A significant change in the way government and Victorians manage fire is required to meet future bushfire challenges.
Minister Jennings

Fire is a natural part of our environment that has shaped our landscape through natural ignition (lightning) and indigenous burning practices for thousands of years. Ironically, however, our success in suppressing bushfires has led to an unnatural build up of fuels and deterioration in ecosystem health.

The combination of high fuel loads, drought and climate change is driving a significant increase in bushfire activity. Notable recent events include the 2003 Alpine, 2006 Grampians and 2006/07 Great Divide fires.

Living with fire – Victoria’s Bushfire Strategy emphasises the importance of preventative actions to meet future bushfire challenges. The increased use of fire as a management tool, in particular, planned burning together with engagement of communities in decision making, aims to reduce the frequency and impact of the large, landscape-scale fires experienced in Victoria over the last decade.

Bushfires will remain a part of Victoria’s summers. Resilient communities however, are well informed, well prepared and best able to manage this threat.

Minister Cameron

Victoria’s firefighting agencies are renowned as world leaders in bushfire response. With a measurable increase in the number and severity of bushfires over the last decade, it is vital that we continue to build our response capabilities.

To help protect communities, the first attack capabilities of our fire agencies are critical. Having the right mix of aircraft and fit, skilled and experienced firefighters spread across the state is crucial to providing rapid first attack.

Highly skilled well-equipped firefighting agencies are required to respond to bushfires as well as undertake planned burning to reduce fuel loads.

Living with Fire will provide additional support to regional and at risk communities, paid and volunteer firefighters to ensure we can safely meet future response and prevention challenges in an increasingly active bushfire environment.

This Strategy will build the capacity of our firefighting agencies using shared equipment coordinated through better integrated emergency management systems.

Living with fire is Victoria’s first comprehensive bushfire strategy. It seeks to reduce the threat of bushfires while facilitating resilient communities and improved environmental outcomes. It will enable our bushfire agencies to be better prepared to meet future challenges in a time of climate change.

Gavin Jennings MLC
Minister for Environment, Climate Change and Innovation

Bob Cameron MP
Minister for Police and Emergency Services
This Strategy provides direction and a framework to:
• Increase the area of Victoria's public and private land treated with fire to reduce fuel loads, maintain ecosystems and manage future bushfire risk;
• Inform local communities engaged in bushfire planning, preparedness, response and recovery;
• Optimise firefighting resources available to undertake planned burning, response and recovery operations – supported by equipment and training; and
• Improve land use planning and adaptive management by fire agencies to mitigate risk and facilitate continuous learning.

The last decade has seen a dramatic increase in the number, size and severity of bushfires in Victoria. The major fire events of the 2003 Alpine Fire, 2006 Grampians Fire and the 2006/07 Great Divide fire are all evidence of increasing fire risk. Similar trends are being experienced in North America and Europe, including California (2007) and Greece (2007).

Bushfires are a vital part of our natural environment, driving regeneration and maintaining the health of species and ecosystems. The combination of drought, climate change and unnaturally high fuel loads however, has created an unprecedented bushfire risk.

Victoria's bushfire agencies are very successful at first attack firefighting, keeping most fires to small sizes and limiting their impact. An unintended consequence of this success is that large amounts of natural fire (lightning initiated fire) has been removed, resulting in a build up of unnaturally high fuel loads.

To position Victoria to meet future challenges and reduce the threat of bushfire a clear strategy is proposed. A key focus of this strategy is an increased planned burning effort in Victoria.

Burning will always be risky. It requires significant planning, risk management and operational capability.

In addition considerable community awareness, acknowledgement and sharing of risk are required to undertake this activity.

Understanding the risk and ecological needs of our environment will underpin the use of planned fire and the treatment of bushfires. As well as reducing bushfire risk to the community, planned fire is important to sustain ecosystem health and resilience. Across the landscape a mix of areas burnt with different severity, at different times of the year, and at different frequencies will provide a patchiness that provides a healthy diversity in our parks and forests while also reducing fuel loads.

To carry out the burning program at the scale necessary will require a significant investment in trained and experienced firefighters across the Department of Sustainability and Environment (DSE), its partner agencies and the Country Fire Authority (CFA).

This strategy will position Victoria's bushfire management agencies to effectively manage risk in partnership with the community with clear direction under six themes.
Strategic directions

Managing the land with fire
Increase the planned burning effort based on ecological and risk management objectives. This will require building firefighter capability to resource an expanded planned burning program, including a landscape scale mosaic burning program on public land plus support for planned burning on private land.

Building community capacity to live with fire
Improve the community's understanding of the role of fire in the environment and increase shared responsibility for risk, prevention and preparedness for bushfire.

Enhanced response and recovery
Continue to lead the way in fire response while building on our recovery efforts. Including:
- aircraft and rappel crews for rapid and remote area response;
- greater integration across agencies, including shared vehicles and the integrated Emergency Coordination Centre;
- road and strategic fuelbreak networks for increased protection and safer working environment for firefighters;
- seamless integration and support for recovery from bushfires.

Workforce/volunteer capability
Build and maintain a skilled, fit and experienced firefighting force to deliver an increased planned burning program, meet rising response needs and provide support to volunteers.

Planning for protection
Provide the community and planners with better risk management and mitigation tools, including the acceleration of the implementation of Integrated Fire Management Planning.

Risk and adaptive management
Develop a more responsive approach to the management of bushfires based on continuous learning and improvement through the development of interagency risk modelling, statewide scenario planning and improved ecological research and monitoring.
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Fire is a natural part of the Victorian environment

The Victorian environment is one of the most bushfire prone areas in the world. Natural ignition (lightning) and indigenous burning practices have shaped our ecosystems over tens of thousands of years. Many ecosystems are reliant on bushfire to regenerate and maintain health.

Natural fire regimes vary widely across the State. Drier areas, such as the Mallee and coastal heath may burn each year, while wetter forests, including the Central Highlands and the Otway Ranges burn less frequently and often only following periods of extended drought.

Successful first attack and suppression efforts have removed much of the natural fire from the Victorian landscape and have unnaturally increased the length of time between fire episodes across large tracts of forested areas.

As a consequence fuel loads are at an unprecedented high level (see figure 4).

The number and severity of bushfires has increased

The last decade has seen a significant and measurable increase in the number, intensity and area burnt by bushfires. In 2006/07 a record number of fires occurred. There were 1,083 ignitions on public land alone – 45% above the thirty year average. In excess of 1 million hectares were burnt. Projections suggest that this will continue to escalate.

The 2002/03 season was of a similar scale.

There is a direct link between drought, increased fire activity and more intense fire behaviour.

Over the last century, major fire events, including 1939 Black Friday, 1983 Ash Wednesday, 2003 Alpine Fires and the recent 2006/07 Great Divide Fires have occurred during extended periods of drought.

Drought compounded by climate change

Victoria historically experiences a ten to fifteen year dry-wet cycle. The severity and longevity of the current drought, however, with record low rainfall and high temperatures, is unprecedented.

Climate change will mean longer, more intense drought periods, lower average rainfall and increased temperatures. The number of Very High or Extreme Forest Fire Danger days are projected to increase by up to 20% by 2020 and up to 60% by 2050 (Hennessy et al., 2006). Storm events are also projected to increase in severity. This is significant as lightning is a major source of ignition for bushfires.

Historically, severe bushfire events, while relatively rare (less than 5% of recorded fires), cause 95% of life and property loss (Cheney 1976). The projected increases in severe fire conditions will lead to a likely rise in the occurrence of damaging bushfires. This means that a minor increase in occurrence will have major consequences.

The frequency and impact of fire related events is also predicted to rise. For example, the combination of more localised storms and increased flash runoff from burnt catchments is likely to increase flood events, as experienced in Gippsland in June 2007.

Climate Change is projected to directly affect ecosystem services and biological productivity (e.g. water, timber production, biodiversity) which, if coupled with severe bushfire events, will have significant detrimental impacts.

There is a clear upward trend in the number and severity of bushfires over the last seventy years.
Bushfires threaten water catchments, settlements, local economies and biodiversity

Victoria has over 7 million hectares of largely forested public land, approximately 50% of which is National Park.

Vulnerable settlements

Loss of life and settlements from bushfires is well documented in Victoria’s history. The Ash Wednesday fires of 1983 resulted in 47 deaths and the loss of over 2,500 houses and buildings.

The “sea change/tree change” trend to semi-rural lifestyles and ongoing development of the urban rural fringe over recent decades, means more lives and assets are at risk from bushfires. The value of assets has also increased dramatically with rising property values and investment.

Resilient communities

Bushfires have immediate and long-term psychological impacts on individuals and communities, including anxiety, fatigue and financial stress. These impacts can compound existing stresses from drought and flood events, which have particular impact on volunteerism.

Agriculture, forestry, tourism and associated service industries are particularly vulnerable.

The 2006 Grampians fire resulted in an estimated $100 million downturn in the local economy. Nearly 60% of the region’s businesses derive income from tourism associated with the Grampians National Park.

