COMMONWEALTH SUBMISSION – FLOOD MAPPING

QFCI

Date: 7/11/11 JM

Exhibit Number: 919

QUEENSLAND FLOODS COMMISSION OF INQUIRY

COMMONWEALTH SUBMISSION

RESPONSE TO SCHEDULE OF QUESTIONS

1. The following submission is made in response to the questions contained in the letter from the Queensland Floods Commission of Inquiry (QFCI) to the Commonwealth dated 18 October 2011.

2. The following submission reflects the best available information as at 4 November 2011. The Commonwealth may provide further submissions on any findings and recommendations of the Commission on these matters after the conclusion of the hearings.

3. The submission was prepared by the Attorney-General's Department (AGD), in consultation with the Department of Prime Minister and Cabinet (PMC), the Treasury, Department of Resources, Energy and Tourism (RET), Geoscience Australia, Department of Climate Change and Energy Efficiency (DCCEE), Department of Innovation, Industry, Science and Research (DIISR), Department of Sustainability, Environment, Water, Population and Communities (SEWPC), the Bureau of Meteorology (the Bureau) and the Department of Regional Australia, Regional Development and Local Government (Regional Australia).

Summary of emergency management governance structures and current national work

4. Under the Council of Australian Governments (COAG), the Standing Council of Police and Emergency Management (SCPEM), comprising Commonwealth, state, territory and New Zealand Ministers and the Australian Local Government Association (ALGA), has oversight for the COAG reform agenda for emergency management. SCPEM is supported by the National Emergency Management Committee (NEMC), whose members include senior officials from Commonwealth, state and territory first ministers and emergency management departments, New Zealand officials and ALGA.

5. The NEMC has four sub-committees. Relevant to flood mapping and modelling is the Risk Assessment, Measurement and Mitigation Sub-committee (RAMMS), currently chaired by South Australia. RAMMS includes members from Commonwealth, state and territory agencies and ALGA.

6. There are also a number of reference groups to the NEMC, including the National Flood Risk Advisory Group (NFRAG)[1]. NFRAG is responsible for promoting national best practice in flood risk management.

7. In February 2011, the Ministerial Council for Police and Emergency Management – Emergency Management (predecessor of SCPEM) tasked the NEMC, in consultation with Geoscience Australia, to scope a potential work program to map areas at risk of riverine flooding, flash floods, storm surge and coastal inundation. This work will take into account existing knowledge and initiatives, currency of information and identified information gaps, and the need for consistent methodologies.

[1] NFRAG is comprised of representatives from the: Australian Building Codes Board; ALGA; the Bureau; Geoscience Australia; Insurance Council of Australia; a representative from each state and territory who is either a floodplain manager or an emergency manager; RMIT University (Centre for Risk and Community Safety) and Commonwealth Treasury.

8. The NEMC has established a project team comprising appropriate representation from RAMMS, NFRAG, the National Spatial Information Management Working Group (NSIM)[2] and appropriate Commonwealth agencies including Regional Australia, RET, Geoscience Australia and the Bureau. The project team is holding a two-day workshop later in 2011 to progress the work of flood mapping from a national perspective.

9. The establishment of this project team brings together a broad cross-section of stakeholders that have not previously met collectively. The project team will report, through RAMMS, to the NEMC at its first meeting in 2012.

Question 1: What area should be covered by a flood map? For example, a local government area, a catchment, a basin, a sub-basin.

10. Noting that there are multiple types and users of flood maps, as a general premise, it is the Commonwealth's view that flood modelling and flood mapping activities should be undertaken on a catchment level basis, and not be limited on the basis of local government boundaries. Adopting this approach would have the benefit of giving a more complete picture of risk to state and territory governments and delivering economies of scale. This does not prevent further mapping being undertaken at more granular levels.

11. This view is consistent with discussions at RAMMS, that the area comprising the whole of catchment is the preferred option.

12. Notwithstanding the above statements, it should be noted that there is no 'one map/model fits all' solution to flood mapping as the intended user and purpose of the map affects what data is to be included, the area it should cover and the way it is drawn.

Question 2: Who should be responsible for flood mapping? For example, the Queensland Government, the Commonwealth Government, local governments, catchment-based authorities? If some sort of joint responsibility, how would that work in practice?

13. State, territory and local governments, as the primary users of flood mapping information and as the entities responsible for making decisions based on this data, should be responsible for flood mapping.

14. Where the area (e.g. catchment) in question transcends local government, or indeed, state boundaries, appropriately robust cross-border and coordination arrangements need to be instituted by the relevant local, state and territory governments.

---

[2] NSIM is focused on facilitating the development of spatial information capabilities to enhance decision-making across counter-terrorism, emergency management and critical infrastructure protection, and supporting a range of information management capabilities and objectives within emergency management. Current representation includes: Northern Territory Police, Fire and Emergency Services; the South Australian Office of the Chief Information Officer; Landgate (WA); Tasmanian Department of Primary Industries, Parks, Water and Environment; Tasmania Police; Queensland Department of Environment and Resources; Northern Territory Department of Lands and Planning; Geoscience Australia; Victoria Police; Commonwealth Attorney-General's Department; Defence Imagery and Geospatial Organisation; ACT Emergency Services Bureau; New South Wales Police and the Victorian Department of Sustainability and Environment.

15. Whilst responsibility for flood mapping rests with state, territory and local governments, the Commonwealth, through agencies including Geoscience Australia and the Bureau, has capabilities to support a national flood mapping approach.

16. Geoscience Australia maintains the Australian Flood Studies Database, which contains information on flood studies undertaken nationally. Geoscience Australia also provides nationally consistent, nation-wide topographic information which can include digital elevation models and surface hydrology. This is publicly available in digital form. The Bureau also collects, manages and distributes information relevant to identifying potential flood hazards.

17. The insurance industry is also making a contribution through the risk assessments based on the flood mapping information contained in the National Flood Information Database (NFID). The NFID is maintained by insurers to enable them to make commercial decisions about whether to offer insurance products responding to flood risk. Such risk assessment work may inform the efforts of local, state and territory governments.

Question 3: Who should perform flood mapping? For example, private experts, officers of local, State or Commonwealth governments?

18. Flood mapping should be undertaken by appropriately qualified persons engaged by state, territory or local governments.

