

## EVALUATION OF THE FERNY CREEK FIRE ALERT TRIAL

Norm Free

Shire of Yarra Ranges<sup>1</sup>

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### Abstract

Following the 1997 wildfire that decimated the area of Ferny Creek (3 lives lost and 33 houses destroyed) in Victoria, Australia, affected residents began a campaign to be provided with some form of warning. In response to that community's drive, supported by subsequent comments from the State Coroner, local government (the Shire of Yarra Ranges) initiated the Ferny Creek Fire Alert Trial Committee. Various warning systems were explored but the key factor challenging the committee was the lack of lead-time to provide adequate warning to the affected community, therefore an alert system was the only viable solution. A siren system was devised whereby the activation of a fire unit response to a fire near the township would simultaneously activate sirens in the area thus alerting residents to the imminent threat of wildfire. Intrinsic to the project was a concentrated and carefully orchestrated community communications strategy that raised residents' awareness to their vulnerability to wildfire and assisted them in their personal wildfire survival planning. An independent evaluation of the project was conducted by the Department of Justice. The review focussed on the social factors of the project rather than the technological aspects. It examined whether the alert system increased the level of preparedness by residents and the process by which proper consistent information was disseminated to residents to enhance and reinforce appropriate behaviour in the event the siren activated. This information process involving a multi-agency approach has been labeled the "integrated warning system". The evaluation also raised issues regarding shared meanings and expectations and the concepts of risk perception and risk communication. The findings from this evaluation have much broader implications for community warnings in general.

### Introduction

*"No significant benefit will be attained from research on any component of warning systems unless what is currently known and what is discovered and put to use in specific communities for preparing for specific events"*(D. Mileti, Natural Hazard Warning Systems in the United States: a Research Assignment, University of Colorado, USA, 1975).

On the 21st of January, 1997, five separate fires were ignited in the Dandenong Ranges. The cause of ignition remains unknown but is considered to have been deliberately lit by person/s with malicious intent. The damage caused by the fires in short totalled a loss of three lives, 41 houses and 400 hectares of State forest. Of the five fires the most significant, which attributed to the loss of the three lives, occurred at a residential sub division within the township of Ferny Creek.

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<sup>1</sup> P.O. Box 105 Lilydale Victoria Australia 3140 email: [n.free@yarraranges.vic.gov.au](mailto:n.free@yarraranges.vic.gov.au)

The township of Ferny Creek is located on the western side of the Dandenong Ranges approximately 35 kilometres east of Melbourne, Victoria, and covers an area of 1,093 hectares. It has a population of 1,960 and a total of 680 households (National Census 1996). The specific subdivision of Ferny Creek impacted upon by the 1997 wildfire is located on the north/western aspect of the Dandenong Ranges. The topography relating to this site is unique for a number of reasons. Firstly it faces a north/westerly direction which is vulnerable to the hot and dry summer winds conducive to wildfire. Secondly this specific area comprises of a gully referred to by locals as the “Devils Chimney” which under extreme conditions forms a sub climate that funnels and concentrates the effects of the prevailing winds to support wildfire behaviour. Thirdly and most importantly is the fact the subdivision abuts the Dandenong Ranges National Park, a heavily treed forest. Past resident, previous member of the Sassafras-Ferny Creek volunteer Fire Brigade and journalist, John Schauble, identified thirty-five incidents of wildfire in Ferny Creek and surrounds since 1851 (Schauble J. Fire in the Hills Dudey Gay Printing, Ferntree Gully, Victoria 1972 Appendix 2).

The 1997 wildfire at Ferny Creek originated in forest near a roadside approximately 750 metres below the subdivision. It has been estimated that it only took between ten to fifteen minutes from the time of ignition to the point where the fire front reached homes in Ferny Creek. The Police Arson Squad report found: “...This fire progressed into the ...streets without any warning. Most of the residents who were interviewed didn’t know that there was a fire in that area until it was burning around their homes. Some criticism has been laid relating to the lack of warning of the impending fire however this fire was burning through Mount View Road well before the arrival of the C.F.A. and police....”(1997 Dandenong Ranges Fires Inquest Report p.15)

Following the fire local residents of the affected area began lobbying for a warning system, initially requesting an extension to the Sassafras-Ferny Creek Rural Fire Brigade siren used to alert volunteer fire fighters to attend the brigade. Many residents on that westerly aspect complained that they could not hear the brigade siren from their home. It is important to note that the brigade siren was not activated for the Ferny Creek Fire in 1997 as the appliances were away responding to another fire.