Water catchments

Melbourne’s water storage levels have been at record lows for some years. Water storage for other settlements including Geelong are even more critical.

Fires in catchment areas have both immediate and long-term impacts on water supply.

Short-term impacts include:
- Poor water quality needing significant additional treatment costs;
- Increased erosion resulting in increased sediment loads; and
- Poor river health.

The most significant long-term impact of fire in water catchments is a dramatic drop in yield. In prime wet forests, such as Melbourne’s catchments, water yield falls by as much as 50% for up to thirty years, as regenerating vegetation requires far more water than a mature forest (Lane, 2007).

The 2003 Alpine Fires burnt over 25% of the Murray River’s Victorian catchment which is estimated to have resulted in at least a 10% reduction in flow.

The Thompson Catchment provides up to 60% of Melbourne’s water supply and was directly threatened during the 2006/07 Great Divide fires. It is estimated that burning this catchment would decrease water yields by over 30% for at least 30 years, requiring over 100 years to recover. Water quality would also be impacted.

The 2003 firestorm that devastated Canberra inflicted significant damage to Canberra’s catchments requiring substantial investment – $3.5 million on catchment repair and stabilisation plus $50 million upgrades to water treatment facilities to deal with the higher sediment loads.

Infrastructure

Much of the State’s critical infrastructure is located in remote and forested areas including road and rail networks, telecommunications, gas pipelines and power lines.

During the 2006/07 Great Divide fires, smoke from the Tatong Fire shorted major high voltage power lines resulting in loss of power and a “brown out” in Melbourne and across much of Victoria. The estimated economic impact / loss of this one day event was $500 million.
We are not alone: Interstate and international trends

Similar trends are evident in other parts of Australia – notably in South Australia and the ACT. The 2005 Wangary Fire on the Eyre Peninsula in South Australia resulted in nine deaths and 93 houses destroyed with an estimated $100 million loss to the economy.

Significant increases in the incidence of fires are being experienced globally. Since 1983, South East Asia has experienced 3 landscape-scale fire events in excess of 3 million hectares each. The most recent in 1997/98 consumed 5.2 million hectares of rainforest in Indonesia, resulting in an estimated $US10 billion loss.

The 2007 fire season in Greece was of a severity and loss never before seen, with over 3,000 fires for the season. In particular, the fires of late August had devastating impacts with 190 fires burning 200,000 hectares with 64 deaths and over 2,000 houses and buildings destroyed.

The 2007 fires in southern California were the latest in a sequence of unprecedented disasters with 9 deaths, 1,500 houses destroyed, over 1 million people evacuated (the largest in US history) and over $US1 billion loss.

Forest resources

Bushfires have had major consequences for forest resource industries. The 2003 Alpine and 2006/07 Great Divide fires burnt a significant proportion of Victoria’s native forest timber resource and may have long-term impacts on timber harvesting volumes. Forest areas also play an increasingly important role as sinks for carbon sequestration.

Biodiversity

While fire is vital for maintaining the health and regeneration of our ecosystems, severe bushfires can have devastating impacts on biodiversity. Higher fuel loads increase the intensity of bushfire, leading to greater damage over much wider areas.

Large and severe bushfires that burn over 1 million hectares with large areas of high intensity have immediate and devastating impacts on biodiversity, with few refuges left for recovery of both plants and animals.

Species and ecosystems have evolved to adapt to specific fire regimes (season, frequency and intensity). Altered, typically more infrequent but intense fire regimes, will have significant consequences on ecological communities and individual species.
Climate change, bushfires and the carbon cycle

Carbon, in particular increasing levels of atmospheric carbon dioxide (CO₂), is a key driver of climate change. The carbon cycle describes the natural processes of carbon release and capture (sequestration).

It is now understood that human activities have resulted in the long-term carbon cycle becoming imbalanced, with more CO₂ released (land clearance and, in particular, the burning of fossil fuels) than is stored or sequestered. In the short–medium term natural carbon storage generally occurs through plant growth.

The forest/fire carbon cycle

The natural forest carbon cycle is a balanced system over time with decomposition and fire releasing carbon into the atmosphere and forest regeneration and growth capturing or sequestering it. The length of the cycle and amount of carbon in the system varies depending upon the forest type, management regime and frequency of fire.

In a balanced system, fires naturally consume the fine fuels (litter, shrub and bark layers), which contain only a small percentage of the carbon, leaving the larger fuels (trees and logs). Regrowth over time replaces this material, sequestering carbon and maintaining the carbon balance.

Increased severity of bushfire seasons threatens to further imbalance the carbon cycle by releasing more carbon than has taken place historically. These high intensity bushfires consume increased levels of stored carbon (soil, trees and logs), releasing more CO₂ into the atmosphere and requiring a longer time period of regrowth to restore the carbon balance.

Inappropriate fire regimes, especially an increased frequency of severe fires, may also affect the distribution and productivity of forest types and their carbon sequestering capacities.

A key finding from Australia’s State of the Forests Report (2008) identified that the greenhouse gasses released from the extensive bushfires during the reporting are expected to be offset by new forest growth since total native forest carbon stocks have changed little over the long-term.

Recent research indicates that planned burns, which are generally less intense, release significantly less CO₂ over time than severe bushfire events.

Cultural heritage

Indigenous people in Victoria have for generations managed the land, coast and sea. Their management has created a rich cultural heritage. While much of their generational heritage has been lost since European settlement, substantial and valuable cultural heritage remains.

The protection of cultural heritage values is increasingly being incorporated into fire management, with cultural heritage protection under planned and emergency conditions improving over recent years. Fire agencies will work in partnership with Indigenous people and Traditional Owners of Victoria to ensure cultural heritage values are being considered as part of our planning during all fire management activities.
Bushfire agencies are very successful at putting out bushfires

Victoria's bushfire agencies are regarded as world leaders in bushfire response and community engagement. More than 80% of Victorian fires are contained as small fires (less than five hectares). The remaining 20% of fires result in 90% of areas burnt annually. Aggressive first attack prevents fires from developing into large fires. Meeting this objective in remote areas across Victoria is a significant challenge.

Victoria's bushfire agencies are also among the world's best in raising the level of awareness about fire and in providing education and engagement programs to communities at risk. There is a high level of community acceptance that a tanker will not be available to defend every property. The community's understanding of risk and shared responsibility has grown considerably in recent decades following the lessons of Ash Wednesday.

Figure 3: History of fire in Victoria

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<td>Natural fire</td>
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<td>Landscape scale fire</td>
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<td>• Australia separates from Gondwana and north</td>
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<td>• Australia leader in burning</td>
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<td>• 1939 and 1944 Fires; Stretton and other inquiries; Rural settlement &amp; development</td>
<td>• Forest and fire science initiated</td>
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<td>• Natural lightning fires (at least 200,000 years ago)</td>
<td>• Early (independent brigades); Limited structure and organisation; Forests and CFA Acts</td>
<td>• Declining burn size</td>
<td>• Linton/Moggs Creek Fire (edge protection)</td>
<td>• Climate change – decadal drought</td>
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<td>• Aboriginal settlement and fire use (40,000 years ago)</td>
<td>• Forest and fire science initiated</td>
<td>• Increasing quality assurance– input focus</td>
<td>• Australia leader in burning</td>
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The characteristics of bushfires and our organisational capacity to manage and respond has changed significantly over time.
The cost of suppression
The 2006/07 Great Divide fire ran for 69 days and burnt over 1 million hectares. Suppression of this fire cost $170 million on top of regular budget allocations. Additional sums were made available for recovery.

In the USA, both the costs and the area burnt have more than doubled over the past decade. The average area burnt nationally now exceeds 3 million hectares. Annual fire suppression costs have exceeded $US1 billion since 2000.

Who fights fires
Victoria has three firefighting agencies.

**DSE** is responsible for fire on public land (1/3 of the State). DSE, along with its partner organisations, Parks Victoria, Department of Primary Industries, Melbourne Water, Department of Planning and Community Development and VicForests, form the Networked Emergency Organisation (NEO) with over 2,500 staff with specialist accreditation for fire duties. This workforce is supplemented by up to 700 seasonal Project Firefighters (PFF) during the bushfire season.

**CFA** is responsible for fire on private land in rural areas, the urban/rural fringe and much of greater metropolitan Melbourne. In addition to bushfire, responsibilities include structural (building) fires and a range of broader emergency responses. CFA consists of approximately 58,000 volunteers (of whom up to one third are operational firefighters), supported by paid firefighters and other staff.

The Metropolitan Fire and Emergency Services Board (MFB) is responsible for the Metropolitan Fire District with some, but limited, involvement in bushfire.

DSE and CFA personnel work closely to ensure an integrated and seamless approach to fire response and management across public and private land, sharing resources and jointly managing incidents when required.

The performance of bushfire agencies is regularly reviewed
Victoria’s bushfire agencies have benefited from regular independent reviews, internal assessments and international benchmarking.

