

ALPINE FIRES 2003: REHABILITATION AND RECOVERY OF PUBLIC LAND

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Abstract

The Alpine Fires of 2003 burnt through over 1.1 million hectares of mostly public land in eastern Victoria over a period of over 60 days before being brought under control. The fires extended throughout the Australian Alps into New South Wales and the Australian Capital Territory, burning in total, over 1.8 million hectares.

Recovery and rehabilitation of natural and cultural values, managing visitor use and repair or replacement of built assets affected by the fire is a task of major proportions, requiring careful planning and targeted funding. This paper presents a process to rapidly identify values at risk from potentially threatening processes as a result of the fire, manage visitor use and prioritise and program post fire management response.

In Victoria, post fire recovery and rehabilitation on public land started immediately the fire was brought under control with the establishment of seven rehabilitation teams throughout the fire area. The key components of the rehabilitation program were:

Containment line rehabilitation

Efforts to contain the fires resulted in the construction of over 6000 km of containment line to a range of standards. The initial objective was to stabilise disturbed soils ahead of any significant rain events, followed by full rehabilitation. Rehabilitation guidelines for disturbances were developed.

Recovery Planning

Recovery plans were developed for seven units within the fire area. Fundamental to the fire rehabilitation planning was the preparation of value sets, risk assessment and community consultation to determine:

- Priority areas for stabilising and rehabilitation of disturbances;
- Management strategies to assist ecological recovery and protection of cultural and natural heritage values;
- Built assets in need of repair or replacement; and
- Priority areas to assess and re-open for public use as soon as possible for visitors and to support the affected tourism industry.

The individual unit plans were then synthesised and summarised into a Statewide Ecological and Cultural Recovery Plan, asset replacement plans and opening strategies which programmed funds made available from Government for bushfire recovery.

INTRODUCTION

South eastern Victoria is acknowledged as one of the most fire prone environments in the world (PV and DSE 2003) and eastern Victoria in early 2003 was ripe for landscape scale fires following up to seven years of drought and a season that was one of the driest on record with record day time temperatures. On 7 & 8 January 2003 a series of dry lightening storms passed through the alpine region starting over 120 fires throughout the Australian Alps.

In Victoria, over 80 fires were reported. Most were contained within a few days under relatively favourable conditions, however 9 fires in remote and steep terrain were proving difficult to contain. As fire conditions deteriorated in mid January, these fires in Victoria's North-east and Gippsland regions started to spread rapidly and eventually combined into one, now referred to as the alpine fire. Sixty days later the fires were finally brought under control, but not before burning over 1.1 million hectares. Over 15,500 firefighters and support staff from the Department of Sustainability and Environment, Department of Primary Industries and Parks Victoria, along with the Country Fire Authority staff and volunteers other organisations contributed to suppression activities (State Government Victoria 2003). While having huge social, economic and environmental impact, community losses were modest relative to the size and intensity of the fire. Forty one houses, 9,100 head of stock and 3000 kilometres of fencing were lost, (State Government Victoria 2003) and tragically, one life of a firefighter in a related incident. In Victoria, this was the largest fire since the infamous 1939 fires.

This paper details the recovery and rehabilitation program for public land only that took place during and after the alpine fire event, focussing mainly on impacts on natural and cultural values and built assets and their recovery, rehabilitation and restoration. The paper acknowledges but does not attempt to address other significant fire recovery programs targeted at private land impacts, community recovery and the subsequent State Government inquiry into the 2002-2003 Victorian Bushfires (State Government Victoria 2003).

GOVERNMENT RESPONSE

Once the size, threat and potential loss from these fires was understood, the Victorian Government established a Bushfire Recovery Ministerial Task Force to assess impact on economy, infrastructure, industries and communities and respond accordingly. Seventy Six Million Dollars was made available for recovery over a range of programs targeting public and private land and community needs.