In advocating for the residents the Councillor Robyn Hale, then Mayor of the Shire of Yarra Ranges, established a formal committee with a membership including the Mayor and Emergency Management staff from the Shire of Yarra Ranges, Ferny Creek Residents, The Department of Justice, Country Fire Authority (including both regional and local brigade representation, Victoria Police (including regional and local) and an anthropologist with expertise in human and fire behaviour.

The aim of the Committee was to examine the feasibility of having a suitable fire alert mechanism in place on a trial basis for the 2000 fire season to alert Ferny Creek residents to the eminent threat of bushfire.

The Ferny Creek Fire Alert Trial Committee aimed to achieve the following objectives:

- To initiate and maintain a high degree of local resident participation in the Ferny Creek Fire Alert Trial Project and ascertain the level of need of local residents for a bushfire alert system in the trial area;
- To ascertain the feasibility of a bushfire alert system in the trial area of Ferny Creek;
- To explore various alert systems available and identify a practical, simple, cost effective and reliable bushfire alert system;
- To achieve the installation and activation of a selected suitable alert system by 1<sup>st</sup> November, 2000;
- To conduct a full review of the effectiveness of the bushfire alert system after the end of the fire season to be completed by the 1<sup>st</sup> of May, 2001.

## **Issues Related to Public Warnings**

From the inception of the committee it was obvious aware that the key response agencies, namely the Police and Country Fire Authority, faced a dilemma as to their role in the operation of an alert system.

The Country Fire Authority is responsible for fire suppression and community fire awareness. It had previously denied the requests of residents to install an extension of the Brigade siren system, as the role of the siren was to activate brigade members to attend the brigade to respond to a call. The Country Fire Authority is not vested with a role to warn residents.

The Victoria Police is responsible for the protection of life and property and is vested with the responsibility of issuing community warnings and undertaking evacuations at the request of the controlling emergency service, which in the case of fires is the Country Fire Authority. The police currently possess a mechanism known as the State Emergency Warning System (SEWS) which involves a distinctive tone being played over television and radio stations to attract attention and then following the tone a message detailing specific information is broadcast. Evidence submitted before the Coroner during the inquest into the 1997 fire indicated that there was insufficient time for a response brigade appliance to attend the scene and evaluate a fire before it had already impacted upon the residents. It follows then that there would be insufficient time to provide adequate and reliable information to warn residents. There was unanimous agreement that a warning system would not meet the requirements of the Trial community.

Hence the term 'alert' and its specific connotations was applied. An alert would provide a minimum of five minutes notice to residents of the threat of an impending fire. It would and could not provide information pertaining to the extent of the threat or provide advice to residents on how to act. The alert would act as a trigger in activating residents who already were in a state of readiness and provide them with sufficient time to activate sprinkler systems, collect children or pets and prepare to defend the property. The key to an appropriate response by residents relied upon their level of awareness and preparedness.

## **Initial Trial Community Survey**

On the 10<sup>th</sup> of August, 2000, a questionnaire was posted to the 180 landowners in the trial area to gain further input from the residents. Whilst some properties would be occupied by the registered landowners, others may be holiday homes, vacant lots or leased houses. The aims of the questionnaire were to check the level of fire awareness and preparedness of residents, to ascertain residents' viewpoints on whether an alert system was needed for the area, and, if an alert system was considered appropriate, to establish which alert option was most preferred.