19. Whilst the Commonwealth considers flood mapping should be undertaken in a nationally consistent way and in accordance with any nationally agreed guidelines, the Commonwealth does not have a strong view regarding the nature of the person and persons that should perform the mapping. This is appropriately a matter for state, territory and local governments.

20. Where flood mapping is performed on a commercial basis, it will be important that contractual and intellectual property arrangements allow for the public release of the data.

21. Flood modelling, from which flood maps may be created, is largely undertaken by technical experts funded by government or industry. The adoption of a consistent approach would be beneficial given the involvement of both the government and private sectors in carrying out flood mapping.

22. It would also be appropriate for validation processes to be built in where mapping is undertaken by individuals or organisations without appropriate local knowledge of the area in question.

Question 4: Should there be mapping guidelines to guide all flood mapping completed in Queensland? If so, who should set the guidelines?

23. The Commonwealth is of the view that flood mapping should be guided by a nationally agreed and consistent approach, supported by instructional guidelines.

24. The NFRAG is currently leading the development of a publication on Floodplain Management in Australia to replace two dated, but related publications (the *Floodplain Management in Australia: Best Practice Principles and Guidelines* – Standing Committee on Agriculture and Resource Management, CSIRO 2000 (SCARM Report no. 73) and Australian Emergency

Manual Number 19 - *Managing the Floodplain*). This new publication on Floodplain Management in Australia, which is scheduled for completion in June 2012, will contain a number of supporting guidelines.

25. Any guidelines developed should take into account the requirements of, and be developed in close consultation with, the diverse range of stakeholders across all levels of government, the community and industry.

26. It will also be important that any guidelines anticipate future developments to ensure that, for example, issues associated with climate change are given sufficient consideration.

27. Climate change will increase the national exposure to flood risk. This means that past experience of flood frequency, severity and extent will no longer provide adequate guidance to manage risks into the future. Managing these risks will require new information and it will be important that climate change scenarios are incorporated into flood modelling and mapping practices. A nationally consistent approach would assist in effectively managing changing flood risk.

28. The initial findings detailed in the *Report on the Environmental Scan into a Notional Approach to Flood Modelling*, 2011, prepared by AGD, highlighted the complexity and diversity of flood modelling in Australia and noted that some local governments are not making flood data used in mapping readily available (**Attachment A**). In summary, the report indicates that the state of play in Australia's approach to flood modelling can be described as one in which:

    - there are many agencies, organisations and individuals involved in flood modelling
    - there is coordination in some areas but the effectiveness varies between jurisdictions and in some instances it is often limited or ad hoc
    - flood modelling is a complex technical task that is reliant on good quality meteorological, hydrological, geomorphologic, digital elevation and land use data
    - some people are able to access data easily while others either cannot, or are unaware of how to, access it
    - there are limited mechanisms to discover data and there is duplication of effort looking for it
    - there are issues around the coordinated collection, cost, licensing and archiving of data, and
    - there is both consistency and inconsistency (or the perception of inconsistency) in the accuracy and methodology of flood modelling.

29. In July 2011, AGD hosted a national flood modelling workshop in Canberra with key state, territory and private sector stakeholders. The outcomes of this workshop, and related work, have been considered by the NEMC, who have agreed on the importance of a nationally consistent approach to flood mapping and modelling. This will be considered by Ministers at the 11 November 2011 meeting of SCPEM.

30. Completion of mapping in accordance with nationally consistent guidelines will drive consistency between jurisdictions and assist in maximising the utility of modelling across local government areas and state and territory boundaries.

31. Legal risks in respect to publication of flood mapping could be reduced if national guidelines and standards, supported by consistent state and territory legislation where necessary, were

applied. Pursuing the adoption of a favourable and, where appropriate, consistent liability regime across jurisdictions could serve to manage risks and enhance the confidence with which flood mapping data can be released to the public and other interested stakeholders.

Question 5: Who should fund flood mapping? For example, local governments wholly, state government wholly, commonwealth government wholly, current resilience funding program arrangements, another type of joint funding involving the State, Commonwealth and local governments? What other funding options are available?

32. Consistent with the view expressed in response to questions two and three, flood mapping should be funded at the state, territory and local government level.

33. The Commonwealth provides funding for state and territory governments to undertake some natural disaster mitigation activities, which can include activities relating to flood mitigation and flood mapping via the Natural Disaster Resilience Program (NDRP). The funds provided under the NDRP National Partnership Agreement specifically target priority areas of disaster management and support for volunteers in the emergency management sector. Under the NDRP, states and territories are required to submit a proposed annual implementation plan reflecting their risk priorities to the Attorney-General for his consideration. States and territories provide direct administration of projects under the NDRP.

34. Also of relevance in terms of the financial support provided by the Commonwealth is the Commonwealth funded Financial Assistance Grants program, which is administered by Regional Australia. Under this program, the Commonwealth provides funding to the local government grants commissions in each state and the Northern Territory, which then make recommendations, in accordance with the National Principles and the *Local Government (Financial Assistance) Act 1995,* for allocating grants.

35. Councils are free to spend these grants according to local priorities and, as such, local councils could use the funding to carry out flood mapping activities should this be identified as a priority for the region and viewed as being able to improve local governments' capacity to provide their communities with an equitable level of service.

Question 6: What amount of data-sharing is appropriate? Should any agency which completes a flood study be required to share its information with other government agencies, insurance companies and financial institutions? On what terms should it be required to share such information?

36. The Commonwealth is of the view that data sharing should be maximised across all levels of government, industry and the broader community on terms that reflect the uses to which end users wish to put the data.

37. The Commonwealth considers that flood maps should be available to the Australian community on a nationally consistent basis and that any guidelines developed should take account of appropriate data sharing models. Further to this, existing flood mapping data should be made publicly available, where this is not already the case, with appropriate caveats concerning data limitations.

38. The work of the Australian Governments Open Access and Licensing Framework (AusGOAL) will inform consideration of what terms may be applicable to such data sharing

arrangements. AusGOAL is a product of the Cross Jurisdictional Chief Information Officers' Committee (CJCIOC) and provides a framework for determining appropriate creative commons licences for distribution of data from Australian governments.