The funds were programmed and allocated by the Statewide Bushfire Recovery Steering Committee to which reported a series of Working Groups:

- Ecological and Cultural
- Asset Replacement
- Catchment & Water
- Communications
- Agriculture
- Salvage Logging
- Tourism
- Staffing
- Budget & Programs

Public land rehabilitation co-ordination fell mainly under the Ecological and Cultural and Asset Replacement Working Groups where processes were established, targets determined and funds allocated to a number of program areas.

In addition, Regional Multi agency Recovery Committees were established under the Department of Human Services to co-ordinate community recovery across government agencies.

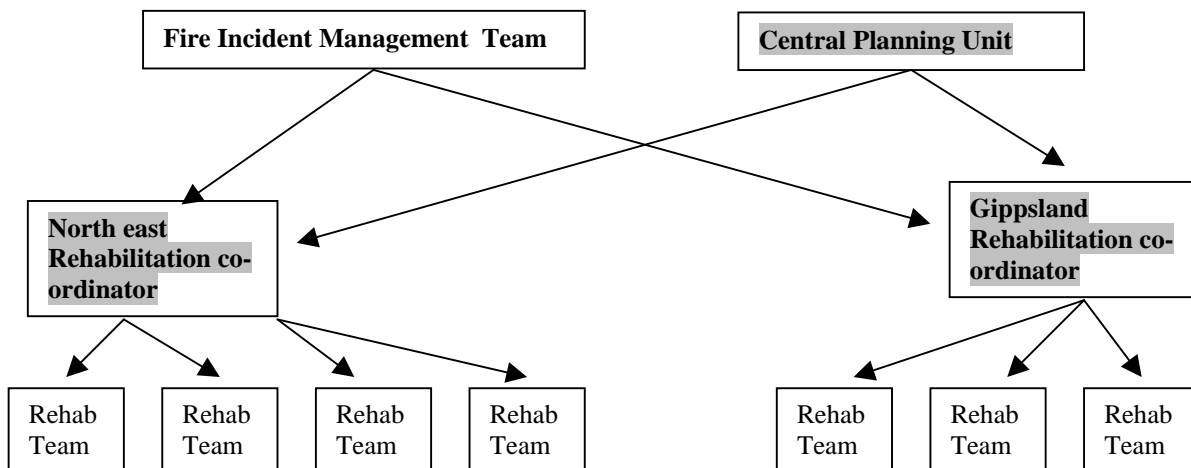
PUBLIC LAND IMMEDIATE RESPONSE

As the fire were beginning to be brought under control, the need for immediate rehabilitation on public land was considered while the Incident Management Teams were still in place.

A Rehabilitation Team structure was put in place to attend to immediate tasks quickly and efficiently. The teams considered all public land and thus multi agency staff from Parks Victoria, and the Departments of Sustainability and Environment and Primary Industries were involved.

While Incident Control arrangements were in place, rehabilitation fell within those command arrangements of the AIIMS Incident control structure. When fire suppression operations ceased and Incident Management Teams wound up, multi agency rehabilitation teams continued to operate but under normal regional delivery structures.

Seven rehabilitation teams were put in place with geographic area responsibility with Statewide planning co-ordination.



Central Planning Unit

The Role of the central planning unit was:

