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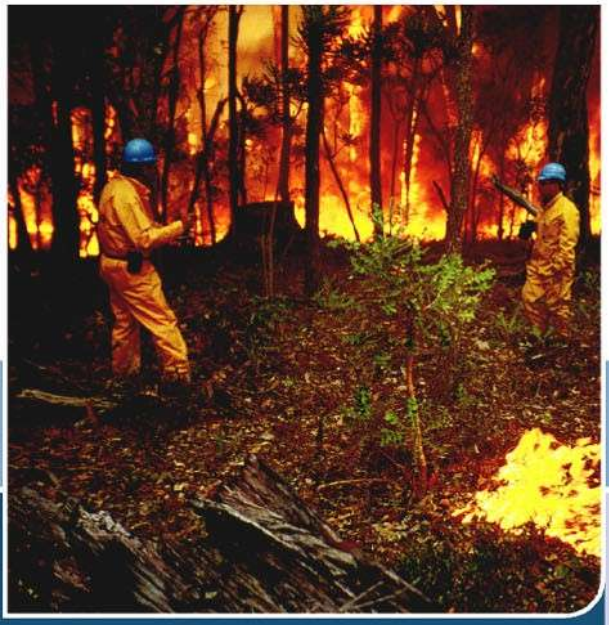

FOREST BIOSECURITY AND PROTECTION

Protecting our forests

Wildfires and Communities: Australasian Perspectives

Laura Kelly

CSIRO SCION

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Report No. 15565

Wildfires and Communities: Australasian Perspectives

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Date: March 2005
Client: Foundation for Research, Science and Technology
Contract No: C04X0403

ACKNOWLEDGEMENTS

This research was carried out under a Social Science Research Centre Summer Studentship, at the University of Canterbury, supervised by the Bushfire Research Group, November 2004 - February 2005.

Funding by the Foundation for Research, Science and Technology (Rural Fire Programme COX0403), and New Zealand rural fire sector stakeholders (National Rural Fire Authority, New Zealand Forest Owners' Association, Department of Conservation, New Zealand Defence Force, Territorial and Local Authorities) is gratefully acknowledge.

Assistance provided by Stuart Anderson and Grant Pearce, Ensis Bushfire Research Group in accessing and interpreting technical fire information, and by Margaret Richardson, Scion Rotorua in editing the report is appreciated.

Additional copies of this publication are available from:

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Kelly, L. 2007. Wildfires and communities: Australasian perspectives. Ensis Forest Biosecurity and Protection, Scion, Bushfire Research Group, Christchurch. Ensis Contract Report No. 12563. 26 pgs. [output number 41719].

EXECUTIVE SUMMARY

National and international research on natural disasters was examined November 2004 – February 2005 to determine what information was available on community resilience and recovery after wildfire events in Australasia. This report provides a background to proposed research aimed at understanding alternative social recovery practices. This research is to be carried out under the Ensis Bushfire Research Programme (Ensis is the Joint Forces of CSIRO and Scion, formerly Forest Research).

The main findings of this report are summarised below:

Wildfire impacts

- Wildfires can have many different impacts on a community including the physical, mental and emotional effects of the disaster as well as the effect on livelihoods, income and assets. For this reason, a holistic approach to wildfire recovery is required.
- After the occurrence of a wildfire the physical and economic loss for a community and individuals can be huge. The cost of damage from wildfire is accrued through the loss of possessions and stock, fire suppression, transport, clearing up, welfare, rebuilding, restoration, loss of production, and basic loss of livelihood.
- Of even larger significance than either the loss of material possessions or injury is the loss of life.

Emotional impacts

- Post-traumatic stress disorder for both adults and children can cause anxiety, sleep disturbances and depression for months after the event.
- Research on children who have been directly affected by bushfire has shown that some children experience emotional distress for a long time after the bushfire. This distress can be related to the experience of having to leave their homes, fears about their parents' safety and fears about future as well as actual experience of the fire.
- In the immediate aftermath and longer periods afterwards, there are increased needs for mental health intervention and care. Opportunities exist for early intervention to lesson the distress and mitigate the risk of problems and disorders.

Factors influencing recovery

- A community's ability to respond to, cope with, recover from, and adapt to hazards are influenced by economic, demographic, and housing characteristics. Research on socio-economic and demographic characteristics indicates that the very young, very old, disabled, single parent

households, migrants, people lacking communication and language skills, new comers, and low income earners are likely to experience high levels of vulnerability to natural hazards.
- Official recovery efforts typically run for relatively limited periods of about 12 months. However, there is now awareness that for many groups recovery can be a very lengthy process.
- Insurance issues can inhibit recovery. If a client underinsures their property or assets, the insurer will only pay a percentage of the loss. As a result the customer acquires more debt and more stress.
- It is the intangible aspects of recovery (such as the loss of animals, possessions, and property or missing neighbours who were forced to move) rather than the tangible that take the longest to restore after a disaster.

Building resilience

- It is through building communities' resilience to disasters such as wildfire that a community is more likely to recover more quickly if one does occur.
- It is necessary for every community member to be self-responsible, because fire brigades are unable to protect everyone; therefore, members of the community have to be aware of the best methods to combat the situation if they are placed in fire danger.

It is important to seek ways to facilitate communities' resilience and growth as a result of wildfire disasters. Knowledge of past disasters, and in particular wildfire events that have occurred through Australia and New Zealand, provides us with a background to examine beneficial recovery mechanisms to reduce social impacts for future wildfires in New Zealand.

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1. INTRODUCTION

This paper is the result of a scoping project to determine what research has been carried out, and what information is available regarding community recovery after wildfire events in New Zealand and Australia. It represents the documented literature and informal material which could be accessed from libraries in New Zealand and on the Internet over a 10 week period, November 2004 – February 2005. Helen Bones has focused on the rest of the world in her report titled "Wildfires and Communities: International Perspectives" (Bones 2005). The information presented in this paper is intended to provide background knowledge to Ensis' Bushfire Research programme, for which an objective is to improve community recovery following wildfires.