A total of 114 (63%) questionnaires were returned for analysis. A high response rate was anticipated due to the high level of community awareness of bushfires in the area. A total of 96% of respondents use English as their first language thus facilitating communication strategies with this group. Over 60% of respondents indicated that they were a member of Community Fireguard. The majority of all respondents (86%) advised that they possessed a bushfire survival plan. Approximately 65% of all respondents planned to stay and defend the home in the event of a fire with the remainder either leaving early on a total fire ban day (23%) or a significant number of (12%) who made no response to this question. When asked if there was a need for a dedicated bushfire alert system in their area, which might provide only ten minutes notice, almost ninety per cent of respondents replied in the affirmative. This result indicated a strong desire by respondents that they would like some advance warning, however short, of an imminent fire.

## **Selected Fire Alert System**

The committee was and remains committed to exploring all viable options for an effective and reliable alert system. Research to date including international queries via the Internet reveal that while there are numerous public warning systems there are no commonly used alert systems which are used for the short time frames intrinsic to this project. Most warning systems involve extensive lead times (at least a number of hours) in which time relevant and accurate information can be disseminated to target communities. After considerable research and deliberation the Committee agreed that a siren system was the most viable solution considering the cost, time frame for implementation and reliability.

The issue was raised regarding which individual, group or agency would be responsible for actually activating the system. The need to absolve any individual of the responsibility to activate the siren was imperative therefore a systems approach was explored. In order to provide the most timely response providing the optimum alert time focussed the Committee on the Country Fire Authority Communications Centre, referred to as VicFire.

Activating the alert system at the earliest report of an impending fire would meet this goal. The current response by VicFire to the receipt of a fire call via the emergency telephone number 000 is to enter the details of the required location into a computer system and then activate Brigade units' appliances, which are responsible to respond to the desired location. The computer system automatically selects the appropriate response Brigades according to the location of the fire. Software was developed defining the geographical areas where the presence of fire would threaten the Ferny Creek Trial area. Once a call to a fire was received the computer would then automatically activate the Ferny Creek Fire Alert System simultaneously with the response Brigade/s.

## **Communication Strategy**

The Committee devised a communication strategy to ensure residents in the Ferny Creek Fire Alert Trial Area and other stakeholders had a clear understanding of the alert system and, to provide them with the tools and advice to develop a personal bushfire survival plan involving the CFA endorsed "leave early" or "stay and defend" principles. In its education to residents in high wildfire risk areas the Country Fire Authority promotes a 'leave early or stay and defend strategy'. The strategy is based on the research of fatal bushfires between 1962 and 1998 that showed over half the deaths resulted from people being caught in the open or in vehicles (Krusel, N. and Petris, S. (1992). *Staying Alive: Lessons learnt from a study of civilian deaths in the 1983 Ash Wednesday bushfires*. *Fire Management Quarterly*, 2, 1-20.). The Country Fire Authority endorses that people who are not physically or mentally capable to stay and defend their property in the face of a bushfire should leave early in the day. In the event that a person is capable to stay and defend their property then the Country Fire Authority encourages the adoption of suitable equipment and training to allow them to perform this act more safely and effectively.

Resident, Anna Marie Shew drew upon an analogy of likening the alert to a piece of a jigsaw puzzle in that it is only one component of the response to the threat of an impending fire. Other components relate to a heightened state of awareness though using the individual's senses in smelling or sighting smoke, seeking further information from a Country Fire Authority radio scanner, the electronic media, the Community Fireguard telephone tree (involving members contacting other members in a systematic manner), through the activation of a Country Fire Authority Pager or by contacting the Country Fire Authority direct.

A Shire newsletter titled *On The Alert* was circulated to all residents in the trial area and to local Country Fire Authority Brigades to keep everyone apprised with the progress of the Trial and to provide advice on survival plans. The newsletter was designed in a distinctive manner to attract

the interest of residents. The Shire provided the broader community with information pertaining to progress of the trial through local newspapers and radio stations. The media was very supportive of the trial.

Almost 80% of questionnaire respondents indicated that they wished to attend a public meeting. A meeting was held in Ferny Creek on the 10<sup>th</sup> of November, 2000, to disseminate questionnaire results, stress the need and provide advice on devising personal survival plans, explain the role of the alert system as one component of the personal survival plan and to gain feedback from the community. All participants were registered to identify residents from the trial area who did not attend the meeting. The community meeting provided an excellent platform to present the project to residents, answer any concerns and to provide the Country Fire Authority with an opportunity to market its survival strategies and provide assistance to the community in preparing survival plans.

