framework of the Commonwealth's Natural Disaster Relief Arrangements. Under these arrangements, the Commonwealth reimburses the State 50 percent of the cost of approved assistance measures, once a State expenditure threshold of $200,000 is exceeded.

Financial Assistance - Equity

24.52 The largest financial grants are for those households whose principal dwelling is rendered uninhabitable by a natural disaster such as bushfire, flood, storm or earthquake. The size of grant is assessed in terms of the level of need. Eligibility is established through an income test, taking household size into consideration. The maximum grants available total some $22,800.

24.53 It is highly desirable that Government financial assistance schemes such as the Personal Hardship Grants adhere to the principle of equity. This means that when assistance is provided to different people in different events, it must be *apparent* that the assistance is fairly provided. That is, it must be apparent that people with *similar needs receive similar assistance*. The reasons for any differences in treatment should be obvious and broadly acceptable.

Fire Damage Benambra
February 2003 – CFA

24.54 Post-emergency financial assistance occupies a sensitive and difficult space. It is administered as part of the social welfare system and must operate consistently with those principles. However, it is also part of emergency management and often provided when a local community is undergoing a very public crisis. At these times, the wider community and Government want to be seen to be doing something urgently to restore that community's normal functioning. The Government's package of assistance must be seen as comprehensive, whether or not public appeal moneys are being distributed to affected communities and individuals.

24.55 In addition, the policies governing such assistance are not always the same in relation to the personal and economic impacts of a natural disaster. For people whose home and livelihood are affected by the natural disaster – for example, farmers or tourist operators – the nature of Government financial support for damage to their home will differ from the nature of support given to their business.

24.56 Assistance to businesses affected by natural disasters is strongly influenced by the view that those losses are not a special category; business owners should protect their income source thorough prudent risk management, such as insurance or other financial products that smooth out income fluctuations. While low-interest loans are usually offered after natural disasters to businesses with reasonable prospects of recovery, cash grants are not normally provided.

24.57 To achieve substantial equity in Government post-emergency financial assistance we would need to compare a number of factors:

- Assistance available to householders, small businesses and non-profit organisations;
- Type of emergencies (bushfire, flood, storm or earthquake);
- Other events of the same type; and
- Previous policy and practice for assistance.

24.58 Achieving substantial equity in these situations may well be unattainable.

Insurance and Income Thresholds-Dilemma

24.59 An obvious equity issue arises for those people whose application for a Personal Hardship Grant is rejected because they are insured or have an income above the test thresholds. These people, who have been prudent, may well complain of discrimination when those who fail to insure, for whatever reason, do receive Government assistance. However, if the Government made significant grants available to those who are already insured, Government would be accused of providing a *disincentive* to insure – and accused of wasting taxpayers' money.

24.60 The income test applied by the State is intended to ensure that grants are targeted to those people most in need, that is, those who may not be able to afford insurance among all their competing household expenditure needs.

24.61 Claims of inequity can also arise when recipients of the Emergency Grant following a single house fire of non-natural causation see that other people whose houses are damaged or destroyed as a result of a bushfire, flood, storm or earthquake can receive far greater amounts for what appear to be equivalent losses. The point to explore here is whether there really is a difference between (i) the needs of an individual household at a time when the rest of the community is unaffected and has available resources to assist, and (ii) the situation where community resources are stretched or exhausted because of an emergency event which has affected several or more households in similar ways.

24.62 A further issue is that eligibility for grants is tied to *natural events* defined under the Natural Disaster Relief Arrangements. Grants would not be available for other emergencies that might inflict similar damage, such as a chemical incident or aircraft crash. The current approach results in an ad hoc consideration of each event. This is inequitable in that it can lead to delays in assistance being provided, and would inevitably politicise the grant process. However, that is the Commonwealth's preferred position.

24.63 One way to redress equity issues is to target money from public appeals (where they are initiated or supported by Governments) to those whose needs fall outside standard assistance guidelines or whose personal situation renders them technically ineligible for Government assistance.