By comparing recovery mechanisms and resilience to wildfire events, methods and practice, guidelines can be developed that reduce social impacts from similar events in New Zealand. In the future it is hoped that this will enable communities and economies to recover more quickly from wildfire events. It is through an evaluation of international research that we seek to understand long-term social recovery practices.

The information gained in this review has been derived principally from experiences of disasters rather than dedicated social studies. Wildfires are a natural hazard which can be foreseen, prevented and combated to a greater degree than hazards such as severe storms, floods, earthquakes and volcanism (Gledhill 2003). Consequently, it appears that the majority of research available on wildfire concentrates on prevention. Despite the degree of predictability, there exists a lack of research surrounding wildfire effects on communities during or immediately after the disaster. As with most types of disasters, studies have to be largely retrospective, as there is rarely the opportunity to document the event as it unfolds. Regardless of this, if a fire does occur it is useful to view the experiences gained of those in other disasters.

2. PROBLEMS AND RESEARCH APPROACH

2.1 Previous Research

It is broadly acknowledged that there is a lack of research on the social ramifications of wildfire in Australasia. However, some research has been undertaken. A concentrated site of information appears in the 2004 November issue of the *Australian Journal of Emergency Management,* which focuses on 'International Perspectives on Recovery'. The proceedings from the *NZ Recovery Symposium* held in Napier 2004 also provide useful information. There are, however, various projects currently underway. Josh Whittaker, a PhD student at RMIT University in Melbourne, has a project titled 'Adaptive Capacity and Social Resilience to Bushfires in South-east Australia'. He presents the idea that where levels of social and institutional capacity and resilience are high, 'communities' will be better able to prepare for, respond to and recover from the incidence of wildfires (Whittaker 2004). Dr Alison Cottrell from James Cook University in Queensland is heading a Bushfire Cooperative Research Centre (CRC) project with the aim of 'Understanding Community Needs, Perceptions and Attitudes'. Indicative results and the framework of this project were due at the end of July 2005.

2.2 Definitions

For the function of this report a few key words are outlined below.

A **wildfire** is a free burning and unwanted wildland fire requiring a suppression action.

The term community can be used very loosely as it has a broad meaning. Generally, community is the entity to which one belongs. More particular to wildfire, I will use Buckle and Coles' definition from the *Australian Journal of Emergency Management* (2004). **Community** means:

People at a local (that is sub-municipal) level who are not organised by emergency services but have skills, resources and an organisational capacity or structure that allows them to provide services to people at risk or actually affected by disasters…Community therefore is local, voluntary, self-organising and may have disaster management as only part of its span of interests" (Buckle and Coles 2004).

Emergency Management Australia (EMA) gives key definitions in its glossary for disaster and emergency. It describes an **emergency** as:

An event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and co-ordinated response (Buckle and Coles 2004).

The glossary defines a **disaster** as:

A serious disruption to community life which threatens or causes death or injury in that community and/or damage to property which is beyond the day-to-day capacity of the prescribed statutory authorities and which requires special mobilisation and organisation of resources other than those normally available to those authorities (Buckle and Coles 2004).

The NZ Civil Defence Emergency Management Act 2002 defines **recovery** as:

The coordinated efforts and processes to effect the immediate, medium and long-term holistic rehabilitation of a community following a disaster (Norman 2004).

2.3 Research Focus

There are many different elements to take into account when dealing with recovery. These include the physical, mental and emotional effects of a disaster as well as the effect on livelihoods, income and assets. The NZ Civil Defence Emergency Management Act 2002 that replaced the Civil Defence Act of 1983 focuses on taking a more holistic approach. Through this holistic approach, the Act has established a framework for Civil Defence Emergency Management to build resilient communities (Ministry of Civil Defence and Emergency Management 2005).

The foreword from *The Australian Journal of Emergency Management,* volume 19, number 4 (2004) reflects the increased interest and commitment to disaster recovery in both Australia and New Zealand. This interest in recovery is a digression from the usual focus on response. It highlights the recovery developments in both New Zealand and Australia and examines the key attributes of the most effective recovery programs. The foreword addresses the need for a holistic approach when addressing

recovery. Key components of this include: community, psychosocial issues, the environment, infrastructure and the economy. It claims that the range of articles present highlights the diversity of issues requiring consideration in recovery. It is clear that the overall aim and objective of the various aspects of recovery described are very similar. However, while a community may be affected as a whole, we have to be aware of individual circumstances. It needs to be recognised that for some residents of an affected area there is no feeling of attachment to the area. Contrastingly, in some settings, particularly rural, the geographic area may be an intrinsic part of the traditional view of the community (Marsh 2001). This refers to the meaning of 'community' "as shared space or as growing from close proximity" (Marsh 2001). As a result, these residents may be more vulnerable to negative impact from the physical destruction of the environment. However, even then one cannot assume that the residents are of like mind and are not in conflict with each other or are not apathetic to each other's needs (Marsh 2001). This is reinforced in an *Emergency Management Australia* report titled "Guidelines for Emergency Managers Working with Culturally and Linguistically Diverse Communities" (Mitchell 2002).

3. PERCEPTIONS

3.1 Wildfire Vulnerability

The hazard potential of a wildfire is either moderated or enhanced by geographic factors such as the proximity to houses, as well as the social fabric of the place. The social fabric includes community experience with hazards, and community ability to respond to, cope with, recover from, and adapt to hazards. These coping mechanisms are influenced by economic, demographic, and housing characteristics (Cutter 2003). Research on socio-economic and demographic characteristics indicates that the very young, very old, disabled, single parent households, one person households, migrants, people lacking communication and language skills, newcomers, and low income earners are likely to possess high levels of vulnerability to natural hazards (McGee and Russell 2003). It can be argued that a policy of disaster response needs to include examination of the conditions that make human communities vulnerable to unforeseen natural and technological events (Comfort et al. 1999).

3.2 Readiness

In many landscapes, such as the state of Victoria in Australia, wildfire is inevitable. It is important to recognize the extent to which people are able to influence the level of impact wildfire can have on their lives and property (McGee and Russell 2003). This means being prepared. Undertaking actions before the fire impact enables social units to respond actively when a wildfire does strike. Household preparedness for a wildfire includes minimizing the amount of fuel around the property; undertaking vegetation management; cleaning leaves from gutters; placing fly screens on windows; ensuring access to adequate water supplies and gathering appropriate fire safety equipment such as ladders, hoses, buckets, mops, portable water pumps, and personal protective equipment. There is also a growing acceptance of the need to foster local year-round preparedness (McGee and Russell 2003).