Between the 13<sup>th</sup> and 30<sup>th</sup> November, 2000, Shire staff conducted personal visits to all individual Ferny Creek Fire Alert Trial residences not represented at the meeting and provided an information package with the same information relayed at the meeting. In the event that the resident was not at home an information package was left at the address with a covering letter to contact the Shire and confirm receipt of the information.

## Evaluation

A research officer appointed by the Office of the Emergency Services Commissioner, Department of Justice conducted an objective evaluation of the trial. The evaluation has included personal interviews of all Committee members regarding the process involved in the project, a follow up questionnaire to establish level of change of residents' awareness and survival planning and establish effectiveness/need for alert, and an examination of the incidence of alert activation. The evaluation had three main aims:

- "To measure the impact of the 'communication strategy' on the Ferny Creek residents' awareness and behaviour for bushfire survival and preparedness;
- To explore and evaluate the process of the fire alert trial working group's activities and communication, including community and stakeholder consultation about the fire alert system and subsequent operation of the siren;
- To evaluate the impact and consequence of the fire alert siren's development and operation for Ferny Creek Resident." (Betts R., Ferny Creek Fire Alert Siren Evaluation Report, Office of the Emergency Services Commissioner, Victoria August, 2001)

## Evaluation of the Impact of the Communication Strategy

The evaluation found a high level of participation by residents at the public forum and in completing and returning questionnaires. Residents also found that the project newsletters and personal door knock beneficial. A mid-project questionnaire conducted by the researcher (involving 46 respondents) found that; "The most effective bushfire survival actions seemed to be undertaken by residents who were members of Community Fireguard; For those residents who had decided to not defend their home, (7 respondents) they may not be influenced by either the community education material or the fire alert siren; Some concern needs to be expressed however that some residents (6 respondents) viewed the siren as a prompt to evacuate their home either as a result of 'Leave Early' message (the choice not to defend their home) or because evacuation was identified as their response to bushfire survival." (Betts R., Ferny Creek Fire Alert Siren Evaluation Report, Office of the Emergency Services Commissioner, Victoria August, 2001)

Upon the conclusion of the 2000/2001 fire season the researcher conducted another survey to which 54 responses were received. In relation to their knowledge of the siren and opportunity to comment over 70% of respondents stated they had a thorough knowledge of the siren operation and

sufficient opportunity to comment. Of interest is that eight respondents were not interested in commenting, eight required further information and two had no knowledge or were aware of opportunity to comment. When questioned as to the mediums through which residents received knowledge of the system operation the responses ranged between 77% being advised through the project newsletter, 39% from friends and neighbours, 31% from local newspapers.

Half of the respondents responded that they had no dislikes of the siren system, whilst others commented on concerns regarding the number of false alarms, ownership of the system, the sound and volume of the sirens, unclear as to what action they should take after the siren activated and that the siren had no provision to advise if a threat was overcome.

A question linking the value of the siren to the concept of safety found that 55% of respondents found that the siren had positively contributed to their feelings of safety. An examination of a response to the value of the siren to the community found that "The comparisons between self and other seemed to be important variables in understanding community residents' perceptions about safety. Examining these views from residents revealed that 20 of the 54 respondents (38%) believed the siren would be of high value to the community but they found the siren to be of little influence to their own bushfire survival actions."