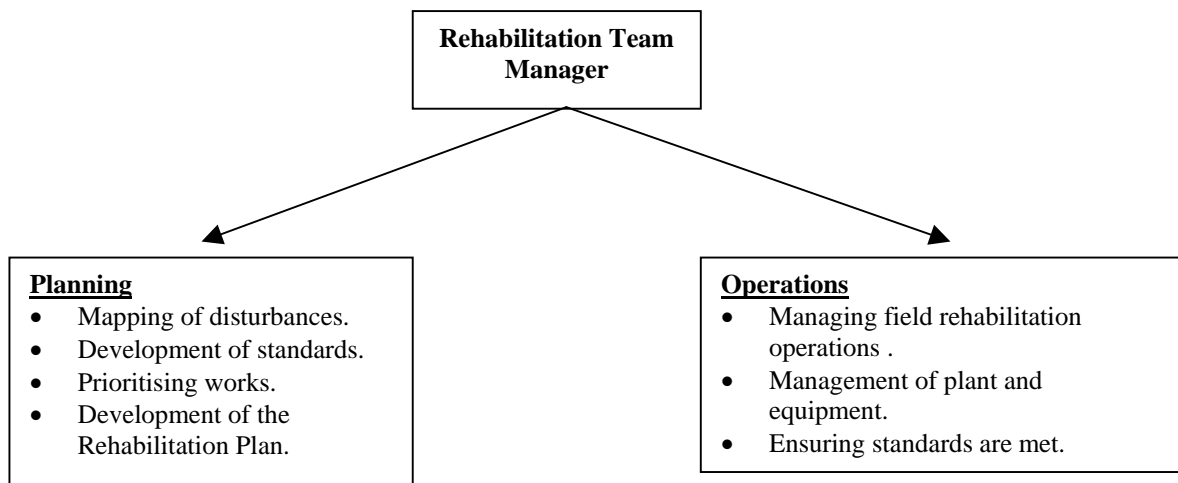
- To assist Incident Management Team with the establishment of the Rehabilitation Teams;
- To develop the Rehabilitation Plan template and generic fire and values information, and provide risk assessment guidelines.
- To synthesis values information for management purposes;
- Provide the linkage with the Bushfire Recovery Working Groups.
- Prepare the Statewide Fire Recovery Plan by consolidation of the seven rehabilitation plans.

Rehabilitation Teams

The Rehabilitation teams had two key tasks:

- Stabilisation and rehabilitation of over 6000 kilometres of containment and control lines established during the fire suppression efforts; and
- Development of rehabilitation plans to identify medium to longer term needs and program and target funding made available.

To achieve this teams generally had the following structure:



REHABILITATION OF DISTURBANCES

Fire suppression operations over 60 days led to the establishment of over 6000 kilometres of containment line. The level of disturbance created varied and included:

- Machine constructed firebreaks up to and over 50m metres wide in previously undisturbed areas;
- Widening the verges of existing tracks up to and over 50 metres wide;
- Surface scrapes across open areas, particularly on private cleared land;
- Simple brushing up on footprint of existing tracks;
- Re-opening of previously closed roads, such as those used for past logging operations;
- Construction of handtrails in previously undisturbed areas and on walking tracks.
- Helipads; and
- Staging and refuge areas.

Principles for Rehabilitation

In accordance with the Code of Practice for Fire Management on Public land (CNR 1995) containment line stabilisation and rehabilitation was to be carried out as soon as practicable after the fire was declared safe. Due to the extremely dry conditions, and extent of soil exposure from the fire, there was extreme concern over sediment entry into watercourses and water quality. While little could be done to protect burnt undisturbed soils in the landscape, it was considered vital to stabilise disturbances that may add to soil loss when significant rain events occurred and provide a setting for natural regeneration to occur quickly. Already thunderstorm activity was causing massive movement of soil and rock in the steep catchment areas that been burnt severely. Massive sedimentation was causing "slugs" to move downstream as seen most graphically in the Buckland River in North-east Victoria.

The other reason to act quickly on containment line rehabilitation was that in areas where fire suppression machinery was still in place, it could be used for rehabilitation before being removed from the fire ground, reducing delays in getting machinery back to often remote locations.

Under the *Native Title Act 1993*, new access tracks, control lines or helipads may extinguish native title unless closed and rehabilitated. Works did not have to be assessed for validity during the emergency. However, if the land manager intended to retain any of these roads,

control lines or other infrastructure the areas would need to be assessed for validity and any procedural rights would need to be followed. (PV and DSE 2003). Under the *Waterways Protection By-law* approval is required from the Catchment Management Authority for works affecting defined waterways. Again this was not required during the emergency, however was a requirement for rehabilitation.

Accordingly, the two key principles established for containment line rehabilitation were:

- All disturbances, including widened breaks adjacent to tracks, that were not part of the pre fire track network system, were to be rehabilitated; and
- General Road and Track Rehabilitation Guidelines (DSE & PV 2003) , that were built on the Code of Forest Practice (NRE 1996) and approved soon after the fires by the Catchment Management Authorities for work on and near waterways, were the basis for rehabilitation standards.