Not only is there a need for individuals in a community to be prepared, there is also a need to link up disciplines such as science and social science, emergency management and other relevant policy sectors. This is necessary in order to find the balance between controlled nature, controlling nature or controlling human behaviour (Cary et al. 2004). There is a need for a diversity of inputs because one perspective cannot make sense of the complex phenomenon of fire nor recommend singular policy and management responses across varied landscapes (Cary et al. 2004). This diversity of inputs is considered critical by many in social science research in order for communities to successfully live with fire in an ecologically and socially sustainable way (Cary et al. 2004).

3.3 Resilience

Disasters disturb a community's way of life, which easily translates to a degraded quality of life and undermines the cohesion of the affected community (Gordon 2004). Through building resilience to disasters such as wildfire, communities are likely to recover more quickly if one occurs. In the article *Disasters and Communities: Vulnerability, Resilience and Preparedness* (2001), Paton and Johnston outline how community resilience can be described at several interdependent levels.
They define community resilience as:

- The community's ability to bounce back and recover using its own resources - this recovery needs to be directed in order to safeguarding the physical integrity of the built environment and lifelines (e.g. building codes, retrofitting buildings).
- Ensuring economic, business and administrative continuity (including emergency management and social institutions).
- Ensuring that community members have the resources, capacities and capabilities necessary to utilise these physical and economic resources in a manner that minimises disruption and facilitates growth.

(Paton and Johnston 2001).

In New Zealand, Lifeline Utilities form part of the wider Civil Defence Emergency Management (CDEM) categorisation of infrastructure (Brundson et al. 2004). The infrastructure includes elements of the built environment from hospitals and schools to residential housing, commercial and public buildings. There is a critical dependency of these elements on utility services; therefore the need for a collaborative effort when responding to community-wide emergencies and disasters is highlighted (Brundson et al. 2004).

After a disaster there is a need to establish and re-evaluate priorities (internal and external). It is part of a process that begins at the "operational level during the immediate response, with progressively more strategic decisions being required as more information becomes available" (Brundson et al. 2004).

Here is a summary of key steps Lifeline takes in the recovery process following a disaster. They are also steps that could be utilised by recovery teams following a wildfire.

1. Understand what needs to be done to recover each utility's operation;
2. Understand the external constraints on immediate operational repairs;
3. Put in place interim low-capacity fixes; carry out immediate tidy-up operations;
4. Strategic decisions – what to repair/rebuild/fully redevelop;

5. Match internal priorities with external considerations (e.g., priorities of other utilities and the recovery manager on behalf of the community);
6. Formalise works programmes and carry out design work; and
7. Organise and manage contracts for the physical works.

(Brundson et al. 2004).

3.4 Residents' Views / Surveys

Much of the material gained in the articles on the social impact of wildfires was acquired through observation, theory and generalisation. It appears that generally there was no systematic approach, but that researchers just talked to people where they felt it was necessary or important. However, some articles were founded on surveys and questionnaires filled out by people who were affected by wildfire.

The *NSW 2001/02 Christmas Bushfires: Surveying Affected Communities* article highlights the data collected on people's bushfire experiences following the fires (Alexander 2003). The survey provides a glimpse of perceptions, attitudes and behaviour of a sample of residents in several fire-affected communities in New South Wales. The data collection was aimed at improving the understanding of community needs and expectations with respect to bushfire emergencies. Topics that the survey addressed through a questionnaire were:

- Each individual's perception of risk;
- Their preparedness;
- Interaction with the emergency services;
- The information flow during the fire, and;
- Finally, which is more relevant to our research, the respondents were asked to indicate how the bushfires affected their property as well as how any disruptions they may have experienced impacted on them and their family.

The survey contained 35 questions which were mainly multiple-choice, but did include a section at the end where respondents could write comments on any matter they wished (Alexander 2003). The questionnaire was distributed to 1,300 households over the affected areas and 76% were returned. It provided an important opportunity for people to express their views on a range of community safety issues, and for the fire services to demonstrate their interest in listening to those views. It was highlighted that the respondents utilised the questionnaire to give a certain amount of closure to the event (Alexander 2003).

Another similar article is the *Tasmania Bushfires: Report on the Response of Residents Affected by the Fires* (Saunders 1998). This study looked at the Tasmania bushfires that occurred on 17 and 18 January, 1998. It aimed to "collect information from the residents directly affected by the fires and through analysis of the data, examine their level of bushfire preparedness during the summer and their behaviour on the morning of the fires and during the fire threat" (Saunders 1998).

The size of the area surrounding Hobart affected by the fire was about 5,800 hectares and included approximately 4,700 households. The survey was completed by 222 people, representing almost 5% of the total number of people affected by the fire (Saunders 1998). The sample was divided almost equally between males and females, with a modal age of 40 to 49 years and modal residence time in the area of 2 to 5 years (Saunders 1998). Although the preparedness of those affected is not the focus here, the participants inadvertently highlight how the fires affected them personally. Issues with communication hindered and aided participants' protection.

The survey measured the effectiveness of the communications to the public early in the fire season; it included the percentage of the community that received the message, the proportion who took notice of the information and finally the number who implemented the advice. A major concern highlighted in the article regards the number of people that evacuated just before the fire front arrived. This is despite advice in fire service pamphlets and through the media that the decision to evacuate must be made well before fires reach an area. Late evacuation is an ineffective survival strategy because exposure to heat and smoke adds to confusion at the time. It is in these cases where fatalities occur, which is the greatest social impact of all (Saunders 1998).

3.5 Self-responsibility

Much of the literature espouses self-responsibility in addressing the ways a community can prepare, prevent and recover from wildfires. Often the area affected is a vast size, within which fire brigades are unable to protect everyone; therefore, members of the community have to be aware of the best methods to combat the situation if they are placed in fire danger.