39. Whilst the Commonwealth is supportive of data sharing, it is conscious that the release of flood mapping products and modelling outputs (data sharing) raises numerous issues that will require careful cross-sectoral consideration. These include: liability, licensing and intellectual property considerations, potential impacts on land values and property markets, insurance prices and insurability. A thorough examination of these and any other areas of impact will be required in the development of an appropriate data sharing model.

Question 7: What types of flood mapping should be available to the public to enable them to be properly informed when making decisions affecting land planning, such as purchasing a property or making a development application, and in the context of an emergency such as deciding whether and when to evacuate? Should the flood mapping available to the public be, for example:

- **the flood maps or information used in local planning schemes**
- **flood maps and information held by State government agencies**
- **flood maps and information held by Commonwealth government agencies**
- **maps showing flood risk, historical flood height at property and similar**
- **maps showing evacuation routes**
- **maps showing zones of land that are likely to be flooded in certain eventualities ie when the food rises about a certain height at a certain gauge**

40. The Commonwealth is of the view that the public should have access to flood mapping that is easily understandable, readily available and that facilitates the ability of individuals and communities to make informed decisions about flood risks.

41. The types of information that are made available to the public should be taken into account in the development of any nationally consistent guidelines.

42. One of the main pillars of the COAG agreed National Strategy for Disaster Resilience is community resilience built through education – an informed community is able to make its own decisions about the risks it faces, including flood risk. In a resilience-building context, the more accurate information presented in a comprehensible manner and made available to affected individuals and communities, the better informed and prepared an individual or community can become.

43. Flood mapping data available to the public should be expertly compiled but should be comprehensible and easily understood by any reasonable person who is not an expert in flood mapping, topography, geospatial information or other related fields.

44. The terms upon which such information is to be made available to the public should reflect the aims of all levels of government to maximise community resilience. Such terms should also reflect liability exposures.

Question 8: What sort of information or education should be provided to members of the public to assist them in understanding the maps?

45. Commonwealth, state and territory governments are currently working together to develop a Communications Strategy to support the National Strategy for Disaster Resilience (Communications Strategy). This question should be considered as part of this process.

46. The Communications Strategy is being developed in acknowledgment of the importance of the consistent promotion of the concept of disaster resilience. This would serve to improve the consistency of information being provided to the community and reinforce the need to be prepared for natural disasters, the importance of building self-reliance, sharing responsibility and learning from experience.

47. This question should also be afforded further consideration in the development of any guidelines that would underpin a nationally consistent approach to flood mapping.

48. A recommended approach for community education is set out in the Australian Emergency Manual Number 45 - *Guidelines for the Development of Community Education, Awareness & Engagement Programs* (**Attachment B**). The manual outlines six 'principles of effective practice' in developing and implementing programs of community education, awareness and engagement for natural hazards, as follows:

    - Principle 1: 'localise' programs and activities where possible.

    - Principle 2: develop a program theory model for present and new programs and activities that will provide a template for detailed planning and implementation, a 'roadmap' for evaluation and a permanent record of the thinking that occurred during program development.

    - Principle 3: develop a small suite of programs and/or activities that focus on achieving different intermediate steps (processes) along the pathway from 'risk awareness' to 'preparedness' (planning, physical preparation, psychological preparation) and that are integrated into a general plan for enhancing natural hazard preparedness in a locality or region.

    - Principle 4: where appropriate, consider an integrated approach to planning, program development and research.

    - Principle 5: conduct and report frequent evaluations of programs and activities to continually enhance the evidence base for what works in particular contexts in community safety approaches.

    - Principle 6: seek to optimise the balance between 'central' policy positions, agency-operational requirements and specialist expertise on the one hand and community participation in planning, decision making, preparation and response activities on the other.

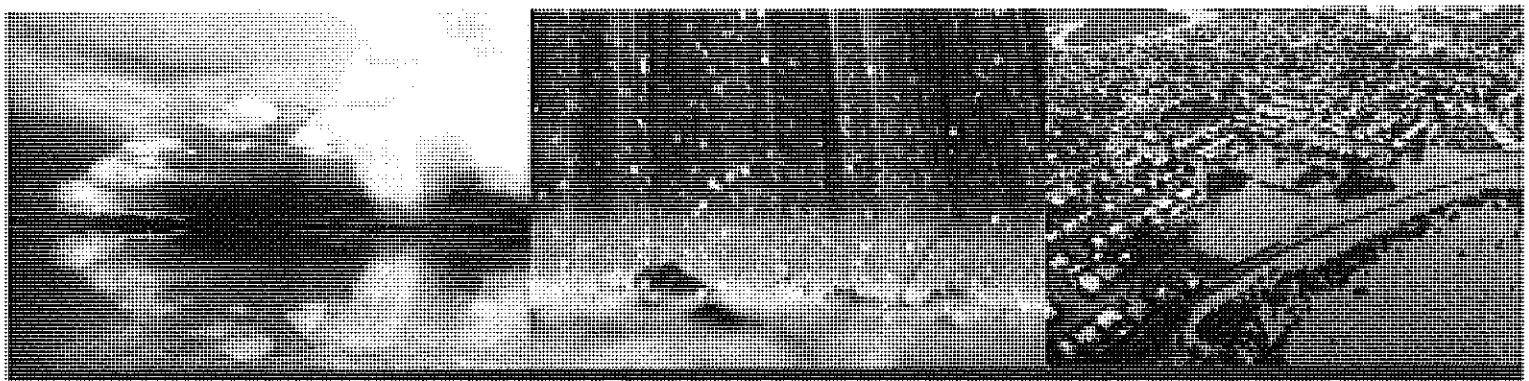
49. The principles emphasise the importance of context – implementing localised programs and activities; consistent and coherent messages and integration of initiatives and strategies that are focused sequentially rather than stand-alone.

Question 9: What sort of information or mapping should be available to insurance companies or financial institutions for them to use in decisions about providing products to consumers?

50. Consistent with the view expressed in response to questions six and seven, the Commonwealth considers that easily understandable flood mapping information should be publicly available.

51. This position has the added benefit of making information available to insurance companies and financial institutions to assist in informing their assessments of exposure to risk.