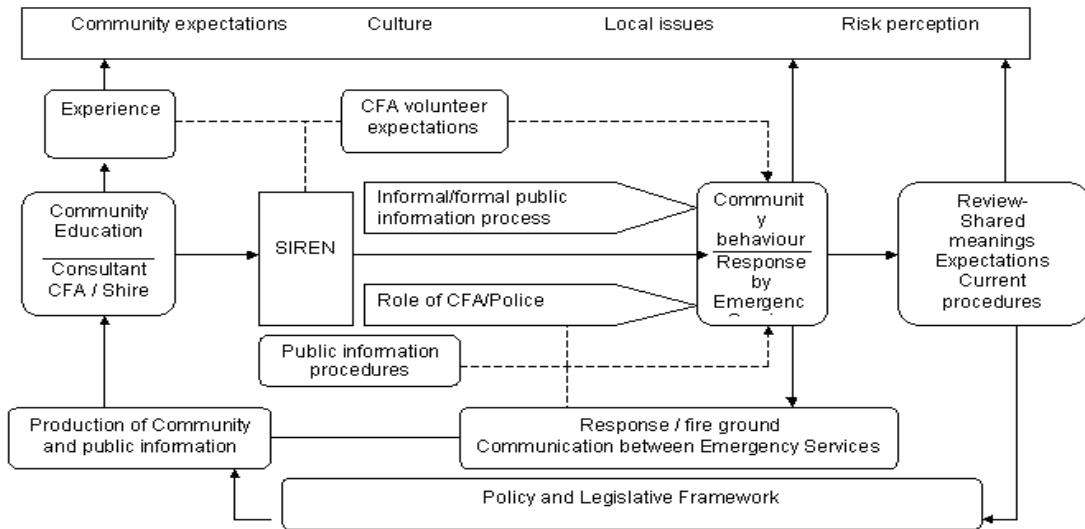
One of the most concerning findings of the evaluation related to responses pertaining to the intended actions of residents upon hearing the siren. A number of respondents (16%) advised that they would evacuate upon hearing the siren, 11% stated they had no specific actions/plans and another 13% indicated they were unsure about what actions they would take. In determining whether the alert system and community education had influenced individual bushfire survival plans, almost 60% of respondents reported that both the system and education were of equal influence, 20% indicated that both the siren and education was of little or no influence to their plans, 11% reported that education was more influential than the siren and 9.5% found that the siren was more influential than the community education. (Betts R., Ferny Creek Fire Alert Siren Evaluation Report, Office of the Emergency Services Commissioner, Victoria August, 2001)

### **An Integrated Warning System**

The evaluation discussed the Ferny Creek Fire Alert System as developing into an 'integrated warning system' whereby the focus of the project shifts from the technological aspects to the social behaviour of residents within the Trial area. Mileti described such a system as possessing three functions, threat evaluation, dissemination of warning and response to warning, each of which involves a distinct group of people respectively. (D. Mileti, *Natural Hazard Warning Systems in the United States: a Research Assignment*, University of Colorado, USA, 1975). The broader concept of the system includes the provision of an educative process that aims to influence appropriate behaviour by residents following activation of the system.

Such a system would also involve a collaborative and cooperative approach between official (government agencies) and unofficial systems (community groups) such as defined by Parker and Handmer (Parker, D. and Handmer J., *The Role of Unofficial Flood Warning Systems* Journal of Contingencies and Crises Management, Vol 6, No.1, USA., 1998).

Figure 1: An integrated warning system



In order to encourage appropriate behaviour the committee first has to identify factors leading to a deficiency in the information process. Such factors have been called weak links and each step in the alert activation and communication processes are currently being dissected to identify weak links and ascertain how this information dissemination can be modified and improved with a view to achieving appropriate behaviour when the siren is activated. Further surveys of residents can focus on information deficiencies and monitor the progress in the effectiveness of this process. Importantly there needs to be an acknowledgment by all involved that the integrated warning system as a process demands a collaborative and supportive approach to ensure the delivery of clear, consistent and reinforced messages to residents. Any ambiguity of intended educative messages has the potential to decrease the receiver's trust and undermines the effectiveness of the objective, i.e. to encourage appropriate behaviour.

Throughout this process is the need to acknowledge that the individual's perspectives, feelings, personal knowledge of risk and relationships with the home, community and environment all impact on their behaviour (Sime J.D. Informative Flood Warnings: Occupant Response to Risk, Threat and loss of Place) in Handmer, J (ed.) Flood Warnings: Issues and Practice in Total System Design, Middlesex University U.K. 1997). Regardless of all the best intentions it is arguably undeniable that some individuals will continue to behave inappropriately in a disaster situation regardless of all efforts to educate them otherwise.