Most recently, the Environment and Natural Resource Committee (ENRC) undertook an inquiry and tabled a report into the **Impact of Public Land Management Practices on Bushfires in Victoria** to Parliament in June 2008. This Strategy is a key part of government’s response to the ENRC inquiry.

A measurable improvement in performance over time is well documented.
Shared responsibility for risk

Appropriate risk management requires the involvement and acceptance of all stakeholders, including the community, industry and government. A key Government role is to provide leadership and advice to the community and industry. Well informed individuals and businesses are often best placed to assess and manage their own exposure to risk.

Managing bushfire risks is a clear example of the need for shared responsibility between government, individuals and industry. Government undertakes bushfire prevention measures (e.g. planned burning), land use planning and emergency response (fire suppression). Home and business owners in bushfire prone areas need to take the necessary steps to prepare their property. Government, individuals and industry working together to share responsibility for bushfire risk will achieve the most desirable outcome.

The strategic direction required to reduce risk, raise awareness and improve protection

A bushfire strategy for Victoria requires a long-term vision with clear directions for the next four years.

Six key themes requiring attention have been identified, including:

- Managing the land with fire – a significant increase in planned burning effort to reduce dangerous unnaturally high fuel loads and promote ecosystem health and resilience;
- Building community capacity to live with fire – so that Victorians understand and support the imperatives for preventative activities and risks associated with fire management and share responsibility for bushfire preparedness;
- Enhanced response and recovery capability – improved first attack, integrated emergency coordination and response, adoption of latest technologies and support for recovery;
- Workforce and volunteer capability – retention of firefighter and specialist bushfire expertise across Victoria, succession planning and a robust model to support the current NEO arrangements and CFA volunteers;
- Planning for protection – improving how and where development occurs and better integration of conservation, production and risk reduction into land management; and
- Risk and adaptive management – understanding and adapting to future bushfire risks and challenges.
Managing the land with fire

**Strategic direction**

Increase the planned burning effort based on ecological and risk management objectives. This will require building firefighter capability to resource an expanded planned burning program, including a landscape scale mosaic burning program on public land plus support for planned burning on private land.

Fire is the only broad scale management tool available to deliver protection, biodiversity and ecosystem services needs.

Fire reduces fuel hazard to levels that provide firefighters with a reasonable chance of containing unwanted bushfires while they are still small. Planned burns break up the landscape sufficiently to reduce the impact of larger fires when they occur, while also promoting healthy and resilient ecosystems.

The natural role of fire in our environment

Victoria is one of the most fire prone areas in the world. Over tens of thousands of years, fire, together with climate, topography and vegetation type strongly influenced the nature and extent of the different forest, scrub and grassland ecosystems seen by the first Europeans.

Prior to European settlement fire continuously reset and regenerated the mix of species and habitat structures such as understorey vegetation, logs on the ground and trees with hollows, to provide diversity across the landscape. This diversity enabled many of our ecosystems to evolve and absorb disturbance, while still retaining their basic form and function over time.

In some areas, Aborigines used fire to promote food resources and significantly altered the timing, frequency, scale and intensity of fire (fire regimes), thus changing the species composition and structure of some ecosystems. Knowledge of the extent of Aboriginal burning practices and the impact on the landscape of southern Australia is, however, fragmentary and assumptions about the impact remain speculative.

Figure 4: Overall forest fuel hazard on public land (Feb 2007)
Early European management
With increasing pastoralism during the 1800s, deliberate burning of thick scrub by Aborigines was often violently discouraged due to the concerns of settlers about loss of fences and grass. This led to thicker understory growth in parts of the State.

Following the 1939 Black Friday fires, greater efforts were made to prevent bushfires and use fire for protection and production purposes. While this lacked a strong scientific basis, it was considered good for the bush – smoke and fire may have been a nuisance, but they were a part of life.

Over time, the use of fire for land management and fuel reduction became increasingly unpopular. In the face of an increasingly risk averse society and growing public concern about the environmental effects of fire, the lack of scientific evidence about ecologically sustainable fire regimes made the widespread use of fire as a management tool more difficult.

Fire protection plans introduced in the late 1980s focused more on burning along the forest edge (areas settled in and around forest margins). Since then the number of homes and other assets along the urban edge have increased and the use of fire has become even more contentious, complex and difficult.

Successful suppression and unnaturally high fuel levels
In recent decades a strong fire suppression culture, improved organisational skills and greater aerial technology have enabled most fires to be controlled while small.

With the exception of recent landscape scale fires, significant natural fire has been largely removed from the landscape, resulting in unnaturally high fuel loads. Some parts of the state that once burnt naturally every one or two decades have remained unburnt for over 50 years.

The occurrence of infrequent, large and severe bushfires rather than more frequent, smaller, dispersed and less intense fires has resulted in an imbalance of fire and less diversity across habitats and landscapes.

This imbalance increases the risk of large fires and also the possibility that some ecosystems will permanently change to a different composition or ‘state’ that is less diverse and less productive.

Reduced ecosystem resilience
In the face of significant change, caused by drought and increased fire activity, it is essential that our parks and forests have the natural diversity to maintain their health, species mix, structure, function and supply of ecosystem services, such as water and carbon storage. Ecosystems that retain the capacity to adapt to and absorb change will be more resilient.

Climate change adds a further layer of uncertainty and complexity to this issue, increasing the probability that some ecosystems will become increasingly stressed and may disappear.

Challenges
Fire as a land management tool
While Victoria’s bushfire agencies lead the world in bushfire management, there is a need to significantly adapt and change the overall approach to meet unprecedented challenges anticipated in the future. A continued focus on excluding and minimising the amount of fire in the landscape will only increase the frequency and impact of severe fires.

Fire is the strongest tool available to reduce the threat of severe bushfires.
to life, property and the environment. Planned burning reduces fuel loads and increases the likelihood of successful suppression efforts.

Many of our ecosystems also require fire to maintain their health and resilience. Fire regimes need to be based on the latest knowledge and tailored to meet a range of land management objectives, taking into account the climate, terrain, flora and fauna and the scale and patchiness of ecosystems.

The current scale of planned burning is insufficient to deliver desirable protection and ecosystem service needs (see Figure 5). Importantly, there is also an opportunity to use bushfires, which are burning under appropriate conditions, to achieve desired land and fire management outcomes.

**Fire management in the future**

Science and history suggest that we need to rethink our approach to managing fire in the landscape in order to redress the current imbalance. This is necessary to restore and maintain diversity in ecosystems, while better protecting human life and property.

Future fire management will aim to provide the right mix of fire (at appropriate frequencies, seasons, intensities and scales) across both public and private land to sustain resilient ecosystems, communities and industries and reduce the incidence of large scale severe fire events (see Table 1).

An increase in investment in Fire Ecology Frameworks has provided land and fire management agencies with a better understanding of the broad fire needs of major ecosystems. Recent landscape scale mosaic burns have successfully taken place in East Gippsland and North East Victoria.

### Table 1: Fire in the environment

<table>
<thead>
<tr>
<th></th>
<th>Fire as a management tool</th>
<th>Severe bushfires</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Includes planned fires and bushfires that meet specific land management objectives (desirable protection and/or ecosystem benefits).</td>
<td>Includes fires caused by arson, escapes or natural ignition that don’t meet land management objectives.</td>
</tr>
<tr>
<td><strong>Protection of life and property</strong></td>
<td>Reduces risks to life, property and public assets when a severe bushfire does occur.</td>
<td>Increase risk to or destroy life, property or public assets.</td>
</tr>
<tr>
<td><strong>Ecosystem resilience</strong></td>
<td>Maintains or improves ecosystem health and resilience, based on a particular ecosystem's requirements of fire frequency, intensity, scale and patchiness.</td>
<td>Reduces ecosystem health and resilience due to inappropriate fire frequency, intensity, scale and patchiness for a particular ecosystem.</td>
</tr>
<tr>
<td><strong>Provision of ecosystem services and public assets</strong></td>
<td>Protects or reduces risk to essential public and private services such as water supply, timber, soil, power and tourism assets.</td>
<td>Threaten significant damage to essential public and private services such as water supply, timber, soil, power and tourism assets.</td>
</tr>
</tbody>
</table>

*Smoke over Melbourne, April 2008*
**Shifting our perceptions of fire**

**Inherent risk**
Planned burning and using bushfires is inherently risky, with operations constrained by weather and the need to protect natural and built assets. These risks need to be weighed against the known and significant anticipated consequences from future severe bushfires.

The recent severe bushfire seasons inflicted significant losses on many rural industries, in particular the tourism and wine industries. As well as working with community, it is important that land and fire management agencies work closely with industry, especially in rural areas, to develop a balance between protection, ecosystem and industry needs.

**Air quality**
Bushfires and planned burning impact significantly on air quality in Victoria. Air quality during the 2006/07 bushfires was some of the worst on record in Victoria:

- Visibility was reduced to 0.4 km in Wangaratta and 1.2 km in Melbourne compared to an optimum of 20 km; and
- Particle levels were in the order of five times the optimum.