4. PHYSICAL EFFECTS

4.1 Economic costs

Before we even look at the economic effects of fire we must acknowledge the economic strain a community can be placed under through the preparation for wildfire. The purchase or maintenance of fire-related equipment, planning or station management plans and protection of assets all attract costs (Cann 2001). These costs affect the budgets of all residents, including pastoralists, local governments, industry, volunteers and government agencies. In fact, the whole community feels the burden: “business costs rise, particularly in insurance and equipment maintenance, loss of production whilst responding is a significant cost that is normally absorbed” (Cann 2001).

4.2 Economic loss

After the occurrence of a wildfire, the physical and economic loss for a community and individuals can be huge. The cost of damage by wildfire is accrued through the loss of possessions and stock, fire suppression, transport, clearing up, welfare, rebuilding, restoration, loss of production, and loss of livelihood (Webster 1986).

For example, the insurance payouts for Victoria and South Australia after Ash Wednesday 1983 were $138 million for Victoria and $38 million for South Australia. The total cost for the Ash Wednesday fires was $440 million (Webster 1986). There were the obvious costs from destroyed homes, properties, fencing, vehicles and livestock, but amongst the hidden and flow-on costs included country-town storekeepers who lost their customers and livelihoods when surrounding farms lost their stock and crops. Cows with burnt udders could not be milked until they healed. Thousands of stock went without food for two days after the Ash Wednesday fire.

People cannot rebuild their houses or business premises or replace machinery or tools until insurance money comes through (Webster 1986).

4.3 Who Covers the Cost?

Russell Blong's article "Damage: the Whole Truth but Not the Whole Truth" (Blong 1999) looks at who covered the costs of small buildings, including houses and their contents, which were affected by some of Australia's biggest disasters. The 1983 South Australia Bushfires and the 1994 New South Wales Bushfires are used as examples. The relative damage costs are borne by insurance companies, the government, charities and the affected parties.

The percentage paid by affected parties is often determined by the degree of under or non-insurance (Blong 1999). A survey by the Australian Insurance Council suggests for the 1994 NSW Bushfires that 18% of buildings and 52% of contents were uninsured (Table 1). Building and contents under-insurance percentages are higher than the estimates for non-insurance. When the recovery costs are often in the millions of dollars, it is easy to visualise the economic strain that is placed on the affected parties. Comparatively, wildfires in Australia were lower on the list of insured damage between 1967 and 1998. Tropical cyclones topped the list with $1800 million of insured damage. Bushfires were sixth on the list with $600 million of insured damage, after hailstorms, earthquakes, floods and storms (Blong 1999).

Table 1: Estimated Percentage Costs.

Costs	1983 South Australia Bushfires	1994 NSW Bushfires
Insurance	31%	39%
Affected parties	31%	37%
Government	31%	22%
Charity	7%	2%

4.4 Economic Recovery

Economic recovery from disaster is dependant on the resilience of local economies, although it may also concern regional or national economies, especially in small or poor countries. Handmer and Hillman (2004) in their article "Economic and Financial Recovery from Disaster", in the *Australian Journal of Emergency Management* and the *NZ Recovery Symposium 2004 Proceedings,* question what the aim of recovery

should be. Is it simply to restore the pre-disaster state? Or should disasters be embraced as opportunities to make local economies more resilient? (Handmer and Hillman 2004). The article states that recovery is often focused on helping sectors that are especially sensitive to outside views, such as tourism, to encourage investment, or to show political progress, and is thus marketed as such. The problem with this approach is that it “may benefit recovery, but it may also obscure problems” (Handmer and Hillman 2004).

Handmer and Hillman (2004) argue, “The aim of recovery should be to ensure that the economy continues to function providing livelihoods and other services for those in the affected area. Recovery programs should support the affected economy so that it can do this" (Handmer and Hillman 2004). An example of recovery aid has been seen in Australian wildfire affected areas; white goods were made available to the affected communities via vouchers redeemable at local stores rather than donated directly from the manufacturers (Handmer and Hillman 2004).

Financial concerns that need to be addressed immediately after disasters were highlighted in the management of the New Zealand Southland floods of 1984. Recommendations arising from this experience include that evacuees should be assisted financially as soon as possible following a disaster by:

a) Payments of emergency benefits by the Department of Social Welfare, and
b) Small interim payments from a Disaster Relief Fund, if one has been established.

Allowances should be promptly paid to people who are billeting displaced families (Luketina 1986).

Handmer and Hillman (2004) acknowledge that “the research literature on economic recovery is sparse, although there appears to be a surge of interest in the topic”. When examining the economic recovery of a community, the examination needs to be explicit about “the macro factors of scale, wealth, and the type of disaster” (Handmer and Hillman 2004). An example the article gives of this is “whether it is a rare earthquake or repetitive flooding; and whether the interest is with recovery over a short or long period”. Not only has there been little study in this area but also there is a tendency for many official recovery efforts to run for relatively limited periods of about 12 months. However, there is now an awareness that for many groups recovery can be a very lengthy process (Handmer and Hillman 2004).

4.5 Insurance cover in New Zealand

Insurance issues regarding payouts can inhibit the economic and social recovery of rural dwellers, especially if they are not adequately covered or if the cause, and liability for the fire, cannot be determined.

Main rural insurance policy types include cover for:

- Dwelling/contents
- Commercial/farm buildings
- Other Assets – plant, machinery, equipment not fixed to a building, etc
- Business interruption
- Vehicles
- Liability
- Livestock.

Lumley General Insurance's Ruralpak insurance proposal is an example of a general rural insurance policy (Lumley General Insurance 2004). It covers:

1. Farm Buildings and Farm Assets
2. Farm Income
3. Farm Assets Breakdown
4. Farm Liability
5. Employers Liability
6. Transit
7. Deterioration of Refrigerated Stock
8. Personal Income Protection
9. Vehicles.

Each section is then broken down into what the customer wants covered and the value of each item intended to be insured. It is within this policy that rural owners can decide what they would like to insure so they can keep their premiums at a minimum.