4 November 2011



Report on the Environmental Scan into
A National Approach to Flood Modelling

June 2013

Report prepared by:

Christopher Perry
National Critical Infrastructure Capability Branch
Attorney-General's Department

10 June 2011

Report on the Environmental Scan into
A National Approach to Flood Modelling

Executive Summary

1. Flood modelling is somewhat complex and involves a number of technical, legal, resourcing and financial factors. It is understood that these things need to be considered before Government can fund or recommend a national approach. This environmental scan was undertaken to help identify the scale and scope of activities in this area and determine what needs to be done.

2. Some information received has been detailed, specific and technical while other information is indicative only, and information gaps are apparent. Further work is required to develop a full understanding of flood modelling in Australia.

3. The environmental scan highlighted that:
   a. there are many agencies, organisations and individuals involved in flood modelling
   b. there is coordination in some areas but the effectiveness varies between jurisdictions and in some instances it is often limited or ad hoc
   c. flood modelling is a complex technical task that is reliant on good quality meteorological, hydrological, geomorphologic, digital elevation and land use data
   d. some people are able to access data easily while others either cannot, or are unaware of how to, access it
   e. there are limited mechanisms to discover data and there is duplication of effort looking for it
   f. there are issues around the coordinated collection, cost, licensing and archiving of data
   g. there is both consistency and inconsistency (or the perception of inconsistency) in the accuracy and methodology of flood modelling

4. In summary, there is no consistent or national approach to flood modelling and there are systemic issues that make if difficult or expensive to perform flood modelling. This limits how Australia is able to use information to support a safe, secure and resilient society.

Note: The term 'modelling' is used in this report generally instead of 'mapping'. The former is used as a holistic term to highlight that this is an ongoing process that takes account of many factors. The latter tends to focus on the 'map' output and could give the impression that the activity is complete when a map is produced.

Introduction

5. This past summer, Australia was hit with some of the most testing natural disasters the nation has ever faced. The sequence of floods, cyclones, bushfires and storms was relentless and they impacted on us physically and emotionally as well as financially. In economic terms, the Queensland floods are likely to be the most costly natural disaster in Australia's history.

6. On 13 February 2011, the Council of Australian Governments (COAG) endorsed a National Strategy for Disaster Resilience. The Strategy provides high level guidance to federal, state, territory and local governments, as well as the business community and the not for profit sector, on priority areas for action in building a more disaster resilient Australia.

7. The Strategy emphasises that governments cannot improve resilience alone – the private sector, and in particular the insurance industry, has a vital role to play. The strategy is also about providing all Australians with a better understanding of the disaster risks we face, and the practical steps that we can take to better prepare and protect ourselves. This will help increase individual and

community level empowerment and resilience rather than relying on post disaster recovery efforts and hand outs.

8. It is necessary to minimise our exposure to disaster risks over the short, medium and long term and focus as much on prevention and mitigation as on recovery. In regard to flood events, our ability to predict and monitor floods, and make decisions during a flood event, is critical. The ability to quantify flood risk and price insurance is also critical and will help ensure that people are better able to recover from floods and that costs are spread across communities. Flood modelling for the purpose of identifying this risk is a critical element here and, if done in a strategic manner, is able to serve a number of purposes.

9. To progress work in this area, COAG agreed to task the National Emergency Management Committee (NEMC) to report on a consistent national methodology to assess risk for priority hazards and the manner in which they will be published. In recognition of the severity of the recent flooding in Queensland and other eastern states, the Ministerial Council for Police and Emergency Management – Emergency Management (now the Standing Council on Police and Emergency Management) asked the NEMC to prioritise the development of a program of work to map areas of risk relating to riverine flood, flash floods, storm surge and coastal inundation. The exercise is planned to take into account existing knowledge and initiatives; currency of information and identified information gaps; identification of the full scope of applications of modelling for flood risk identification and the need for consistent and robust methodologies.

10. At the Commonwealth level, this exercise is being led by the Attorney-General's Department (AGD). AGD commenced a high level environmental scan in March 2011 in cooperation with the Risk Assessment Mitigation and Measurement (RAMMS) Sub-Committee of the NEMC. AGD has consulted with key Government and industry stakeholders including the ICA to seek their input and perspectives.

11. This is the first step in the process as it is recognised that research, analysis and stakeholder consultation need to be undertaken before Government could recommend, agree or consider funding for a national approach to flood modelling. A proposal is expected to be completed later in the year.

12. The Government's Natural Disaster Insurance Review (NDIR) Panel are also addressing issues of flood-related issues as part of a broader review of insurance. To date, findings of the NDIR are consistent with this environmental scan. The NDIR will release its final report setting out its recommendations including insurance industry access and usage of flood modelling data to the Assistant Treasurer on 30 September 2011.

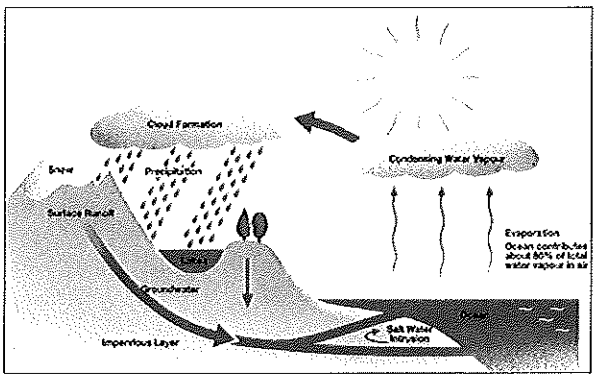
13. The environmental scan process is covered in more detail at Appendix A. Consultation is outlined at Appendix B. A summary of the role or involvement by various areas in flood modelling is provided at Appendix C.

Flood Modelling

14. Flooding results from a series of complex interactions between the natural and built environment. A clear understanding of flooding is critical to understanding what we can do to anticipate, mitigate, monitor and respond to floods.

15. Floods occur where water builds up or flows in places we do not want it or where it is not usually found. The processes that cause flooding are part of the hydrologic cycle that many people are familiar with. A simplified description follows.

16. Rain falls. It varies in intensity, frequency, duration and extent. As rain hits vegetation, a proportion of it is held by leaves. As it hits the ground, it can be absorbed or start to run off to varying degrees depending on the soil or surface type (eg. clay, loam, sand or asphalt). As the soil becomes saturated, water will run off more easily. Water evaporates due to wind and higher temperatures. If it falls as snow or hail, it can remain in place before melting and running off.