DSE and CFA work closely with the Environmental Protection Agency (EPA) and Department of Human Services (DHS) to provide advice to the community about reducing the effects of smoke from planned burning and bushfires, including coordinated information and an alert system on days of high smoke impact.

**Sharing of risk**
A greater and more consistent understanding of risks and an acceptance of the need to share them across all parties is required to achieve a new approach to bushfire management. Management and acceptance of smoke is an example of where risk sharing and trade-offs between conflicting interests and objectives are required. This involves weighing up the benefits of planned burns and the negative impacts of smoke generated from these burns against the greater amount of smoke, loss and damage arising from large-scale severe bushfire events.

Planned burning benefits the tourism industry by reducing the bushfire threat during peak summer holiday periods. Planned burning operations, including smoke and road closures, however, may also impact on visitor experiences and local tourism events. It is important that fire management agencies maintain strong communications prior to and during planned burning activities to reduce these impacts.

The lesson from the past 20–30 years is that if these risks and constraints are not understood and shared, but instead are allowed to overwhelm the wider use of fire as a management tool, then severe fires such as the Alpine and Great Divide Fires will become more likely and more devastating in a hotter and drier climate.
Building community capacity to live with fire

**Strategic direction**

Improve the community’s understanding of the role of fire in the environment and increase shared responsibility for risk, prevention and preparedness for bushfire.

**Changing the way fire agencies and communities work together**

Recommendations of the Victorian Bushfire Inquiry (2003) triggered significant changes to the management of bushfires, particularly the way in which fire agencies engage and work with communities. This has seen fire agencies design and deliver a suite of programs over the last five years to build a more informed and educated community, capable of living with fire.

Prior to the 2006/07 bushfire season, fire agencies delivered 1200 bushfire preparedness meetings across the state, attended by 27,000 people. During the 2006/07 Great Divide bushfires, over 30,000 people attended a record 320 community meetings delivered by fire agencies over the 69 day fire period.

“I can tell you it will be unanimous ... that CFA and DSE have done a magnificent job and are still doing it ... the interaction between CFA and DSE at the coalface in the meetings was just fine, not a difficulty”

---

Resident NE Victoria, 2006

The Victorian public has shown a heightened level of interest and awareness about bushfire events. This has been matched by a growing commitment and ability of fire agencies to inform and involve local communities across the prevention, preparedness, response and recovery (PPRR) continuum. This approach to engagement is better for supporting the incorporation of local knowledge into decision making, as well as generating greater confidence and trust in fire agencies to manage the fire threat.

“It is apparent that many Victorian communities are now much better informed about fire risk and potential than they were as little as five years ago. This has arisen as a direct result of sustained information to communities before and during fire incidents and the ongoing activities of the Fire Ready Victoria program”

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Smith, 2007

**Figure 7: Community engagement**

Communities capable of living with fire

- Awareness of the role of fire in the environment
- Understanding risks and sharing responsibilities
- Enhancing trust between fire agencies and the community

Aware and engaged communities are resilient communities

PHOTOS: BACKGROUND IMAGE – CFA; LEFT – CINDY HANN/DSE.
A growing fire threat

Despite improvements in working with communities, the threat of losing life and property through bushfire remains very real. While Victorian householders in high risk areas are increasingly well prepared to deal with risks posed by fire, many need to do more.

Victoria is experiencing the expansion of the urban-rural fringe communities, high population turnover, more transient and diverse communities and declining volunteerism. In addition, millions of holiday makers visit high fire risk areas, often with little knowledge or experience of fire.

Practical experience and research around community capacity building clearly demonstrate that long-term community change is achieved when people have a stronger sense of ownership in the programs that shape their lives. This ownership is brought about by providing quality information, involvement in decision making and the development of skills, resources and community networks.

Communities that are aware and prepared for bushfires also perform better during other natural emergencies. Following the April 2008 Melbourne wind storms, the Office of Emergency Service Commissioner identified that communities that had a strong focus on bushfire preparation and took responsibility for cleaning up their properties suffered less damage.

“Public safety is not just about the emergency services, it is also about communities and individuals who understand safety, who prepare and plan and know where and how to access critical information.”

Bruce Esplin, Victoria’s Emergency Services Commissioner

Meeting the needs of our diverse community

Fire agencies have developed comprehensive knowledge in designing and delivering engagement processes to meet diverse audiences. This experience is backed by rigorous social research into the knowledge and attitudes of Victorians.

In April and May 2008, a study of knowledge and attitudes within the Victorian public was made in relation to planned burning. The research involved rural and urban focus groups, in-depth interviews with peak bodies and major stakeholders and trials aimed at testing community engagement and education approaches.

The research revealed the public to be predominantly in favour of planned burning to aid asset protection and participants recognised that planned burning is a necessary part of land management. The research also highlighted a lack of knowledge about the process of planned burning and uncertainty surrounding its effectiveness.

The results of the education and engagement trials demonstrated a dramatic shift in support of planned burning following a relatively small level of engagement (Figure 8).

The research reinforced that the Victorian public require a varied approach to education and engagement activities around planned burning. For the majority, basic information and clear messaging will adequately build understanding. Dialogue and transparency are seen as key to building trust and acceptance of the use of fire as a management tool.

Figure 8: Overall impact of engagement trial on understanding and attitudes to planned burning

<table>
<thead>
<tr>
<th>Per cent</th>
<th>Baseline</th>
<th>Following community engagement trial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>78%</td>
<td>76%</td>
</tr>
<tr>
<td>0</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bruce Esplin, Victoria’s Emergency Services Commissioner
Vision for a capable community

Delivering an increased burning program will require a significant shift in the knowledge and understanding of Victorians about the role of fire in the environment and, in particular, an acknowledgement of the risks and benefits of an increased burning regime.

Victorians will need to:

• Understand the role of fire in the environment and the challenges of living in a fire prone country;
• Play an active role in helping land and fire agencies to make decisions around planned burning and other risk reduction options;
• Accept that managing risk and reducing loss is a shared responsibility between government and the community (including individual property owners);
• Work together to deliver greater resolution and agreement over conflicting objectives; and
• Increase resilience and foster proactive plans to protect community assets.

A key tenet of the Bushfire Strategy is to:

Build the capacity and confidence of Victorians to understand, accept and actively participate in the use of planned fire to ensure community safety and forest health.

How we will do it

Capitalise on our experience

Fire Ready Victoria (FRV) is a joint fire agency initiative developed in response to recommendations of the Victorian Bushfire Inquiry (2003). The program involves awareness campaigns, communication, education and empowerment in relation to bushfire and planned burning in Victoria. FRV is acknowledged as being successful in building community capacity to live with fire.

Campaigns for prevention and preparedness under FRV, the Stay or Go message and development of private landholder Bushfire Plans are among Victoria’s success stories in community engagement around fire prevention. Evidence from recent fires demonstrates increased levels of participation, understanding and preparedness among communities at risk from bushfire.

“I would expect in the event of fire you have to protect your own property. And I think that’s probably a point we all realised, we are all responsible for our own assets.”

   Resident, NE Victoria, 2006

An expanded Fire Ready Victoria program

FRV is an effective and proven delivery mechanism for engaging the community around living with fire. The program enjoys a strong community reputation and is the ideal delivery vehicle for community capacity building initiatives under this strategy. New programs will build on existing activities to build capacity across all facets of land and fire management.

1. Building community capacity

• Fire in the environment – More Victorians will be exposed to key messages around the natural role of fire, the use of fire as a management tool to increase community safety and ecosystem resilience as well as the need to share responsibility for risk.

Broad awareness campaigns providing improved information will be employed using media and advertising. Web-based information and text messaging services have been highlighted by the community as vital tools for providing information on bushfires and planned burns.
• **Community support for planned burning** – Communities in rural and interface areas and indigenous communities will be further engaged and involved in decision making around planning for fire. Local engagement teams, expanded education programs and community risk planning programs will support capacity building.

In addition, the formation of a Victorian Bushfire Roundtable to promote dialogue and shared decision making around fire planning with industry and key stakeholders, has been initiated. A trial has been endorsed by a range of key stakeholders representing primary industries, community and environmental groups.

• **Resilient communities** – Programs specifically targeting high risk communities including special needs groups will be developed to increase the adoption of preparedness measures and appropriate response behaviours. These programs also aim to build the confidence and support of these communities as key advocates for the activities of fire agencies.

Highly specialised education programs will target household and community plans and involve intensive case management. Communities will also be supported to manage psychological stress and social disruption created by major incidents.

2. **Building skilled and responsive organisations**

Delivery of effective community capacity building requires highly skilled and dedicated fire agencies utilising collaborative programs tailored to changing community demographics.

• **Local Engagement teams** – Key priorities will be the expansion of on-ground facilitators to actively engage with the community at the local level together with improved community engagement skill development across all fire roles.