4.5.1 Levels of Policy Cover in New Zealand: Replacement vs. Indemnity

Dwellings and farm buildings can either be insured for a replacement or indemnity value. Replacement value means that the property in question, if destroyed in a wildfire, is replaced regardless of the property's depreciation over time. The indemnity value is a set value agreed upon by the insurer and the customer. This reimbursement value does not depend on the actual cost of the property replacement. The property can either be insured by sum or by square metre.

According to Arthur Duckworth, Branch Manager for *Jardine Lloyd Thompson Ltd* in Christchurch, a risk consultancy and insurance broking firm, many people insure for only a percentage of their property and assets' true worth. This is despite being informed of the risk of only insuring it for a percentage. Often this is because people only insure as a precautionary measure, seeing disaster as an event that affects other people and not themselves. If a customer underinsures their property or assets, the insurer will only pay a portion of the loss. This is where a customer can run into difficulties. For example, in the event of a fire destroying a property with inadequate insurance cover, the customer would have to obtain a bank loan to be able to replace the buildings to the original standard. As a result the customer acquires more debt and is placed under stress. Stress might be somewhat relieved if the process of making a claim was simplified. This could be achieved if the organisations offering compensation co-ordinate their activities so applications can be made to one body and damaged properties have to be visited only once by assessors (Luketina 1986).

4.5.2 Who is at Fault? - Public Liability Cover: Responsibility

As well as insurance for property loss and replacement of land and assets, an owner should have Public Liability Insurance to cover the costs of loss to a third party should fire escape from their property. They should also obtain insurance to cover costs for fire suppression or costs levied by any Rural Fire Authority under the New Zealand *Forest and Rural Fires Act 1977* (The Department of Internal Affairs 2006). The Act states that a landowner is responsible for any costs related to a rural fire that starts on one property and escapes to another. This can cause many problems and extended court battles between the Rural Fire Authority and the land owner, as well as the insurance company. A significant difference between wildfires and other natural hazards is the fact that people can start wildfires through direct negligence

and through conditions on their property. Determining who started the fire is where many of the legal problems stem from (Henri 2003).

There are two examples of this issue, the first of which featured in an article by Hutching (1983) in the December 1983 edition of *NZ Journal of Agriculture*. It reports that Godfrey Thomas, a farmer from Ngahape in the Wairarapa, tried to claim insurance for the cost of fighting a fire in a neighbouring forest. The fire started on his property, but because the spread of the fire to the adjacent plantation was considered an act of God (the fire resulted from the explosion of some cow pats in a burn off which sailed into the air and carried over into the plantation), he was not covered by insurance and therefore it made him responsible for the fire fighting costs (Hutching 1983). If the whole forest had burnt down Thomas would have been considered negligent, but he would have been covered by his public liability cover. As a result, it took three years and numerous letters to his insurance company for the matter to be settled (Hutching 1983). For Thomas, the main issues inhibiting his recovery and return to a normal way of life were not so much the destruction of his property, and that of his neighbours, but the high cost of extinguishing the fire. This article highlights the NZ Federated Farmers' concern to see the *Forest and Rural Fires Act 1977* changed, and it becomes questionable as to who is responsible for the payout after wildfires leading to lengthy battles between farmers and insurance companies (A. Undorflay pers. comm.).

The second example occurred in 1997 (Johnston 2003). Mr Tucker was driving his truck and trailer on State Highway 1 north of Christchurch. Without warning, just south of Cheviot, two tyres on one axle burst. Mr Tucker continued driving, unaware of what had happened. Sparks were produced through the weight of the trailer causing the wheel rims to lower and scrape along the road surface. These sparks were blown by the northwest wind into grass on the roadside, igniting a fire which spread into a nearby pine plantation. The cost of fighting the fire amounted to more than $20,000, and the Fire Service Commission and the Minister of Conservation sued Mr Tucker for the costs. Mr Tucker claimed that he had not been negligent and that nothing he did made him liable for the costs. The District Court agreed that he had done nothing wrong but the basic fact that he had been driving made him liable. Mr Tucker appealed to the High Court and Justice William Young reversed the decision. He highlighted the difference between Mr Tucker's situation and that of someone who deliberately lit a fire (Johnston 2003).

A person who deliberately lights a fire has a legal responsibility to ensure that it does not escape and cause damage. The fire lighter has obviously "caused" the fire and must therefore take responsibility if it escapes. Therefore a farmer who lights a fire to burn off a paddock of stubble, or a visitor to the countryside who lights a barbecue in a picnic area, will be liable for all of the consequences…The fact that he or she lit the fire means he or she is absolutely liable for the costs of controlling and extinguishing the fire and for compensation for damage. For a fire that has been caused accidentally, the person will not be liable unless the fire authority can show that that person should have anticipated what happened (Johnston 2003).

Mr Tucker did not "cause" the fire because he had taken every precaution necessary and "no professional truck driver, nor for that matter any person driving a car towing a boat trailer, would expect that a roadside fire might ignite if a tyre burst" (Johnston 2003). It was on that basis that the court did not find Mr Tucker responsible for the fire.

4.5.3 Public Awareness of Fire Risk

What is apparent from both examples in section 3.5.2 is that everyone, whether they are a rural dweller or a visitor to a rural area, needs to be aware of the fire risks in the rural setting because one can be held accountable for the fire fighting costs regardless of fault or negligence. This issue could be addressed in prevention information from Rural Fire Authorities. The two examples question liabilities and highlight the inconsistencies in the interpretation of the Forest and Rural Fires Act 1977. If the Act should be interpreted in the manner directed by the judge in Mr Thomas' initial case, he should be made to pay the costs, unfair as it might seem.

4.5.4 Fire Levies

As previously stated, in the rural areas of New Zealand a person is liable for any fire which starts on their property, whether they caused it or not. However, in urban areas, a person is very rarely liable for the cost of putting out the fire when responsible for it, as these costs are largely met by a levy that is paid with insurance premiums. People living in rural areas also pay levies but these levies fund the administration costs of the district's rural fire authority. However, unlike urban areas, in rural areas the fire authorities are required to try and recover the fire fighting costs from the person responsible for the fire. Each fire authority is responsible for preventing, controlling and putting out fires in its district (Johnston 2003).