17. Water flows to lower areas in relation to topography or the elevation of the land. It naturally runs down valleys and flows into rivers but can also flow as larger sheets or bodies of water. It gets held in dams; and held back or diverted by structures like levees. Water can overflow river banks, dams, levees or block pipes. A dam might break and release a large amount of water that was collected over a period of time.

18. Cyclones regularly affect parts of Australia and often produce large amounts of rain. Tides and storm surges can produce coastal inundation and increase the impact of cyclones. Tsunamis may be rare in Australia but could push water to inland areas.

19. The predicted effects of climate change provide an additional layer of complexity and will amplify climatic conditions. As temperatures rise and there is more latent heat in the system, there will be increased frequency and intensity, and changes in the spatial distribution, of climatic events (including precipitation). As sea levels rise, there will be increased frequency and impact of coastal inundation. By way of example, a mid-range sea-level rise of 0.5 meter in the 21st century will mean that events that now happen every 10 years would happen every 10 days in 2100.

20. Flood modelling enables humans to understand and calculate probabilities of flooding in particular areas. Flood modelling has a range of uses, relies on various kinds of input data and makes use of a number of models and analytical tools. It also results in a number of different outputs. These are covered in more detail in the following paragraphs.

Uses of Flood Modelling

21. Flood modelling is useful to many people because flooding affects many aspects of our lives. Near real-time flood modelling used for emergency management is far more complex and data hungry than the modelling used for non emergency management activities such as environmental analysis and land use planning. Following is a short overview of some of the uses of flood modelling (in various forms) and a description of how it benefits people.

Use	Description
Emergency Management	Emergency managers need to develop evacuation plans, identify safe areas and understand the population that might be affected by flood events. During a flood, they need to be able to anticipate where a flood is likely to be at a given point in time, understand the level of inundations and be able to prioritise activities. Accurate flood information enables them to identify access routes, plan evacuations or movements of people, and support isolated communities.
Environmental Analysis	Environmental analysis involves development of environmental impacts statements, analysing effects on flora and fauna, understanding biodiversity and calculating economic impacts from various influences.

	Floods affect the environment in the short and long term and can greatly affect the natural environment.
Insurance	The pricing of insurance is a function of the risk and the uncertainty associated with estimating that risk. The price of risk depends on the likelihood and magnitude of losses and it is common for pricing to be based on the expected loss experience of a group of like risks. The more uncertainty there is about expected losses, the higher the cost of insurance. Flood modelling provides a way to estimate the frequency and extent of potential floods and therefore the consequent cost of repair or rebuilding. Generally, insurers with better flood information will be able to charge on average lower premiums. Ensuring that people have access to insurance increases resilience generally, and alleviates some of the direct financial impact to the nation.
Land Use Planning	Floods affect the placement and design of roads, bridges, culverts, drainage systems, dams and other infrastructure. They can also influence building codes, land use planning and zoning. Understanding where flooding is likely to occur informs the development and prioritisation of mitigation projects such as placement of levees. Public access to flood information is necessary so that people can make informed decisions and build a resilient society. While it would likely affect communities generally and have an economic impact (eg. real estate prices), it will help mitigate the future costs and impacts of flooding. Flood modelling is an ongoing process because development of new infrastructure shifts or influences water flow, possibly shifting where floods occur.

Case Study: Pricing of Insurance

Insurance companies need to be able to quantify risk in order to determine the price of insurance. This is achieved by understanding the probability of an event occurring and extent of potential floods (amongst other things) and therefore the potential financial impact of a flood to the insurance company. To the extent that data are of poor or unknown accuracy, not up to date and/or low resolution, then actuaries/insurers will increase prices to offset the lack of certainty. Insurance companies carefully monitor their exposure to any one event and buy reinsurance to limit exposure.

There are significant problems for insurers in obtaining the information needed to assess exposure to floods and the detailed data available in other countries are not available in Australia. A sound insurance market needs to be competitive to maintain affordability and equity for the insurance purchaser. It is conceivable that the smaller insurers in Australia will not have the resources to collect and analyse the data needed to allow them to properly price flood risks. Good and regularly updated publicly available flood mapping would give a common framework for consideration of a range of interests, including development and town planning and insurance needs.

Currently, most flood maps in Australia are outdated and refer only to 1 in 100 flood levels, which are defined in different ways. Flood modelling would ideally provide other levels (eg. 1 in 10, 1 in 20, and 1 in 50) and include detailed local topography. Insurers can use this information in conjunction with details about properties (construction type, is the house raised or built on the ground, cost of rebuilding etc.) and pay close attention to building codes in assessing insurance premiums.

The Insurance Council of Australia believes that a first step for them is to be able to access existing data held by LGAs which is not always available to them. Existing data is fine for their purposes now but access to higher quality data would allow more accurate pricing of insurance. Ideally, if flood maps exist, they would be able to access them so that they do not create another version with possible conflicts. There is also some uncertainty about the quality, accuracy and methodology of 'flood maps'.

An interesting point to note is that the Australian share of international expenditure on reinsurance is 2% while recoveries from reinsurance are 6%. This means that reinsurance is relatively cheap and accessible in Australia. There may be less incentive for global reinsurance companies to be involved in the Australian market if there is limited access to information to support the accurate pricing of insurance and reinsurance.

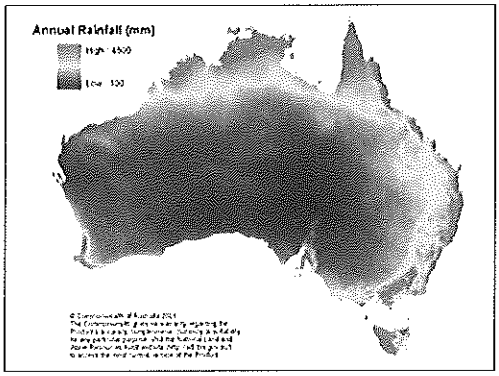
Stakeholders

22. Many people have an interest in flood modelling (and associated aspects of it) including:
    - Residential home owners
    - Industry and business owners
    - Land us planners and property developers
    - Emergency managers and emergency services
    - Government and government agencies (including LGAs)
    - Scientists
    - Environmental groups
    - Engineers
    - Insurance companies and actuaries
    - Data providers

23. In general, flooding is a national issue that affects many people in society.

Data

24. Flood modelling requires a range of different data sets depending on the specific objectives of the modelling activity. Specific data sets may include:
    - Climate data
    - Hydrological data
    - Land cover data
    - Soil or surface type data
    - Elevation data
    - Demographic data
    - Building information
    - Information on flood management structures



25. Taking climate data as an example, this includes information design, rainfall intensity and other rainfall data, as well as information on cyclones, long term climate patterns, seasonal and cyclical variations (eg. el Niño). It also incorporates the predicted effects of climate change (which requires additional input data and models) and covers the frequency, intensity and distribution of climatic phenomena.