• **Interagency partnerships** – Partnerships between land and fire agencies will be strengthened to ensure a coordinated and collegiate approach to land and fire management. The DHS work on bushfire preparedness in vulnerable communities is an example of a government partnership relevant to this strategy.

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**Figure 9: Living with fire: Community participatory engagement activities**

<table>
<thead>
<tr>
<th>Engagement Level</th>
<th>Example Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participate</td>
<td>• Community Fireguard&lt;br&gt;• Highly specialised education and information programs&lt;br&gt;• Community advocacy development&lt;br&gt;• Community fire risk plans&lt;br&gt;• Victorian Bushfire Roundtable with key stakeholders</td>
</tr>
<tr>
<td>Accept</td>
<td>• Engagement in Fire Operations Plans&lt;br&gt;• Local Fire Expos with tourism and accommodation providers&lt;br&gt;• Brigades in Schools&lt;br&gt;• Expanded schools education program</td>
</tr>
<tr>
<td>Aware</td>
<td>• Media advertising&lt;br&gt;• Development of information about planned burning&lt;br&gt;• Leaflets/letter drops/posters</td>
</tr>
</tbody>
</table>
**Strategic direction**

Continue to lead the way in fire response while building on our recovery efforts. Including:

- aircraft and rappel crews for rapid and remote area response;
- greater integration across agencies, including shared vehicles and the integrated Emergency Coordination Centre;
- road and strategic fuelbreak networks for increased protection and safer working environment for firefighters;
- seamless integration and support for recovery from bushfires.

Victoria’s bushfire-fighting agencies are recognised as world leaders in putting bushfires out. This reputation has been earned with success on first attack, as well as managing prolonged ‘campaign’ fires, especially in remote areas. The highly developed dry firefighting skills (limited water) positions Victoria’s bushfire agencies to successfully operate in drier conditions under climate change.

**Elements of successful response**

The major elements of successful fire suppression, both first attack and extended attack are the same:

- Sufficient numbers and coverage of fit, skilled, accredited and experienced firefighters, including expert remote area firefighters, such as helicopter rappel teams, allowing rapid response to all areas of the state;
- Firefighting equipment designed specifically for bushfires, including 4WD slip-on units, tankers and bulldozers enabling firefighters to operate in a safe, efficient and environmentally aware manner;
- An aircraft fleet that supports on-ground firefighters providing detection, access and bombing, as well as providing rapid transport;
- State of the art equipment and technology, such as the Infrared LineScan, GPS and thermal imaging, to inform firefighters of current fire conditions;
- Seamless and integrated incident control and coordination, ensuring adequate planning, response and information is available to firefighters and threatened communities; and
- Modern logistics systems that can be quickly deployed to support ground crews and help manage health, wellbeing and fatigue issues.
Challenges to safe, effective firefighting

Increasing bushfire frequency and severity raises the exposure of firefighters to fire, presenting greater safety challenges for fire management agencies.

**Bushfire agencies must manage:**

**Diminishing people capacity**
Changing settlement patterns and demographics in bushfire prone areas and competition with other industries have led to a reduction in both volunteer and career firefighter recruitment pools. As well as having fewer people available, valuable local knowledge and skills are also being lost.

**Radios and communication**
Reliable and effective communication systems are vital for the safety of firefighters, threatened communities and for the efficient management of bushfires. An effective and reliable communications network will be maintained to ensure safe fire fighting operations.

**Equipment**
The rapidly changing bushfire landscape requires highly mobile and agile bushfire agencies. These agencies need the ability to make the most of advancements in firefighting technologies, including vehicles and IT.

**Access and support**
Roads, water points (dams) and strategic fuel breaks play an important role in fire operations, particularly in first attack and firefighter safety. For the past 15–20 years, through changing rural industries and a shift in land management, the maintenance of access roads, water points and fuelbreaks has become increasingly challenging.

**Firefighting in the future**
Key response challenges in the future include multiple ignitions in remote areas, rapidly developing fires in interface areas and prolonged campaign fires. To manage these challenges requires a skilled, experienced and resourced response capability. It must have the flexibility and mobility to be deployed around the state providing rapid first attack and sustained campaign operations.

**Risk based approach**
The allocation and positioning of resources is based on projected bushfire risk levels, both seasonal and daily, to ensure appropriate coverage and maximised response capability. To achieve this requires a flexible and mobile workforce.
Flexible aircraft fleet
An aircraft fleet with flexibility to meet an array of response and detection operations including:
- First attack fleet for rapid response across the state;
- Larger water capacity aircraft fleet for high risk and campaign fires;
- Dedicated aircraft strategically located to protect significant state assets (e.g. Melbourne’s water catchments) and high fire risk areas (e.g. Otways);
- Upgraded network of airbases and facilities across the state to support air operations, especially in remote locations; and
- Upgraded dispatch, coordination and operational safety systems to meet specific aviation risk management requirements.

Integrated equipment
Integrated DSE/CFA vehicle and equipment fleets are needed to ensure that the fleet mix matches local needs. The right equipment in the right location is critical to ensuring firefighting agencies and trained local communities have the capacity to undertake rapid first attack.

More firefighters
A fit, trained, experienced and accredited mobile firefighting force that can be deployed around the state is needed to meet risk levels. Increased investment in firefighter development is required to bridge the experience gap and ensure skills progression of operational and incident managers.

To support an agile workforce requires the development and maintenance of suitable facilities in remote locations (mobile and/or fixed).

The increase in planned burning and changing nature of response efforts requires a shift in traditional planning, logistics and operations roles. Planning for response operations will require a holistic approach, drawing on all elements of land and fire management, including planned burning objectives and operations, cultural heritage values and asset values.

Operations will need to examine the best use of resources, including aircraft and ground crews with support from logistics with facilities, accommodation, equipment, resources and staff movement.

Remote firefighting capability
An enhanced rapid response capability in remote areas is crucial for successful first attack. Investment in remote capability, including extra helicopter rappel teams is a key element of future response strategies.

Transition to campaign fires
When first attack is unsuccessful, the seamless transition to campaign (prolonged) response is critical. Managing campaign fires requires access to a large resource base that allows for rapid surge capacity and helps manage firefighter fatigue. Recently, Victoria’s firefighting agencies have drawn experienced resources from interstate and overseas to boost the surge capacity. Strengthening these arrangements is a vital component of ensuring access to skilled and experienced surge resources in the future.

Strategic fuel breaks
The establishment and maintenance of a network of strategic fuel breaks will provide extra support for the protection of significant assets, ecosystems and communities. Importantly they create a safer workplace for firefighters and facilitate the delivery of planned burns.

Roads and water points.
An effective and well maintained road and bridge network across the public land estate enhances rapid response, providing ready access to water and improving firefighter safety.

Integrated control and coordination
Seamless integration of agencies delivers efficient and comprehensive coordination and control at local, regional and state levels. A key project will be the establishment of an Integrated Emergency Coordination Centre.

Increased support and development of incident control and coordination centres, including mobile and fixed infrastructure, will enable rapid deployment of Incident Management Teams (IMT’s). Employment of the latest technology, especially IT and communications, allows for real-time information flow from fire ground to incident control centres and the community.
Recovery

Recovery begins the day the fire starts. Effective recovery can not wait until the fire is controlled. Victorian communities have become increasingly expectant that emergency management organisations will coordinate the entire Prevention, Preparedness, Response and Recovery cycle. This is a theme repeated globally following natural disasters such as Hurricane Katrina and the 2004 South Asia Tsunami. This experience has driven a greater emphasis on recovery, including the social, economic, built, cultural and environmental impacts.

Challenges of an increased focus on recovery

Historically, bushfire agencies have focussed on environmental aspects of recovery, in particular track rehabilitation and erosion control. The community’s expectation of a smooth seamless transition to recovery requires skills, expertise and resources. The sustained commitment to emergency efforts heavily affects bushfire agencies who, over successive seasons of major bushfires, become caught in a response-recovery cycle, which impacts negatively on normal organisational responsibilities.

An increase in the use of fire to reduce fuel loads in our forests will require an increased capacity to undertake rehabilitation and recovery on public and private land.

Communities need assurances that an increased burning program will also have in place clear and consistent policy, outlining assistance available to those adversely affected by bushfire or planned fire.

Without additional planning a gap can emerge between the burning activity, emergency response activity and recovery assistance. Whilst fire agencies’ processes have reduced this gap, the community expects a seamless transition from the burning or suppression activity to recovery. Presentation of a whole of government approach to communities impacted is a challenge for the multiple agencies involved in providing recovery assistance.

Recovery in the future

Effective bushfire recovery requires a whole of government approach to ensure that recovery commences with response.

A consistent approach

Embedding recovery in emergency coordination structures will improve the seamless integration of recovery into bushfire management.

Bushfire agencies will work closely with DHS, the lead recovery for agency in Victoria, and with other recovery support agencies such as DPI (agricultural recovery) to ensure that government support to fire affected communities, individuals and businesses is delivered in a seamless and efficient manner.