Mapping

All disturbances needed to be carefully mapped to enable matching with values sets, priorities to be determined, works to be programmed and auditing to take place in the future. While some information was available from the planning units of Incident Control Centres, this needed to be ground truthed and checked for additional disturbances.

Rehabilitation teams logged all disturbances using GPS and downloaded onto GIS resulting in a disturbance line layer for the whole fire which could be overlaid on a range of value sets and priority zones. From this localised maps were produced for operational purposes.

Priorities

As it was clearly going to take significant time to rehabilitate all disturbances, priorities were set to minimise risks to catchment values and water quality. Priorities were set on the following basis:

- Any disturbances that were in the catchment of town and domestic water supplies were first priority. Rehabilitation teams worked closely with water supply and Catchment Management Authorities to establish where these were.

Priority Zones

A Priority Zone system was established to assist works programming. The 5 priority zones were derived from a combination of the following value sets:

- *Catchment values:* Stream condition, basin condition, altitude, catchment vulnerability, drinking water catchments
- *Legislative overlays:* Reference area, Wilderness etc
- *Ecological vegetation communities:* rare, endangered, vulnerable, and depleted

Priorities were also influenced by practicalities of machinery logistics and availability.

Methods

A range of methods have been employed for rehabilitation as stated in the Guidelines and Standards (DSE & PV 2003). The most common activity was pulling windrows of soil, felled trees and vegetation back over bare ground to help re-establish and stabilise soils, create micro climates to facilitate natural regeneration and re-establish habitat quickly on bare ground. In addition was the installation of overland cross bars for drainage with particular attention to stream crossings.

FIELD REHABILITATION UNIT

The most effective field rehabilitation operating team was found to be a working combination of :

- a 20 tonne excavator with power claw or bucket and thumb head to pull apart windrows,
- a small bulldozer for establishment of soil layer and drains; and
- a small ground crew for plant supervision and hand work such as chainsawing and installation of silt trap material.

This work can be carried out for up to \$5,500 per kilometre where there has been significant disturbance, however this varies significantly on working conditions and amount of disturbance.

In high alpine areas, disturbance was minimal and largely associated with protection of Alpine Resorts. Due to the more sensitive nature of this ecosystem because of the short growing period and severe climatic conditions, rehabilitation requires much more detailed intervention to establish cover quickly. Disturbed areas have been carefully drained, in some places covered and hand planted with indigenous alpine species. The cost of this can be in the order of \$10 -15,000 per kilometre of single blade width line.

Outcome

This process proved quite effective with around 80% of disturbance lines stabilised and most with advanced rehabilitation by late Autumn of 2003 prior to wet conditions and snow preventing further work.

In early 2004 an audit has been carried out of disturbance lines and some follow up work required where failures occurred due to heavy rain, standards not being met or further disturbances found that were not initially mapped, however this requirement has been minimal.

REHABILITATION PLANS

The preparation a fire rehabilitation plan is required in accordance with the Code of Practice for Fire Management on Public Land (CNR 1995). The purpose of the rehabilitation plan is to detail measures which address “the rehabilitation of disturbance resulting from firefighting operations and the amelioration of deleterious environmental impacts of the fire”.

Rehabilitation planning and fire recovery efforts for the 2003 Alpine Fire are by orders of magnitude greater than anything experienced in Victoria before. As such, the rehabilitation plans for the 2003 Alpine Fire broke new ground in recovery planning and implementation.

The size, intensity and geographical location of fire raised particular concerns for impact on:

- Water quality and catchment values in sensitive and critical water catchment areas;
- Biodiversity from potential pest plant and animal invasion;
- Concentrated areas of threatened species, communities and restricted habitat;
- Outstanding landscape values;
- Historic and indigenous cultural heritage values;
- Recreation and tourism values; and
- Built assets.

The objectives of the rehabilitation plan are based around addressing the above concerns.