26. Models may be enhanced or updated in near real time by new or current input data including:
    - Rain gauge measurements
    - River gauge measurements

27. For any data type, one needs to consider the required resolution, accuracy and coverage of data. This will influence how and where one might be able to access data, or how much it will cost. It therefore feeds into and influences collection planning and collection methods. Higher levels of accuracy and resolution usually come at greater cost.

28. Historical data about past flood events (flood intelligence) can be very useful as a practical basis of understanding flooding and for validation of models. However, it has limited use for longer term predictions as climate patterns change and new infrastructure is built.

Models and Analytical Tools

29. Flood models and analytical tools make use of a range of input data sets to determine the probability, frequency, extent and depth of flooding in particular locations. In simple terms, they tell us how likely, how often, where and how deep flooding might be.

30. The results are often represented on a hardcopy map. This is useful for communication purposes and broad scale or indicative information but it cannot reflect changes in predictions that result from, for example, changes in infrastructure or new climate change predictions. The information becomes dated.

31. More importantly, results are often available in geospatial formats. This means that flood data can be used for a number of purposes (as outlined above). The flood data can be combined with demographic or building data, for example, for further modelling to understand and predict risk and impact on communities and infrastructure.

32. Geographic Information Systems are often used to collate, analyse, manipulate and visualise information. They can also be used to create maps using the latest data. This last point highlights why the data and processes are the key considerations, not the 'map'.

33. Flood predictions are often expressed as, for example, a 1 in 100 year flood. Care is needed in interpretation here since it does not mean that the flood will only occur once in 100 years. Rather, it is a probabilistic expression of the likelihood of a particular flood event occurring at any given time period and could be expressed as a 1% chance of flooding occurring in a year. It is also possible that a 1 in 100 year flood could occur in consecutive years or even twice in the same year.

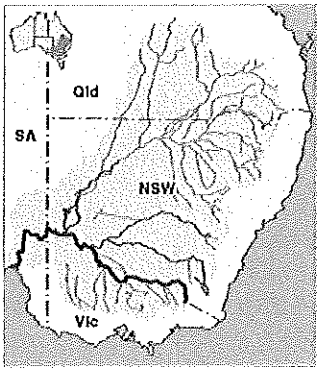
34. Modelling and analytical tools can also be used during a flood event for a number of purposes (also outlined above). In this situation, the models can be provided with new or current input data such as rain density derived from rain gauges and possibly radar, river gauge heights or observed flood levels. Satellite data can be used to identify moving bodies of water. Models can then be run again to update predicted flood extent and flood levels. These models are dynamic in nature and are often very different from the models that deal with more static information.

35. There are number of models of varying degrees of complexity. Simple bathtub models just increase the level of water and compare it against an elevation model to indicate where flooding will occur if, for example, a river reaches a height of 5m. There are also 2D and 3D models that may use 'smooth particle' analysis and take into account many more factors like obstacles, river levees or water interacting with itself. The choice of model depends on the purpose.

36. Complex models produce more detailed and accurate results but require more detailed and accurate data. They take longer to produce and are likely to come at higher cost.

Modelling and Analytical Activities

37. A number of modelling and analytical activities have been undertaken around the country. These have been done by Local Government Areas, government agencies or by authorities like the Murray-Darling Basin Authority.



38. From a national perspective, activities appear to be somewhat patchy and incomplete in coverage, currency and/or accuracy. Activities also appear to be limited by funding, human resources and possibly technical expertise. However, the environmental scan was not able to gather enough specific and detailed information in the given timeframe and further work remains.

39. A number of flood related projects were previously funded under the Natural Disaster Mitigation Programme but the status or effectiveness of these has not been established yet. The National Flood Risk Advisory Group draws together some key participants in the areas of flood risk modelling and could provide a useful source of knowledge and experience. A number of related forums or workshops are planned to address the topic of flood modelling although they do not appear to be framed within a coordinated national approach.

Case Study: Building Community Resilience

Building community resilience to the impact of flooding events involves a range of measures. These can include physical mitigation of flood waters, such as with levees, off season advice of when and where waters are likely to rise in the event of a flood, and real time warnings and flood level advice as floods are occurring. Flood modelling can be used to assist in planning, design and placement of levees, rainfall stations, and river gauges, and assist with community education with regard to how to prepare for flooding that may still occur.

To build community resilience, flood warning systems and their related public education programs must emphasise the need for flood affected residents to remain proactive during the sometimes long periods between large flood events.

In 1993 and 1998, the Ovens and King River catchments in north-eastern Victoria experienced severe flooding. In September 1999, State and Australian Government funding provided a grant of $408,000 to upgrade the flood warning system for the Ovens River, King River and Fifteen Mile Creek catchments. The primary aim of upgrading flood warning services was to help reduce flood damage through the provision of accurate and timely information to the community.

Features of the improved flood warning system for the Ovens and King River include:

- an increased number of automatic rainfall stations and river gauges to provide clearer information and real time data
- improved 'real time' modelling by the Bureau of Meteorology
- improved flood warning information flow from the Bureau to the Victorian State Emergency Service, local councils, agencies, community groups and individuals
- community education, including the distribution of flood response guidelines to all affected residents, and the development of a register for flood information providers.

40. There is scope for more rigorous cost/benefit analysis of the effects of doing or not doing flood mitigation projects in the future, especially to achieve the best return on investment. This would involve more rigorous modelling to help people understand and quantify the effects of flooding with or without specific mitigation strategies.

Key Points, Issues and Questions

41. As a result of this environmental scan, a number of key points, issues and questions have emerged. Identifying them early will help inform subsequent work in this area.