Clear and consistent recovery policy (e.g. fencing and water replacement) that outlines government support for fire affected communities, individuals and businesses, and encourages the uptake of appropriate levels of insurance will assist in delivering effective and responsive recovery programs.

Increased capacity

Increasing the capacity of bushfire recovery agencies to provide assistance and integrated recovery planning will provide more efficient and enhanced recovery programs.

Effective emergency management requires prevention, preparedness, response and recovery

![Figure 10: Emergency Management Model](source: Emergency Management Manual, 2006)
The ability of Victoria’s bushfire management agencies to prevent, prepare, respond and recover from bushfires is wholly dependent on having a sufficient number and distribution of fit, skilled, trained and experienced personnel readily available.

The NEO

DSE is responsible for managing bushfires on public land, which is currently delivered through the Networked Emergency Organisation (NEO) partnership model.

The NEO partners, Parks Victoria (PV), Department of Primary Industry (DPI), Department of Planning and Community Development (DPCD), Melbourne Water (MW) and VicForests, reflects the evolution of responsibility from the Forest Commission to DSE and the break-up of former Departments through machinery of government changes.

The current model utilises a core of full-time bushfire management staff supported by over 2,500 others across government (staff, CBD and regional), whose roles are not primarily fire related but who regularly undertake fire response and planned burning roles during the fire season, plus up to 700 seasonal Project Firefighters.

The contribution of the NEO partners is vital, as they provide many of the skilled and experienced firefighters.

CFA

CFA relies on an integrated workforce of 58,000 volunteers (of whom up to one third are operational firefighters) supported by paid firefighters and other staff.

CFA has broad emergency management responsibilities. The demand for all CFA services is increasing in line with community growth, needs and expectations and a changing community risk profile.

A paradigm shift

The Victorian Bushfire Inquiry (2003) concluded that bushfire management is a 365 day operation and is no longer considered a seasonal activity.

Any increase in planned burning and community engagement will require increases in planning and operational resources across NEO and CFA.

Risks to communities and firefighters have reached unprecedented levels driven by climate variability, changed settlement patterns and increased fire activity.
Challenges and limitations common to both agencies
Managing risk to ensure firefighter health and well-being, in particular physical and psychological fatigue, are a significant challenge for bushfire agencies. The constant, recurring demand to cycle between response and prevention places further pressure on our workforces.

To deliver prevention, preparedness, response, recovery and ecosystem services requires a sustainable workforce that is appropriately distributed throughout the state with adequate skills, experience and training, supported by adequate equipment and infrastructure.

Ongoing workforce and volunteer management, including succession planning, growth and talent management is vital. The profile of experience, especially for on-ground operational managers, if not proactively recruited, will leave bushfire agencies exposed in the near future (see figures 13 and 14).

Volunteers are generally less likely to be available for non-emergency deployments such as planned burns and also find it difficult to commit to campaign fires.

The “tree change/sea change” trend has changed some rural communities. They are not as experienced in fire or as self-reliant as previous communities. These communities have different expectations of the emergency services that should be provided.

Competitive workplace
The changing face of the Australian workforce poses numerous challenges for bushfire agencies. Including:
- Different workplace expectations of generations; and
- Intense competition for skilled and experienced staff requires agencies to be more attractive.

Australia’s labour markets are tight and highly competitive for skilled labour. The ageing workforce and changing nature of employee behaviours and expectations create challenges for all employers to attract and retain staff. Public sector employers often have added difficulties in meeting these challenges with less flexible recruitment practices, having
to compete on price in a volatile labour market and the legacy of superannuation schemes that can drive early retirement.

**Challenges for NEO**
Prolonged campaign efforts and the move to a 365 day a year business focus significantly impacts on NEO agencies’ abilities to meet their organisational responsibilities, placing pressure on the partnership model.

It is becoming increasingly evident that further fragmentation of DSE or NEO partners will increase complexity and limit the ability to meet the rising challenges of bushfire management.

**Challenges for CFA**
CFAs capacity to respond to bushfires in support of DSE is stretched by the increasingly broad and diverse range of emergencies which compete for local CFA resources.

Retaining volunteers, with increased commitments for response and training, creates additional complexity for the CFA.

Building partnerships with employers is required to ensure that the volunteer workforce continues to be able to participate in response activities, in particular campaign fires.

Declining and changing rural populations in some parts of Victoria are having an impact on the viability of some rural CFA brigades.

**Future directions**

**– Core capability**

**Building the experience profile**
Investment in training and development opportunities is required to ensure bushfire agencies have enough skilled and experienced on-ground and incident managers. This includes supporting accelerated training and learning programs, such as additional interstate and overseas secondments.

Designing attractive incentive programs to retain and attract firefighters to undertake both senior on-ground and incident management roles is an important tool in maintaining experience capability.

Scholarship programs, such as graduate programs, will be used to obtain specific skill sets and assist with succession planning.

**Streamlined training**
Having properly trained and accredited firefighters is the most critical element of achieving firefighter safety.

It is important that training programs incorporate the latest information and are delivered in an efficient manner. Future training packages will involve a shift to a modular approach and increase the use of existing and new internal and external training providers.

As well as training, it is important to provide increased opportunities for skills enhancement and maintenance.

**Attracting and retaining staff and volunteers**
A key aspect of maintaining and building bushfire management capacity is the ability of land and fire management agencies to attract and retain personnel.

**Desirable place to work**
In the current labour market, land and fire management agencies must be competitive to attract and retain staff. Aside from pay and conditions, other options available include providing exciting career pathways through progression planning and personal development opportunities. Enticing reward and recognition strategies will also create incentives to attract and retain the right staff.

Organisational culture and leadership are also factors in attracting and retaining staff.

**Building capacity**
Building the experience and capability of current staff is insufficient to deliver significant changes to land and fire management objectives or reduce fatigue issues.

To successfully deliver an increased planned burning program, greater community engagement, improved monitoring and evaluation while maintaining and enhancing response capacity requires a significant investment in staff.
This includes employing more permanent firefighters and skilled staff as well as investing in equipment and infrastructure to enable and support a larger, more mobile workforce.

Support for volunteers will also need to be increased to maintain the viability and sustainability of CFA volunteer brigades.

**Building an identity**
Establishing a branding for all partners involved in bushfire management will help to provide a sense of belonging and true partnership. This will assist to strengthen the NEO partnerships for the next 3-5 years and provide better opportunities to remove disincentives for current partners to participate in fire management.

**Future directions – Surge capacity**
Firefighting agencies require significant resources to safely manage longer fire seasons, with prolonged campaign efforts while retaining capacity to still deliver land and fire management responsibilities.

**More firefighters**
The current NEO partnership concept requires strengthening and broadening to incorporate a Whole of Government commitment to bushfires. It has potential to expand to an all hazard approach to emergency management. There is also the opportunity for the participation of large corporations under a “Good Corporate Citizenship” program.

**Responsive workforce**
A more flexible workforce that can be deployed around the State and is driven by risk assessment and work demands while supported by appropriate technology.

**Health and wellbeing**
Firefighter safety is the number one priority of any fire management activity. This requires attention on and off the fire line.

Successful delivery of land and fire management programs, including response, requires a better understanding of the capacity and availability of staff and volunteers.

Appropriate reward and recognition programs for contribution to bushfire management for all volunteers, paid staff and their families will help maintain morale and continued involvement.

**Fit for work**
Managing firefighter health and safety is as important before and after as it is during an event. Investment and support of programs that proactively maintain health, fitness and well-being including annual “fit for work” initiatives and provision of ongoing stress management. These will help to maintain healthy and motivated staff and volunteers.

**Fatigue: spreading the load**
Managing firefighter fatigue, both on-ground and in incident management roles is a major challenge. During times of prolonged or campaign response, the effect of accumulated fatigue (physical and mental) is significant. Historically, the effects of accumulated fatigue have been compounded after an event with staff and volunteers expected to return to normal work.

Proactive measures to support business continuity and manage staff return to work are needed to reduce the backlog of work to be overcome when returning to normal duties.

The addition of extra resources will help to alleviate the fatigue issue by spreading the workload and not relying on the same workforce to deliver land, fire and emergency management activities.
Planning for protection

Strategic direction
Provide the community and planners with better risk management and mitigation tools, including the acceleration of the implementation of Integrated Fire Management Planning.

Land use planning for bushfire protection

The Council of Australian Government (COAG) Inquiry on Bushfire Mitigation and Management (2004) found that:

land use planning that takes into account natural hazard risks is the single most important mitigation measure for preventing future disaster losses (including from bushfires) in areas of new development.

The impacts of climate change include drier and warmer weather and a greater frequency of extreme events, creating an increased bushfire risk. These impacts are further heightened when combined with continuing trends to extend living and industry into bushland areas with high amenity (lifestyle) values and bushfire risk.