Not only are there issues in determining who is to blame for where and how a fire starts, but rural farmers also have issues with paying a fire levy through their insurance. This is because those who do not have insurance do not have to pay the levy. These farmers get the same protection from the rural fire authority or brigade as those who do have insurance. Those farmers who are too remote do not get any protection at all, even if they pay the insurance levy. The other issue concerning farmers and the levy is in the nature of its use. No longer is the NZ Fire Service solely focused on fighting fires, as now also it helps to fund rescues. Some District Councils also charge a fire levy through the council rates, so in some areas farmers are paying two fire levies.

4.7 Irreplaceable personal possessions

Often when a person's house burns down, so do the memories that go with it. These are irreplaceable items such as photographs, holiday mementos, art and literature, personal and historical memorabilia. The impact of this loss is not so much an economic one as an emotional one. The emotional effects of experiencing a forest fire are discussed in Part 5.

4.8 Injuries

Not only can a person be affected economically by the impact of wildfire, but also, more seriously, they can experience bodily harm. Death is a significant risk during a fire but the most common wildfire injury is irritation to the eyes by smoke or cinders, sore throats from the inhalation of smoke and toxic fumes, asphyxiation, heat cramps, heat exhaustion, heat stroke, clinical shock and of course burns (Webster 1986).

5. EMOTIONAL EFFECTS

5.1 Personal Loss

Of even larger significance than either the loss of material possessions or injury is the loss of life.

5.1.1 Preventative strategies - To stay or go?

A main cause of death in wildfire is through late evacuation. There is much debate whether to evacuate when there is a threat from fire, or whether to stay and protect your property. The majority of houses that burn in wildfires occur when people are not there to protect them. A rural house is not always in the direct path of a fire, but they can ignite through embers from the fire landing on leaves in the gutters or fuel that is too close to the house (Gledhill 2003). If the owners are there to protect the house by making sure all fuel is clear from the home and by keeping the area outside the house wet, it is less likely to ignite. However, problems occur when people decide that they will stay and protect their house, then change their mind at the last minute when the fire gets close and they try to evacuate. It is at this point that the majority of fatalities occur, as people can get caught in their cars trying to flee, as happened in the January 2005 fires in Victoria. Often when these fatalities occur the house is left standing, showing that they should have remained where were they were (Krusel and Petris 1992).

5.1.2 Vulnerability

In the article *Staying Alive: Lessons Learnt from a Study of Civilian Deaths in the 1983 Ash Wednesday Bushfires*, Noreen Krusel and Stephen Petris address the circumstances surrounding civilian deaths during the 1983 Ash Wednesday bushfires in order to assist the development of strategies to minimise the future loss of life (Krusel and Petris 1992). Through the analysis, involving 32 civilian deaths on Ash Wednesday, they identified three causes of vulnerability. These were:

a) The victims implemented an ineffective survival strategy;
b) The victims had insufficient warning; or
c) The victims were incapable of implementing an effective survival strategy without support (Krusel and Petris 1992).

The paper highlights that to address and rectify these problems communities need to strategically work together to develop wildfire strategies that best satisfy their particular needs (Krusel and Petris 1992).

5.2 Trauma

It is the intangible aspects of recovery rather than the tangible that take the longest to be restored after a disaster. This recovery begins once the initial impact and shock of the disaster has subsided, “after the heroics, the altruism, and the self-sacrifice have been displayed in abundance, when the heavy brigade has withdrawn, and the reality dawns for the locals about the loss of their familiar ways of life” (Taylor 2004). According to Taylor (2004) even after all this the people affected are:

> …still in mourning for the recent past, grieving for their nearest and dearest, missing the familiar faces of neighbours that have scattered elsewhere, accommodating the loss of animals, possessions, property, and perhaps livelihoods, and trying to put on a bold front to the irrepressible news-media hunting for sensational titbits and wanting them to wallow in sorrow for their viewers and readers...

In this period after a disaster, the recovery from these kinds of effects is subtle but just as necessary as "the visible restoration of buildings, roads, electricity, sewerage, and water supplies" (Taylor 2004). Unlike these utilities which can be taken care of by skilled workers, the repair of "human fragmented minds cannot be undertaken by skilled interveners without the full cooperation of the survivors and casualties" (Taylor 2004). There also needs to be an assessment of the individual, family, and community needs for the maintenance of life and the development of plans to meet these needs. What is made clear is that in the recovery any disaster personnel, whether they are disaster managers or health professionals, must adapt their conventional training and expertise to fit each case because no disaster is the same as the last (Taylor 2004).

5.2.1 Debonding

Rob Gordon, in his article *The Social System as Site of Disaster Impact and Resource For Recovery,* highlights an affected person's high arousal in emergencies (Gordon 2004). The state of high-arousal is an instinctive survival reaction to threat, and intensifies the focus on physical and psychological resources. This intensified focus results in a narrowing view of the social world around them. A person in this state can only live in awareness of the present, without reference to a past or future. The awareness lost is replaced with the focus on immediate problems and the intense impressions of the dominant experience. In the months after the incident if flashbacks of the trauma are reactivated, the person becomes detached from their current life and activities. Gordon describes this disconnection with social life as a result of trauma as 'debonding' (Gordon 2004).

According to Gordon, "Debonding is complex, varied or incomplete depending on the circumstances and individuals involved. Its pervasiveness, completeness and duration vary and disruption of the life continuity occurs on several dimensions" (Gordon 2004). These dimensions include the intensity, pervasiveness and duration of the disaster. There are many factors which also effect the nature of the debonding such as people's relationships that were affected and the loss of friends, family, colleagues or people in the community, their career and assets, physical injuries and the effect it can have on self or personality. In the end debonding affects the continuity of social relationships (Gordon 2004).

5.2.2 Disaster Stress

The stress that can manifest after a disaster can occur from various situations. The physical problems addressed earlier, such as the loss of one's house and livelihood, can be a significant factor in stress, which in turn can influence judgement and decision making (Paton and Flin 1999). Not only do people directly affected by the disaster get stressed, but so can the emergency managers. The stress that the managers can experience relates to the emergency environment, meaning time, pressure, level of risk and heat. Stressors also can be organisational and operational (Paton and Flin 1999).