Data Accessibility and Quality

a) For insurance companies, access to existing flood mapping data will meet their immediate need of being able to price flood insurance.
b) Data that is poor or of unknown quality is likely to result in higher prices for premiums.
c) The ICA would like to be able to access better quality data in the future, recognising that mitigation and resilience should be the key drivers behind flood modelling.
d) Some flood mapping data is quite old and there are questions about the quality, accuracy or methodology of available information.
e) Data that does exist is held by different organisations and is not often easy to discover.
f) Government could consider establishment of a national data library with an online catalogue system (even if the data itself resides elsewhere in the country).
g) Some fundamental data should be considered a national resource because it underpins many Government and business activities and enhances effectiveness, efficiency and productivity.
h) There is a question as to whether Government has a role to coordinate or fund such data. (It is often beyond the ability or interest of smaller entities to coordinate or fund such data collection.)
i) There is a question about what type, quality and resolution of data is required for national purposes and what arrangements could be developed to cost share the purchase or creation of data for particular interests.
j) Data is often purchased multiple times with public money because of the way licenses are created. There would be cost benefits in better coordinated collection planning and data acquisition across Government. (Multiplying the base cost of data by about two or two and a half would often allow much greater use of data for a range of purposes.)

Data Discoverability

k) There are many agencies, organisations and individuals involved in flood modelling and people are not always aware of where to source information (data, models and expertise) resulting in wasted time and money, and duplication of effort. Government could consider establishment of a national flood coordination group to provide strategic oversight of flood-related activities.
l) Government could also establish a website that draws together flood-related information on funded projects, research activities, data and mapping products.

National Standards

m) Standards are important to provide assurances about the accuracy, relevance, currency and consistency of (any) information. There do not appear to be any agreed national standards for flood mapping activities, particularly for flood mapping work in LGAs.
n) There have been suggestions that Government funding for flood mitigation projects (for example) could be made conditional upon the recipient making the data available and meeting certain standards.

Risk and Planning

o) Mitigation projects could be appraised in terms of how they modify risk (assuming data and models are available and accessible).
p) There are questions as to whether issues may arise about inappropriate zoning or building approvals if more consistent or accurate flood modelling activities are undertaken and show that houses have been built in flood prone areas.
q) There are questions about what impact this may have on property prices or about liability by land use agencies if this is the case.

42. The environmental scan only touched peripherally on international flood-related activities. While these present possible approaches, they would have to be adapted to the Australian context. A few additional points are:

    a) In the United States, the following occurs:
        i. Data purchased with public money is made available freely to the public for other uses.
        ii. Flood insurance is mandatory but it is underwritten by the Federal Government.
        iii. There are good faith provisions in legislation to stop litigation for best effort flood modelling activities.
        iv. Properties have been bought back in areas of high flood risk.
        v. There is a strong interest by the public and private companies in increasing the resilience of critical infrastructure.
    b) The United Kingdom has undertaken a broad scale, flood risk assessment across the nation. This supports targeted investment in areas of greatest need, strategic flood management planning and understanding how mitigation projects modify risk.

Initial Recommendations

43. It is clear that there is no consistent or national approach to flood modelling and there are systemic issues that make if difficult or expensive to perform flood modelling. This report on the environmental scan is not intended to define the solution but to substantiate and inform further effort in this area.

44. It is recommended that:
    a) All States and Territories take urgent steps to ensure the flood mapping data produced by local governments in their jurisdiction is made available to the insurance industry and other relevant stakeholders, including if necessary by legislation.
    b) AGD and BoM lead a Strategic Coordination Group at the Commonwealth level in collaboration with States and Territories to progress longer term issues
    c) The Strategic Coordination Group develop a proposal for Government on a national approach to flood modelling, with costed options
    d) A workshop be held to identify specific objectives and possible project activities including:
        i. better coordination of flood modelling activities
        ii. addressing impediments to accessing existing data from local, state and Federal agencies (including the use of legislative, policy or other means)
        iii. a coordinated approach to data collection (including factors such as data type, resolution, location, purpose, priority and cost)
        iv. means to discover and access data and other relevant information more effectively
        v. creation of national standards and a framework for developing and agreeing to these standards relevant to flood modelling and mapping (that address general and specific requirements)
45. The next phase of work will involve broad stakeholder engagement with the public and private sectors
46. Consideration be given to how this work will be communicated more broadly, possibly through a dedicated website.

47. A Project Plan will be developed for the next phase of work.

48. A scoping study may need to be undertaken in order to:
    a) define requirements for data, tools and products related to flood modelling
    b) gather specific, detailed information about available data, models and analytical tools, modelling and analytical activities and products
    c) identify gaps and possible solutions to filling those gaps

d) consider the role of Government in regard to flood-related data and other activities
e) explore the public benefits of data being available for free or at a minimal cost; and
f) identify how other countries approach flood modelling and the provision of flood-related information to their communities

49. As a guiding principles, the proposed approach to flood modelling should aim to meet the needs of the majority of stakeholders at least cost.

APPENDIX A

Process

50. It is recognised that research, analysis and stakeholder consultation needed to be undertaken before Government could recommend, agree or consider funding for a national approach to flood modelling.

51. The first step in the process was to gain an understanding of what has been done, what needs to be done and the roles of respective agencies and organisations in this area. Specific information was requested as follows:

Item	Description
Data	Data already collected or available, planned collection or analysis of data requirements; coverage, release or use limitations, general costs (eg license restrictions), funding for data
Models and Analytical Tools	Models you use, are developing or plan to develop; release or use limitations, general costs (eg. license restrictions), funding for models or analytical tools
Modelling and Analysis	Modelling and analysis you have conducted
Outputs	Information about outputs of your work related to flood modelling including reports, databases, maps, analyses
Other Agencies	Other agencies or organisations whom you think we should approach in regards to flood mapping
Contact Officer	A contact officer in your agency responsible for this activity and whom we can contact for clarification or further information