Rehabilitation Plan Development

A Rehabilitation Plan template was developed by the Central Planning Team, along with fire wide value sets and strategic risk assessment. The Rehabilitation Teams then completed the plans for the seven respective areas. This was achieved through a planner on each rehabilitation team that facilitated the engagement of experts in a range of fields to evaluate the strategic risk assessment for the more localised rehabilitation plan area and contribute to the development of tactical management actions. Experts brought onto the teams for periods to assist the development of specific parts of the plans included to varying degrees as required, representatives of local indigenous communities, flora and fauna planners, local heritage experts and catchment management officers. Key to the rehabilitation teams was also a GIS expert and associated computer, mapping and map printer facilities.

This information was then integrated at an all of fire level then summarised and consolidated into the Statewide Fire Recovery Plan (PV and DSE 2003).

Risk Management

The Rehabilitation plans are developed along a risk management approach which focuses on:

- Values: Identification.
- Risk: To those values and threatening processes as a result of the fire;
- Risk rating: From the value and consequence matrix; and
- Response: determining measures to ameliorate those risks.

1/ Values

Value sets were compiled for each rehabilitation area in tables and maps. They included:

- Threatened flora and fauna
- Priority zones
- Basin and stream quality condition
- Elevation classes
- Water supply catchments
- Recorded heritage sites
- Ecological vegetation classes
- Catchment vulnerability
- Fire severity classes
- Fox Prey vulnerability
- Recorded indigenous sites

Fire Severity mapping

Fire severity mapping was carried out initially through analysis of Landsat data with 4 classifications for Forest, from Crown burn – light crown scorch, and two for treeless, burnt and unclassified (presumed unburnt). It was found that for treeless areas, this had some inaccuracies, indicating significant areas burnt than were not, however for rapid response was effective.

The whole fire was later flown for aerial photography at 1:20,000 and 1:10,000 for the Bogong High Plains and fire severity re interpreted. This process is very expensive and takes several months for outcomes. Therefore, priorities needed to be targeted at management needs. In this case it was targeted at grazing licence areas to assist with decisions on grazing.

2/ Risk assessment

A fire wide strategic evaluation of values and threatening processes as a result of the fire was undertaken by the central planning team to identify priorities for management to ensure consistency in approach of the rehabilitation teams. This was achieved through an expert panel that considered values and severity, likelihood and immediacy of known and potential threatening processes.

3/ Risk Rating

The *risk rating* for each threatening process and value affected was determined by:

- Calculating the *threat score* by gauging severity against likelihood of the risk; and
- Applying the threat score to the value priority.

Local evaluation was required then to apply this information at a local level and inform the development of tactical management actions in each plan.

4/ Response

The outcome was a program of work priorities to address the risks, both operational and for performance assessment and monitoring for the key program areas.

The following is a **selection only** of the key management actions that were developed through the risk assessment process:

THREATENED SPECIES AND COMMUNITIES

A CASE STUDY: Mountain Pygmy Possum *Burramys Parvus*

Value: Mountain Pygmy Possum is a threatened species in Victoria whose habitat is restricted to alpine boulderfields containing specialised and restricted species such as Mountain Plum Pine.

Risk: The 2003 Alpine fires effected significant parts of the habitat areas, particularly the edge areas where food gathering occurs. The Mountain Pygmy Possum has suffered post fire population decline due to loss of habitat and probably increase in exposure to predation, particularly by foxes, while food sources and cover re-establishes.

Response: Predator control programs targeting foxes have been increased and introduced where previous programs were not carried out.

PEST PLANT MANAGEMENT

A CASE STUDY: English Broom *Cytisus scoparius*

Value: English Broom has invaded high value sub-alpine and riparian environments in the Eastern Alps of Victoria. It is extremely invasive and highly competitive resulting in an almost total domination of the forest understorey where uncontrolled, having a catastrophic impact on biodiversity.

Risk: The 2003 Alpine Fires burnt through large areas of English Broom infestation where huge amounts of seed were in existence in the soil. The seed is extremely fire responsive and a massive regeneration through seedling growth emergence has occurred, taking competitive advantage of post fire conditions. This is both a huge threat if left unchecked, and a strategic control opportunity while the seed bank is vulnerable if the post fire emergents can be eradicated.