The key drivers of change are increased demand for new housing statewide due to population growth and changing demographics such as “tree change and sea change” lifestyle trends. Significant growth has already occurred in high bushfire risk areas including the peri-urban areas around Melbourne, Geelong, Ballarat, Bendigo, the towns of La Trobe Valley and coastal settlements, such as the Surf Coast.

Planning for protection against bushfires is undertaken at two broad levels, land use planning through planning schemes and bushfire management planning. Good planning informs land use and management decisions through engagement and discussion between communities and stakeholders. It uses available knowledge, promotes integration and adequately identifies and shares risks to define agreed strategies and actions. This can be supported by decision making tools and market-based instruments to achieve the best outcomes.

Figure 15: Fairhaven burnt out and rebuilt since Ash Wednesday 1983

Key:
- Lost and rebuilt since Ash Wednesday
- New Construction since Ash Wednesday
- Survived Ash Wednesday
Current planning approach
Planning is undertaken at both a policy and statutory level. The statewide policy approach to managing bushfire risk is reflected in the State Planning Policy Framework. Statutory planning tools, such as zones and overlays operate at the local government level through planning schemes. For example, the Wildfire Management Overlay (WMO) identifies high bushfire risk areas, where bushfires pose a threat to life and property. The WMO does not prohibit development rather it provides a set of objectives and decision criteria for planning authorities to apply when assessing development applications.

Further work is required to assess what impacts current planning approaches are having on development in high fire risk areas as there is a significant increase in houses constructed in the Ash Wednesday bushfire footprint, for example Fairhaven on the Surf Coast (Figure 15 and ‘A new approach required for managing settlement’).

Following the recent Melbourne 2030 Audit the Government committed to review the effectiveness of policies, regulations and guidelines applying to the location and design of new fringe settlements in fire prone areas to improve safety.

Issues and challenges for land use planning
In this rapidly changing bushfire risk environment, adequate risk management can only be achieved through shared responsibility between the Government and the public. Responsibility for undertaking bushfire prevention and protection activities by designing and maintaining safe living and working environments across public land, farming, production areas, lifestyle blocks, homes and workplaces must be shared.

Urban growth
Issues in addressing existing and new developments in high bushfire risk areas include:

- Adequate consideration of bushfire risks during early strategic planning stages of new developments, including excluding or modifying developments in high bushfire risk areas;
- Addressing risks within and around existing developments, especially in high bushfire risk areas such as the Dandenongs, Macedon and Surf Coast; and
- Bushfire agencies working with land managers, developers and communities to share solutions and responsibility for bushfire risks within and around existing developments.

Competing objectives
Delivering bushfire risk mitigation, environmental protection and lifestyle outcomes has the following challenges:

- Balancing the objectives of managing bushfire risk and maintaining biodiversity and residential amenity; and
- Developing appropriate incentives and education programs which encourage land owners and developers to improve practices for broader environmental benefits and bushfire safety.

A new approach required for managing settlement
To better manage future bushfire risk, land and fire management agencies will work with planners to review Government policy and improve planning outcomes through the Victorian Planning System. This involves:

Policy Framework

- Developing a hierarchy of planning principles to guide development and decision making processes in high risk areas, including bushfires, and other natural hazards such as storm surge (coastal), flood and landslip, for example:
  - Prohibiting certain types of new development including schools, child care centres, and aged care facilities;
  - Ensuring new developments or structures in bushfire prone areas mitigate the risk from severe bushfires through their location, design and construction;
- Improving the integration of bushfire planning with land use planning;
- Ensuring land use planning processes support emergency management responses, and enable individuals to “stay and defend or go early”; and
- Increasing consistency and strengthening linkages between planning and building controls, including programs to benefit existing developments (e.g. home risk assessment and retrofit programs).

Research and Modelling

- Investigating risk threshold and development capacity issues for identified high bushfire risk areas;
- Understanding best practice and investigating subdivision, built form and design outcomes to reduce risk, as well as promote sustainable living approaches (bushfire and energy efficient designs are complementary);
- Developing tools to support planning and risk management decision making by planners, communities and individuals; and
- Investigating options to improve the certainty and consistency of planning in high bushfire risk areas.

PHOTOS: TOP TO BOTTOM – DSE, CFA.
**Capacity Building**
- Work with vulnerable communities and local government to find practicable and workable solutions to managing areas of high bushfire risk, using the following principles:
  - Identify exposure to risk;
  - Facilitate local solutions to the exposed risk;
  - Provide advice to Government on potential solution;
  - Develop the necessary tools to respond to the potential solutions;
- Ensuring the responsibility for bushfire risk management is accepted, shared and acted upon by all stakeholders; and
- Supporting community and agency capacity to better plan, assess and act on outcomes.

**Bushfire management planning**

Bushfire management planning provides a framework for strategic and operational plans based on key land and fire management objectives, including protection, biodiversity, ecosystem services and industry needs. The aim is to reduce detrimental bushfire impacts and better promote community and ecosystem resilience.

For emergency management planning it aims to facilitate the development of integrated prevention, preparedness, response and recovery plans with the involvement of communities, stakeholders and land and fire management agencies. For land management it aims to incorporate conservation and ecosystem service needs.

**Current approach**

In Victoria, the long-term strategic plans for bushfire management on public land have focussed on Fire Protection Plans. The Victorian Bushfire Inquiry (2003) found that this protection driven approach had contributed to the removal of fire from the landscape and lacked integration with private land. It is likely that this approach failed to protect and enhance ecosystem services (e.g. biodiversity, timber, water).

The Code of Practice for Fire Management on Public Land (Revision 1) 2006 enables an integrated holistic approach to bushfire management planning. Investment, including creating Fire Ecology Project Officers has allowed biodiversity and ecosystem services objectives to be incorporated in the Fire Ecology Planning process and will now form part of new Fire Management Plans.

Councils and public authorities have statutory responsibilities for fire prevention. Councils have additional accountability for Municipal Fire Prevention Plans (MFPPs). The 2003 Auditor General’s Report into fire prevention and preparedness and the 2003 Victorian Bushfire Inquiry identified a number of deficiencies in municipal fire prevention planning. In particular, private land holders have no explicit regulatory responsibility for fire prevention or preparedness.

**Challenges and issues**

Existing fire management plans have not adequately created a framework that address current and emerging risks or reflect the fact fires spread freely across the public and private land. The risks are complex, dynamic and vary depending on people’s values and perceptions. Future fire management planning will aim to better understand and integrate all components and stakeholders involved in land and fire management.
The community holds competing views about the best strategies and actions to reduce severe bushfire impacts. There must also be an acknowledgment that some groups suffer the potential impacts of proposed mitigation strategies more than others (e.g., asthma sufferers).

**Future of bushfire planning**

The key challenge for bushfire management planning is to systematically move communities as well as land, fire and emergency management agencies from a response focus to a prevention, preparedness and ecosystem health focus.

Future bushfire management planning challenges are:

- Reducing the impact of severe fire events in the face of climate, other environment and development changes;
- Supporting local government and capacity to deliver their bushfire management planning responsibilities;
- Increasing integration with key stakeholders such as utilities, infrastructure providers, Alpine Resorts and private timber companies;
- Defining objectives and strategies that will enhance community and ecosystem resilience;
- Protecting significant assets, including water catchments;
- Engaging communities in strategic decision making to promote sharing of risk over the need for more fire on public and private land, plus acceptance of its impacts (e.g., smoke), inherent risk and disruption to industries like tourism;
- Increasing the understanding and sharing of risks and accountability between land and fire management agencies, local government and private landholders; and
- Addressing the risk of arson and accidental fire ignitions.

**A new approach**

**Integrated Fire Management Planning**

The Victorian Bushfire Inquiry (2003) recommended improved integration of bushfire management across all tenures. The recent Integrated Fire Management Planning (IFMP) initiative is designed to improve the consistency of bushfire management planning by establishing a framework for a more coordinated and accountable approach.

IFMP aims for multi-agency and community involvement in the management of bushfire risk across all tenures by delivering integrated and holistic fire planning that accounts for protection, biodiversity and other ecosystem needs.

IFMP provides an appropriate platform to meet the challenges of a rapidly changing and more bushfire prone environment. Implementation of IFMP will be accelerated through provision of:

- Expertise, capability and resources to undertake planning in priority areas; and
- Tools and information to support risk assessment and decision making.

**Fire Operations Planning**

Fire Operations Plans (FOP’s) outline the short–medium term implementation of Fire Management Plans, in particular prevention and preparedness operations (planned burning, slashing etc). They are a key mechanism to inform and engage the community of operational actions for the following three years, as well as providing short term objectives, including the immediate planned burning program.

Improvements in FOP’s are required to better reflect the shift to landscape scale mosaic burning activities, whilst ensuring smaller protection and ecological burns remain adequately captured.
Strategic direction

Develop a more responsive approach to the management of bushfires based on continuous learning and improvement through the development of interagency risk modelling, statewide scenario planning and improved ecological research and monitoring.

Victoria's bushfire agencies successfully extinguish over 80% of lightning strikes and other ignitions before they spread and threaten communities. The paradox of highly effective bushfire control – the icon of success for agencies worldwide – is that it helps build up the fuels that support large fires.