5.2.3 Psychological aspects of recovery

Some victims of wildfire require emotional counselling for years after their traumatic experience. Wildfires can be a cause of trauma to children as well as adults. Research on children who have been directly affected by wildfire has shown that some children experience emotional distress for a long time after the wildfire (Children Youth and Women's Health Service 2004). This distress can be related to the experience of having to leave their homes, fears about their parents' safety and fears about future, as well as actual experience of the fire. Some children do not share their distress with their parents as they do not want to worry them (Children Youth and Women's Health Service 2004).

5.2.4 Southland floods

Any psychological problems that appeared following the 1982 Southland floods were probably a consequence of the flood's aftermath rather than the flooding itself. This was due to the huge clean up and realisation of the devastation. In the aftermath of the floods, people were advised not to throw out flood damaged items such as photos and memorabilia as it was thought this would have adversely affected people's long term recovery (Luketina 1986).

5.2.5 Post-traumatic stress

Post-traumatic stress disorder for both adults and children can cause anxiety, sleep disturbances and depression for months after the event, but for most people these symptoms gradually disappear. More seriously, however, people can experience nightmares, sudden waves of panicky feelings that the fire is happening again, social withdrawal, feelings of hopelessness, an exaggerated startle response (being 'jumpy'), difficulty in concentrating, headaches, general body aches and general sick feelings (Webster 1986). Usually these symptoms fade in a few weeks, but if they persist medical authorities advise that the person should have counselling from a qualified psychologist.

5.3 Recovery strategy

In the immediate aftermath, and longer periods afterwards, there are needs for mental health intervention and care, in addition to those that normally exist in the community (The Royal Australian and New Zealand College of Psychiatrists 1997). There are opportunities for early intervention and possible intervention to lesson the distress and mitigate the risk of problems and disorders (The Royal Australian and New Zealand College of Psychiatrists 1997). Following a disaster, those affected should be provided with information about the causes of the disaster, the possibility of a recurrence and any action being planned to reduce the risk of recurrence (Luketina 1986). Information also should be given to those affected of what they can do to prevent a similar disaster happening again. These actions will hopefully alleviate some of the anxiety and feelings of hopelessness that those affected may feel.

To ease children's anxiety, parents should aim to keep as many familiar family routines as possible as too many changes can increase the stress for the child. The familiarity of routines will assist children to feel safe, so too will physical closeness and comfort (Children Youth and Women's Health Service 2004).

To overcome debonding, communication must be established with affected people to link them with others who have been affected and the recovery system as soon as possible. By normalising communication immediately, those affected can communicate with each other about their experiences and talk about the recovery system. All those affected by the disaster need to be identified, and connected with each other so that individuals know that they are not alone. By being aware collectively of each other, they can form shared representations of their predicament and needs (Gordon 2004).

5.3.1 Case study

A good example of a recovery strategy is the way in which the Dandenong Ranges community in Victoria responded to the 1997 wildfire. On a historical scale the fire was considered small, but because the majority of the community was ill-prepared the impacts were significant (Wositzky 1998). Three lives were lost in the fire, 41 houses were destroyed, dozens of houses were partially damaged, 179 private gardens were burnt and 400 hectares of National and State Park was destroyed (Wositzky 1998). As a result the community, agencies and local government were quick to respond and within days a recovery committee was established and a recovery framework was put in place (Wositzky 1998). The structure developed to manage the recovery provided an "integrated, coordinated approach, had clear lines or communication, involved a dynamic process of monitoring and reassessing needs and services, and involved the community" (Wositzky 1998).

The principles of recovery that the local government provided were:

- Immediate response – it was identified the people needed support straight away, so two recovery centres were set up the day following the fire. Recovery centres were designed to offer a range of financial, legal and insurance advice as well as personal support and material aid.
- Qualitative response – in all tasks that needed to be addressed it was recognised that care was needed when action was undertaken. They acknowledged a need to respect residents' dignity and privacy.
- Coordinated response – they wanted all agencies and their recovery actions to be coordinated in order to be more effective.
- Ownership by the community – they strongly believed that the community should own the recovery process and should be involved in all decisions affecting them.
- Participation – given the complex nature of the recovery process, authorities recognised that the participation of a number of agencies was needed within the broader community.
- Transparent process – it was determined that all its actions would be open and be available for scrutiny.
- Managed information – during the recovery, information needed to be "timely, accurate and available through a variety of mediums" so that it could be distributed effectively (Hayes 1998). This was done through a media liaison person and through community networks, local post offices and general stores.
- Timely outreach – a timely outreach strategy was established as it was acknowledged that not all of who were affected would have access to the recovery centres.

(Hayes 1998).

Through the inclusion of the community in the recovery process, it is thought that the projects provided the community with opportunities to “come to terms with the experience, to express emotions related to their personal and collective experience and to assist the community in linking the past event to a changed environment and a new future” (Wositzky 1998). The crucial factor in the success of the Dandenong Ranges wildfire recovery was in the commitment of the community to the voluntary clean up. This dedication of the community volunteers was so great that 150 of them continued with their assistance to those directly affected for at least a year following the fire (Wositzky 1998). The volunteer efforts were managed by the volunteers registering on a database according to the type of assistance they offered; therefore coordinators were able to call on the appropriate people when necessary. The recovery project allowed the people to focus on the positive process the community and forest were experiencing. This was described as a “regeneration of the natural and human environment, the community strength and spirit of care, love, and hope that was illuminated in the actions of the neighbourhoods following the fires” (Wositzky 1998).

6. RECOMMENDATIONS AND CONCLUSIONS

The best way for a community to recover from a wildfire is to be adequately prepared. Regardless of this, with the world’s constantly changing weather conditions, urban spread and changing land use, it is inevitable that wildfires will still occur. This project indicates a need for more research to be undertaken regarding the social ramifications of wildfires. Primarily this can be done through case studies of significant fires. Researchers need to be prepared to undertake research if a fire occurs; and assess how emergency management plans that have been put in place are carried out and to measure their efficiency. By analysing these procedures we can see what requires development and change. It is clear that communities need to be educated about wildfire risk so that they can be well equipped to be able to be responsible for their own resilience and protection.