Response: Significant funding has been targeted at English Broom mapping and control over the post fire period to achieve as much eradication as possible prior to new seedlings producing viable seed, which is expected to be within two years of emergence.

ECOLOGICAL FIRE

CASE STUDY: Alpine Ash *Eucalyptus delegatensis*

Value: Alpine Ash is a eucalypt that widely dominates the wet montane vegetation communities at about 900 – 1400 metres above sea level. Trees grow to massive heights and in older growth forms provide important habitat for a range of species as well as high aesthetic and landscape values. The species generally does not have the ability to regenerate

vegetatively and trees don't survive higher intensity fire conditions. It regenerates almost exclusively from seedlings that emerge prolifically following fire in ash seedbeds under high sunlight conditions and requires winter stratification prior to germination. Alpine Ash is thus particularly competitive in montane post fire conditions and huge single aged stands reflect past fires. Alpine Ash does not produce seed until 18 – 20 years of age.

Risk: Frequent fire at less than 25 year intervals may seriously effect stand regeneration due to lack of seed. The 2003 Alpine Fires burnt areas that had been burnt widely in 1985 fires and in areas harvested for timber in the last twenty years.

Response: In previously logged areas in State Forest, interventionist re-seeding has occurred to ensure sustainable regeneration occurs for further timber harvesting. In previously logged areas now in national parks, monitoring is occurring to determine whether there is sufficient regeneration to sustain Alpine Ash biodiversity without intervention. In national parks where the natural fire regime in Alpine Ash forests has been less than 20 years, natural processes will be allowed to occur, this may result in a significant long term change to biodiversity in the wet montane vegetation communities in these areas.

GRAZING MANAGEMENT

A CASE STUDY: Alpine Grazing

Value: The grazing of cattle on public land in alpine areas has occurred for over 150 years. The most intense grazing occurs in alpine and sub-alpine grassy woodlands and open areas. These areas have very high biodiversity and water catchment values and are sensitive due to extreme climatic conditions. Grazing is managed by licence which controls where grazing can occur, stocking rates and a range of other conditions. The 2003 Alpine Fires affected 43 grazing licences and burnt 93% of the licence area. (PV 2003)

Risk: Burnt areas are at high risk from disturbance while recovery is taking place. It was found that after the 1998 Caledonia fire in sub-alpine areas, it took 3-4 years for pre fire grazed bare ground and vegetation cover condition to be re-established (PV 2003). Sensitive areas such as alpine bogs and wetlands may take decades to recover.

Response: A project to manage Fire Affected Grazing was quickly established and a Scientific Advisory Panel put in place to advise Parks Victoria. Grazing has been disallowed for at least two years in national park and one year in State forest while recovery is assessed as part of post fire monitoring. Limited grazing has been permitted in low elevation areas and confined unburnt areas.

INDIGENOUS CULTURAL

A CASE STUDY: Surveys of Indigenous Cultural Sites

Values: The Australian Alps is recognised as having high indigenous cultural values. Although only 1% of the fire affected area has been surveyed, 430 Indigenous cultural sites are registered (PV and DSE 2003).

Risks: Due to the exposed nature of the post fire environment, key risks are vandalism and pilfering, and erosion of sites. Activity from fire suppression and rehabilitation activity is also possible. This is exacerbated by the lack of information available.

Response: Communities with an interest in the fire affected area were invited to nominate a person to be employed on the rehabilitation teams to assist with preparation of the plan and community elders and representatives were involved throughout the process. Some immediate survey work was carried out to scope the response. The lack of information was agreed by the communities as the key issue and funds directed to representative archaeological surveys of the fire affected areas to be carried out with the communities. The information is to be recorded and made available for fire managers in the future.

HERITAGE

A CASE STUDY: Historic Huts

Values: Historic Huts exist throughout the alps representing an association with a range of past and present activity such as logging, mining, grazing and recreation. Their condition varies considerably in terms of integrity, design and state of repair and in the Alpine National Park have been attributed significance consistent with the Burra Charter . Of 81 huts that existed in the fire affected area, 45 were destroyed by the fire and the sites of the ruins now hold historic value. Historic huts often also have other values such as for refuge, social and licensed grazing activities.