### Evaluation of the Working Group

The evaluation of the trial working group processes found that there was a strong acknowledgment of the leadership role provided by the Mayor, who provided opportunity for open debate and maintained the public profile of the project. The CFA and Police both expressed views that the final selection of the sirens as the system was preconceived in that it immediately met resident needs and comments made in the Coroners report and may have restricted the opportunity to other alternatives. The community representatives were very supportive of the role of local government in its leadership and active communication with the local community.

## **Alert System Activation and Issues**

Throughout the project concerns were also raised that the sirens would be activated by calls occurring in conditions when the threat of wild fire was negligible such as during the night when temperatures and humidity are not conducive to wildfire conditions or on a rainy day. Such activations could then lead to a 'cry wolf' or false alarm syndrome which has been postulated as reducing the attention and response of the public. (E.L. Atwood and M.N. Major 'Exploring the "Cry Wolf" hypothesis, International Journal of Mass Emergencies and Disasters, USA, Vol 16, N3, 1998.) The evaluation identified the need to ensure residents were advised of the reason for an activation of the sirens to ensure that confidence in the integrity of the system was maintained.

Legal advice received during the project advised that the possibility of a failure of the system to activate due to causes beyond control also needed to be conveyed to the community to ensure residents were not solely dependent on the operation of the sirens to activate their plan. If residents were not informed that the system was not infallible then there was a possibility that they could find the Shire and committee liable. Information detailing the operation of the siren and emphasising that it was not foolproof was communicated to the trial community via the Project newsletter and at a public meeting conducted prior to the 2001/2002 fire season.

Whilst Victoria experienced an unusually hot and dry summer during 2000/01 fire season no actual bushfires occurred in the vicinity of the Ferny Creek Trial Area to test the system and residents' reactions, although there were five instances in which the system was activated. All of these activations occurred prior to the software programming being installed limiting the system to the extreme Fire Danger Index factor. Three of these incidents occurred between 11.20 pm and 8.05 am in relation to calls of a grass and scrub fire, a smoke sighting and a fence fire. Two incidents between 3 pm and 5.40 pm relating to calls of a car fire and a grass and scrub fire. Both incidents also occurred under conditions not conducive to wildfire. Some residents were observed to respond to the activations by going out to the front of their properties and checking their surroundings and then seeking further information to establish the nature of the incident.

## **Conclusion**

Fortunately the 2000/2001 fire season was uneventful regarding the incidence of bushfires. Whilst the alert system was activated (in accordance with the activation criteria) on a number of occasions there was no threat to the Trial community. Such activations have however introduced debate on the need for a 'stand down' signal. Given the relatively quiet fire season the committee decided to extend the trial period for a further two fire seasons and conduct further surveys and evaluation at the completion of each fire season. As the committee shifts its focus from the technological aspects of the alert system to the behavioural 'integrated warning process' the opportunity for progressive surveys should provide considerable information in assessing the effectiveness of the information disseminated and its impact on the trial community.

In closing it would appear appropriate to quote the final paragraph of the Office of the Emergency Services Commissioner evaluation report, which provides a very positive assessment of the project: "Community based warning and alert systems have not been previously developed and evaluated for bushfire survival and although the research literature has identified the needs for broad thinking across multi agencies and community consultation, this project has enabled an initial analysis of a community engagement process. These discoveries and achievements have enabled this Project to be at the cutting edge of warning/alert system and community engagement development and research. This project has set in place some positive practices of community engagement and multi-agency cooperation and has also exposed the complexities which are involved in the development of a community based alert system for bushfire survival."



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## Author Biography

Norm Free is a Senior Executive Officer appointed to manage the Shire of Yarra Ranges' Emergency and Safety Planning Unit and has represented local government on emergency management at State National and International Forums. He previously served for over twenty years as an officer with the Victoria Police Force and was awarded the Australian National Medal and Victoria Police Service Medal & 1<sup>st</sup> Clasp He has completed a Graduate Certificate in Disaster Management Swinburne University and was elected as a Director on The International Emergency Management Society in 2001.

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