In order to achieve a holistic recovery process all disciplines such as science, social science, emergency management and other relevant policy sectors must to be coordinated to achieve a cohesive procedure. Recovery managers also need to be aware of the varying nature of wildfire effects, from the economic ramifications to the psychological ones, not only in the short term but the long term as well.

REFERENCES

Alexander, R. G. 2003, 'NSW 2001/02 Christmas Bushfires: Surveying Affected Communities', in *3rd International Wildland and Fire Conference and Exhibition*, Sydney, Australia.

Blong, R. 1999, 'Damage: the truth but not the whole truth', *Australian Journal of Emergency Management,* vol. 13, no. 4.

Bones, H. 2005, 'Wildfires and Communities: International Perspectives', Ensis Bushfire Research, Forest Biosecurity and Protection, Ensis, Christchurch.

Brundson, B., Crimp, Lauder, Palmer, Scott, Shepard 2004, 'Key considerations for Lifeline utility recovery planning', *The Australian Journal of Emergency Management,* vol. 19, no. 4, pp. 37 - 43.

Buckle, P., Coles, E. 2004, 'Developing community resilience as a foundation for effective disaster recovery', *The Australian Journal of Emergency Management,* vol. 19, no. 4, pp. 6 - 15.

Cann, P. 2001, 'The true cost of fires, who pays? Is prevention an alternative?' in *2001 AFAC Annual Conference*, Darwin, Northern Territory.

Cary, G., Dovers, S., Lindenmayer, D. 2004, 'Fire research and policy priorities: insights from the 2003 national fire forum', *The Australian Journal of Emergency Management,* vol. 19, no. 4, pp. 76 - 84.

Children Youth and Women's Health Service 2004, *Bushfires and children*, Available: [http://www.cyh.com/HealthTopics/HealthTopicDetails.aspx?p=114&np=141&id=1893#top] (22 November).

Comfort, L., Cutter, S., Fordham, M., Hewitt, K., Krimgold, F., Peacock, W., Pulwarty R., Oliver-Smith A., Weiner J., Wisner, B. 1999, 'Reframing Disaster Policy: The Global Evolution of Vulnerable Communities', *IISIS*.

Cutter, S. L., Boruff, B.J. & Shirley, W.L. 2003, 'Social vulnerability to environmental hazards', *Social Science Quarterly,* vol. 84, no. 2, pp. 242-61.

Editor. 2004, *The Australian Journal of Emergency Management,* vol. 19, no. 4.

Gledhill, J. B. 2003, 'Community Self-Reliance During Bushfires: The Case For Staying At Home', in *3rd International Wildland Fire Conference and Exhibition*, Sydney, Australia.

Gordon, R. 2004, 'The social system as site of disaster impact and resource for recovery', *The Australian Journal of Emergency Management,* vol. 19, no. 4, pp. 16 - 22.

Handmer, J., Hillman, M. 2004, 'Economic and financial recovery from disaster', *The Australian Journal of Emergency Management,* vol. 19, no. 4, pp. 44 - 50.

Hayes, L. 1998, 'Recovery: a Local Government response', *Australian Journal of Emergency Management,* vol. 13, no. 2, pp. 22-25.

Henri, C. D. 2003, 'Fire Insurance for Bushfire Risk', in *3rd International Wildland Conference*, Sydney, Australia.

Hutching, G. 1983, 'Fire Fighting Costs: More Heat then Light', *NZ Journal of Agriculture*, p. 24.

Johnston, R. 2003, 'Rural Fires - Lighters Beware', In *Lawlink Magazine*, vol. 19, pp. 1 -2.

Krusel, N., Petris, S. 1992, 'Staying Alive: Lessons Learnt from a Study of Civilian Deaths in the 1983 Ash Wednesday Bushfires', *Fire Management Quarterly,* vol. No. 2.

Luketina, F. 1986, *The 1984 Southland Floods*, Research Section, Department of Social Welfare.

Lumley General Insurance 2004, 'Ruralpak (Farm Protection)'.

Marsh, G. 2001, 'Community: the concept of community in the risk and emergency management context', *Australian Journal of Emergency Management,* vol. 16, no. 1, pp. 5-7.

McGee, T. K., Russell, S. 2003, '"It's just a natural way of life..." an investigation of wildfire preparedness in rural Australia', *Global Environmental Change Part B: Environmental Hazards,* vol. 5, no. 1-2, pp. 1-12.

Mitchell, L. 2002, 'Guidelines for Emergency Managers working with Culturally and Linguistically Diverse Communities', *Emergency Management Australia*, no. July 2002.

Norman, S. 2004, 'Focus on Recovery: A Holistic Framework for Recovery', *NZ Recovery Symposium Proceedings*, pp. 31-46.

Paton, D., Flin, R. 1999, 'Disaster stress: an emergency management perspective', *Disaster Prevention and Management,* vol. 8, no. 4, pp. 261-267.

Paton, D., Johnston, D. 2001, 'Disasters and Communities: vulnerability, resilience and preparedness', *Disaster Prevention and Management,* vol. 10, no. 4, pp. 270-7.

Saunders, W. 1998, *Tasmania Bushfires (17-18 January 1998): Report on the Response of Residents Affected by the Fires*.

Taylor, T. 2004, 'The Recovery Phase of Disasters: The human sequelae', *NZ Recovery Symposium Proceedings*, pp. 150-160.

The Department of Internal Affairs 2006, *New Zealand Forest and Rural Fires Act 1977*, New Zealand Government, Wellington.

The Royal Australian and New Zealand College of Psychiatrists. 1997, *The Role of Psychiatrists in Disasters*.

Webster, J. 1986, *The Complete Australian Bushfire Book*, Thomas Nelson Australia, Melbourne.

Whittaker, J. 2004, 'Social Resilience to Bushfire Hazard', in *Bushfire CRC - Inaugural Conference*, Perth, Australia.

Wositzky, H. 1998, 'Out of the ashes, a community responds: the Dandenong Ranges Bushfires, January 1997', *Australian Journal of Emergency Management,* vol. 13, no. 2, pp. 17-20.