Risk: Burnt hut sites can be a danger to the public, however over zealous “cleaning up” of sites during the fire recovery period may impact on remaining historic values and may compromise future interpretation of the values. Sections of the community have sought to replace burnt huts for historic, social and refuge purposes. To that end, a new community group formed after the fire, the Victorian High Country Huts association. However, consistent with the Burra Charter, original manifestations of heritage cannot be replaced by building a replacement. A rebuilding program needs to carefully consider community needs and historic values.

Response: All ruin sites have been assessed for significance prior to site cleaning. A forum has been established to determine community views on hut values and fire affected hut management to establish principles. All huts and ruin sites are being re-assessed for significance given representation of values has now changed. Four huts have been approved for immediate replacement. Two because of high refuge needs, one for management purposes (fire tower) and one for specific social values associated with the site. Several others are under consideration for licensed grazing needs. A site interpretation program is commencing to interpret historic values at sites.

TOURISM AND VISITOR SERVICES

A CASE STUDY: Mount Buffalo National Park

Values: Mount Buffalo National Park is a tourism icon for Victoria, attracting a visitation of up to 250,000 visitor days and contributes significantly to the regional economy. The Park also contains an historic Chalet and Ski Resort. The park was almost totally burnt out in 2003, however the key built infrastructure was largely saved. The Park and Mount Buffalo Chalet was closed for about 40 days during and following the fire. The main impact on infrastructure was loss of road safety signs and barriers, directional and interpretive signage, walking track bridges, boardwalks and steps, ski bridges and tree risk around roads, visitor sites and walking tracks.

Risks: The post fire park environment was a potential risk to the welfare of visitors from damaged built infrastructure and natural features becoming unstable and dangerous from fire affects. There was also a risk to the local economy trying to re-establish itself following the devastating effects of the fire as Mount Buffalo is a key tourism attraction. The re-opening of the park was seen as crucial to getting the message out that the area is ‘back in business’.

Response: A park opening strategy was developed in co-operation with tourism operators and interests. A “recreation opportunity” approach prioritised resources to assess, repair and re-instate visitor priority areas to enable reopening the park and associated businesses in a staged manner. The use of the website and information published for the community was crucial to getting the correct message out. Interpretation programs now aim to inform people of ecosystem recovery and the role of fire in the environment. The refurbishment of all built assets will continue over a three year period and the opportunity will be taken to re consider need and design.

CONCLUSION

A fire of the proportion of the 2003 Alpine Fire required a massive response for rehabilitation and recovery, however the approach developed can be used at all scales. The key was the establishment of multi skilled and cross tenure rehabilitation teams with both operational and planning functions while the incident management teams were still in place. This enabled a quick assessment and response to the stabilisation and rehabilitation of fire suppression disturbances and to prepare fire rehabilitation plans to consider all aspects of recovery. The risk management methodology enables a carefully considered, targeted and consistent approach. The provision of strategic values information is crucial to risk management. The liaison with other authorities involved in wider community recovery is efficiently achieved through the rehabilitation team, particularly once fire incident control has ceased.

REFERENCES

CNR 1995 Code of Practice for Fire Management on Public land. Department of Conservation and Natural Resources. Melbourne. Australia.

DSE & PV 2003 General Road and Track Rehabilitation Guidelines. Parks Victoria and Department of Sustainability and Environment. Unpublished report, working document for 2003 Alpine Fire rehabilitation program.

NRE 1996 Code of Forest Practice. Department of Natural Resources and Environment. Melbourne. Australia.

PV and DSE 2003 Statewide Public Land Ecological and Cultural Fire Recovery Plan.. August 2003, Melbourne, Victoria, Australia.

PV 2003 Fire Affected Alpine Grazing Strategy (Draft). Parks Victoria. Unpublished internal working document.

State Government Victoria 2003 Report of the Inquiry into the 2002 – 2003 Victorian Bushfires. State Government of Victoria, 2003. Melbourne, Australia