Clarity of Policy

24.64 While there are clear policy positions in relation to personal hardship grants, the Inquiry recommends that a clear and consistent policy be developed for assistance to the community arising from *all* emergency events. This policy cannot, and should not, replace prudent risk management by individuals, business and landowners. Ultimately, the community is a partner in all such events and must accept an appropriate level of risk; we are not proposing that individuals transfer their risk to the State through inaction. The best strategy for Victoria is planning and preparation combined with appropriate insurance. Having said that, these plans and actions are best developed within a known and consistently applied policy framework.

24.65 The Inquiry considers that Government should review financial assistance and relief measures, including fencing policy, to develop a policy framework that holds for all circumstances in accordance with the following two principles:

1. It should not replace prudent risk management (insurance) by private land holders; and
2. It should be *predictable*, *equitable*, and *consistent* when applied to different areas, different emergencies and over different years.

24.66 The framework should include general policy guidelines that can be flexibly managed where appropriate by local managers, applied in accordance with the above principles and linked with local circumstances and needs. It should also provide an imperative for appropriate land management on public land at the public/private interface.

Recommendation

24.67 **That Government review the emergency relief and financial assistance policy, and develop and communicate a predictable, consistent and equitable policy designed to assist the community to recover from emergencies, including natural disasters.**

A Case Management Approach to Recovery

24.68 Representatives from Government, non-government and community organisations visited farms and households to provide support and to assist people in accessing relief entitlements.

24.69 While these representatives were undoubtedly well-intentioned and acted in the best interests of those affected by the fires, the Inquiry was told that many community members became frustrated at the amount of paperwork and the number of forms. People engaged in rebuilding their lives, businesses and communities – busy hand feeding and hand watering stock, rebuilding fences, disposing of stock and making good other damage to their property – were required to 'tell their story' and give their personal details to each and every agency in the hope that an entitlement may flow.

24.70 Unfortunately, co-ordination and information sharing between organisations appears to have been minimal. The current approach is time consuming and frustrating for both individuals and the community – and it is no guarantee that people will not slip through the cracks.

24.71 The Inquiry therefore believes there should be a case management approach to recovery.

24.72 This should be co-ordinated through the established recovery processes to ensure that personal details are captured by one organisation, and then shared with other appropriate agencies when they need to interact with individuals and households. This should also provide a more efficient way of assessing eligibility if additional entitlements become available through the efforts of charities and fundraising.

24.73 The Inquiry was also told that it was frustrating to ring Government for advice or assistance, and be passed from person to person or from department to department. It appears that, in some cases, people gave up in frustration. Quite conceivably, they may have missed out on entitlements.

24.74 The Inquiry believes contacting Government can and should be done more efficiently to provide the service the community is entitled to expect. We propose a 'one-stop-shop' approach that would operate in concert with our recommended case management approach.

24.75 A community awareness campaign should accompany these processes. Formal consent may be required from individuals to ensure their information can be shared and that privacy concerns are managed.

Recommendations

24.76 **That DHS, in conjunction with Local Government, Government departments and the non-government sector, modify recovery planning at all levels to include a case management approach supported by an appropriate information system to be activated at the time of an emergency.**

24.77 **That the Privacy Commissioner be asked for advice in the development of this model.**

24.78 **That the State Emergency Recovery Committee explore opportunities to establish a 'one-stop-shop' approach wherever practicable following emergencies, including a single telephone number to connect a person to all agencies involved in the recovery process.**

Fencing and Rehabilitation: Private Land Damage Following Fire Suppression Works

24.79 These issues were addressed in the Interim Report (Appendix III) and Government has accepted the following recommendations.

Recommendation 4 from Interim Report

That Government initiate a review of the fencing policy for boundary and internal fences damaged as a result of a fire.

Recommendation 5 from Interim Report

That Government develop a consistent policy for the rehabilitation/restoration of private assets damaged or consumed in authorised fire suppression activity.

Conclusion

24.80 Recovery efforts have been, and continue to be, wide-ranging. This Chapter has looked at some of those efforts and the issues they raise, including community development, welfare and financial support, the rebuilding of infrastructure such as roads, and the impact on farmers and communities.

24.81 A particular concern is the depth of physical and mental exhaustion evident in many of the communities we visited. This is reflected in both personal and community wellbeing.

24.82 The Inquiry believes that recovery will be a long and slow process that will continue in fits and starts as new hurdles emerge. Government must continue to work in partnership with volunteers, farmers and other small business operators to meet that ongoing challenge.