Linkages, causes and effects of bushfire disasters are complex and continue to change. Therefore, bushfire management must be adaptive.

An adaptive management cycle has five critical steps:
1. Identify what we know
2. Identify what's changing
3. Take action
4. Evaluate
5. Adapt and modify

Figure 16: The risk and adaptive management cycle
**What we know**

Bushfires will continue to take place while fires of disastrous impact need not. Disasters are symptoms of multiple and inter-linked failures to foresee and address risks that grow unnoticed over time leading to events that overwhelm communities and emergency services.

Treating bushfire risks can be counter-intuitive. Effective treatment of local risks is often at odds with effective treatment of risk across broader areas and timeframes.

The Council of Australian Governments (COAG) Inquiry on Bushfire Mitigation and Management (2004) identified bushfires as a special case and highlighted the need for enhancement of government approaches to risk management. Effective assessment of bushfire risks will require significant investment to develop the necessary techniques to capture the state of current risks and the mechanisms that drive them.

**What’s changing**

Bushfire risks are changing:

- Threat rises with greater fuel loads, drought and fire dangers;
- Exposure rises as “sea changers/tree changers” populate bushfire-prone areas for amenity and lifestyle, while other rural populations age and decline;
- Expectations of services rise, as does community dependence on them – the services relate to land, fire, emergencies, infrastructure and social well-being; and
- Biodiversity risks rise as fire control excludes fire from vast tracts of bush then fails to prevent large fires, burning large tracts all at once.

Bushfire management must change and adapt to risk. A recurrence of Ash Wednesday-like fire conditions would result in a much greater disaster. Worldwide lessons highlight the need to invest more in prevention, preparedness and in ecosystem management.

Predicting change, including the effects of different courses of action, is critical. So too is comparing predictions with actual change, to improve future action. Necessary approaches include scenario planning and adding the formal rigour of scientific method to the necessary experimentation that daily fire operations require.

**Take action**

Taking action includes:

- More proactive definition of what the community wants, through initial learnings and ongoing risk assessment;
- Achieving better agreement with communities over necessary actions and any associated trade-offs (e.g. biodiversity versus protection), plus sharing of risk and discomfort (e.g. the need for smoke) and the gaining and use of knowledge;
- Greater use of fire under a wider range of conditions to achieve what the community wants;
- Achieving more integrated and holistic planning of land use and bushfire management;
- Implementing the risk and adaptive management cycle;
- Improved ecosystem monitoring and modelling; and
- Re-allocating and increasing our capacity to achieve these initiatives and to address the existing threats.

**Evaluate**

Continuous improvement in operational performance alone is insufficient to adapt to the changing bushfire risk environment. Assessing risk and the achievement of real outcomes across the landscape over decades is required.

Evaluation must include feedback from community, through community members undertaking monitoring, identifying learnings and feeding this into the fire planning cycles.

Evaluation and learning requires fire agency staff to have the capacity to observe the way our surroundings react to our actions, review expectations about the future, reflect on what they do and make appropriate adjustments.

Agencies must invest in research, expert opinion, rethinking procedures, challenging strategic wisdom, monitoring, predicting and sharing of local knowledge.

**Adapt and modify**

Useful learning must result in change and adaptation. Making changes through ‘learning’ must become routine, not just something that happens after bushfire disasters.

Bushfire agencies and communities must learn together, so that they can respond to changes faster and achieve better outcomes.

Adaptation takes effort and time. Achieving adaptive behaviours will depend on deliberate investment in that activity across the community and agency workforces.
Risk and adaptive management in practice

Effective implementation of the Strategy in a time of climate, social and ecological change, will involve a set of five integrated initiatives.

1. Risk management framework
To best treat bushfire risks, agencies must understand where, when and how the risks apply across Victoria, both locally and strategically.

The interrelated and dynamic nature of bushfire risks, ignition, spread and damage (figure 17) are distinctive and do not fit standard risk management frameworks.

The development of a custom risk management framework, which better incorporates bushfire risk drivers and risk interactions, will enable bushfire agencies to better model, monitor and prioritise risks. The custom framework will be consistent with the broader Victorian Risk Management Frameworks.

A bushfire risk management framework will allow land and fire management decision-making to be transparent, based on needs of environmental, protection and ecosystem services, supported by assessments of risk and possible treatments.

The framework will enable trained staff to undertake planning and allocate resources based on a systematic analysis of risk.

The framework will allow agencies to consider the values and perceptions of the community in determining local strategies, and help in analysing treatment effectiveness.

Cooperative research between fire agencies, the Bushfire CRC and Melbourne University has increased understanding of the relationship between bushfire threat, critical risk and climate change through the Phoenix Fire Spread Model.

2. Performance evaluation
To be effective, agencies must understand and monitor performance in the short, medium and long-term.

In the short-term the agencies must be effective in meeting service delivery objectives such as the annual extent of planned burning. Such measures must, however, measure their intended effect such as reduced levels of fuel hazard.

The measures will be global or purpose-built and involve lead indicators and regular monitoring and assessment.

Medium-term and long-term measures will range from coarse indicators using existing capabilities, to leading indicators of effectiveness at statewide, regional and local level, addressing resilience and supported by systematic monitoring.

Recent fire climatology and climate change modelling has allowed bushfire agencies to better evaluate the changing bushfire risk environment, such as increasing Fire Danger Index trends.

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**Figure 17: Bushfire risk management**

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chance of fire starting</td>
<td>Spreading</td>
</tr>
<tr>
<td></td>
<td>Doing damage</td>
</tr>
</tbody>
</table>
3. Adaptive management and learning
Ideally, management is adaptive, not reactive or disconnected. Effective managers continually assess and learn from their changing operating environment by reviewing the impact and effect their actions (or inactions) are having on this environment. They then match or adapt their responses to this reality.

Uncertainty and change are the major factors that drive the need for adaptation. Managers can tackle uncertainty head-on by being ‘actively’ adaptive and deliberately taking actions that explore by designing the effects of alternative thinking and actions.

Establishing and promoting a culture of adaptive management requires the investment and support of programs in modelling, prediction-making, monitoring, evaluation, knowledge management and learning. Victoria’s fire agencies have a good basis built through a culture of debriefing at operational and community levels. This culture will be strengthened and extended through specialist units, broader staff commitment and inclusion of the community.

4. Enabling Information Technology
State of the art IT systems are essential for making land and fire management agencies more effective and responsive. IT allows for rapid information sharing, facilitates predictive and risk modelling and promotes good adaptive management.

The creation and enhancement of IT systems with the latest modelling, collaborative and interactive technologies will allow strong integration between agencies and effective participation of community in bushfire management.

Delivering an improved IT system requires investment in data sharing, systems modelling, hosting and support.

5. Research
Investing in ongoing research programs is a critical element of adaptive management. To continuously improve, any organisation must review, monitor and research its past, current and future environments to identify gaps, changes and better ways to do business.

An adequate land and fire research program, with strong linkages between staff and research activities is critical to the success of this strategy, especially in a time of climate change.

Development of existing partnerships with research organisations, such as universities, the Bushfire CRC and AFAC will ensure that the latest thinking and broadest levels of expertise are available to support and inform land and fire management activities.
References


Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Name</th>
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</thead>
<tbody>
<tr>
<td>AFAC</td>
<td>Australasian Fire and Emergency Services Authorities Council</td>
</tr>
<tr>
<td>CFA</td>
<td>Country Fire Authority</td>
</tr>
<tr>
<td>CRC</td>
<td>Cooperative Research Centre</td>
</tr>
<tr>
<td>DHS</td>
<td>Department of Human Services</td>
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<td>DPCD</td>
<td>Department of Planning &amp; Community Development</td>
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<td>DPI</td>
<td>Department of Primary Industries</td>
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<td>DSE</td>
<td>Department of Sustainability &amp; Environment</td>
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<td>ECC</td>
<td>Emergency Co-ordination Centre</td>
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<td>ENRC</td>
<td>Environment and Natural Resources Committee</td>
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<td>EPA</td>
<td>Environment Protection Authority</td>
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<td>FRV</td>
<td>Fire Ready Victoria</td>
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<td>GFF</td>
<td>General Firefighter</td>
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<td>IFMP</td>
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<td>IMT</td>
<td>Incident Management Team</td>
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<td>MFB</td>
<td>Melbourne Fire &amp; Emergency Services Board</td>
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<td>MFPF</td>
<td>Municipal Fire Prevention Plans</td>
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<td>MW</td>
<td>Melbourne Water</td>
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<tr>
<td>NEO</td>
<td>Networked Emergency Organisation</td>
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<td>PFF</td>
<td>Project Firefighter</td>
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<td>PPRR</td>
<td>Prevention, Preparedness, Response and Recovery</td>
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<td>PV</td>
<td>Parks Victoria</td>
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<td>WMO</td>
<td>Wildfire Management Overlay</td>
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