52. A general overview of the process follows:

Date	Activity
01 Mar	AGD sent letters to relevant Commonwealth agencies, the Murray-Darling Basin Authority and ALGA requesting information on flood modelling
07 Mar	AGD sought legal advice about the Water Act to advise the Attorney's Office
22 Mar	RAMMS sent letters to jurisdictions requesting general information on flood modelling
23 Mar	AGD met with Treasury to discuss a national approach to flood modelling
30 Mar	AGD sent an update (submission) to the Attorney on a national approach to flood modelling
27 Apr	AGD met with the Insurance Council of Australia to discuss their requirements for flood risk mapping and activities in this area
27 Apr	AGD met with members of the Natural Disaster Insurance Review (NDIR) Panel to exchange ideas on flood modelling
06 May	Developed initial Project Schedule (current version shown at Appendix C)
13 May	RAMMS sent letters to jurisdictions requesting detailed information on flood modelling
18 May	Started draft Report
01 Jun	Finalised draft Report with initial recommendations
10 Jun	Final version of Report following review and comments

APPENDIX B

Consultation

53. The table below lists (in alphabetical order) agencies, organisations or individuals consulted as part of this environmental scan with an indication of who lead the consultation and whether input was received. This provided a broad perspective on the topic and helped identify common views and issues. It should be noted that not all areas were able to provide a response, or a detailed response, given the time constraints.

54. Consultation was extensive but not in great depth as the initial focus was to define the general scale and scope of flood modelling activities to inform scoping of a general work program and subsequent follow up consultation.

Agency, Organisation or Individual	Lead	Input
Australian Capital Territory	RAMMS	✗
Australian Institute of Actuaries (informal discussions)	AGD	✓
Australian Local Government Authority (ALGA)	AGD	✗
Bureau of Meteorology	AGD	✓
Cooperative Research Centre for Spatial Information (CRCSI)	AGD	✓
CSIRO	AGD	✓
Defence Imagery and Geospatial Organisation	AGD	✓
Defence Science and Technology Organisation	AGD	✓
Department of Climate Change and Energy Efficiency	AGD	✓
Department of Innovation, Industry, Science and Research	AGD	✓
Department of Regional Australia, Regional Development and Local Government	AGD	✓
Department of Sustainability, Environment, Water, Pollution and Communities	AGD	✓
Geoscience Australia	AGD	✓
Insurance Council of Australia (ICA)	AGD	✓
Murray-Darling Basin Authority	AGD	✓
Natural Disaster Insurance Review (NDIR) Panel	AGD	✓
New South Wales	RAMM5	✓
Northern Territory	RAMM5	✗
Queensland	RAMMS	✓
South Australia	RAMMS	✓
David Hocking - Spatial Industries Business Association (SIBA)	AGD	✓
Tasmania	RAMM5	✗
Victoria	RAMMS	✓
Western Australia	RAMMS	✓

RAMMS – The Risk Assessment Mitigation and Measurement Sub-Committee (of the NEMC)
AGD – The Commonwealth Attorney-General's Department

55. Further, two documents were referred to in the preparation of this report:
    a) Reforming flood insurance – Clearing the waters, April 2011 (A Treasury report) and
    b) Understanding flood risk – Our National Flood Risk Assessment (A UK Environment Agency report).

APPENDIX C

Summary of Role and Involvement in Flood Modelling

56. The following table provides a summary of the roles and involvement of various agencies and organisations in flood modelling. It is based on input received. It provides no comment on input provided and should not be taken as necessarily complete.

Agency or Organisation	Role or Involvement
Australian Institute of Actuaries (informal discussions)	1. Actuaries quantify risk on behalf of insurance companies in order to determine the price of insurance. 2. They try to understanding the probability of an event occurring and extent of potential floods (amongst other things) and therefore the potential financial impact of a flood to the insurance company.
Bureau of Meteorology	1. The Bureau is the national flood forecasting and warning agency providing flood warning services in a cooperative arrangement with State, Local and other agencies. 2. The Bureau gathers and stores climate and weather data from a range of sources. 3. It is involved in developing the geofabric - a national data set that identifies the spatial relationships of important hydrological features such as rivers, lakes, reservoirs, dams, canals and catchments. 4. It maintains a range of observation systems including weather stations, river gauges and radar stations as well as satellite observing systems. 5. It performs climate modelling and provides seasonal climate forecast updated monthly. 6. It provides seasonal flow forecasting service and is piloting 7-10 day streamflow forecasting services. 7. It performs hydrologic modelling to make predictions about flood levels at key locations on rivers as part of its flood warning role including a new water availability forecasting services. 8. Issues severe weather warnings including for very heavy rainfall. 9. It makes data available to the public through a website and other electronic forms including through web services.
Cooperative Research Centre for Spatial Information (CRCSI)	1. The CRCSI was involved in creation of the Urban DEM – initially to focus on sea level rise but intended as part of a national elevation data framework (NEDF). 2. The data is available through GA's NEDF-Portal. 3. Future steps intend to focus on new data acquisition, hydrological conditioning, expansion of the portal and enhancing a visualisation tool. 4. Assisted in an audit of elevation data for GA 5. According to DIISR, the CRCSI was also involved with mapping of the 2009 Victorian bushfires, and the 2008 Szechuan earthquake in China
CSIRO	1. CSIRO conducts research using a range of data types and models. Research project relate to flood mapping, monitoring and prediction.

	2. It has developed different methods depending on the requirement. Many of the tools are available only to researchers as they have not yet been operationalised. 3. Research involves use of various satellite data sets. 4. It has conducted a range of research activities and developed different models. 5. It has used hydrodynamic modelling using various specific models of varying complexity. 6. It is involved in research on better measurement of rainfall through the Water Information Research Development Alliance in conjunction with the BOM. 7. It developed a clean SRTM DEM data set with BOM and the Australian National University resulting in a number of derived products.
Defence Imagery and Geospatial Organisation	1. DIGO is considering release of SRTM 2 DEM data across the whole of Australia.
Defence Science and Technology Organisation	DSTO is not involved in flood modelling as it falls outside of their core capability areas.
Department of Climate Change and Energy Efficiency	1. DCCEE is involved in modelling the impacts of climate change. 2. Key focus has been on storm surge and implications o sea levels 3. It has invested in products that support national risk assessment 4. There is likely to be future investment in developing a national wave data set and further analysis of rainfall intensity under changing climatic conditions 5. It commissioned work that starts to identify the extent of coastal erosion. 6. In partnership with the CRCSI and GA, acquired access to high resolution elevation data for key coastal urban areas. Had to negotiate broad access agreements. Looking at further acquisition. 7. It invested in the NEDF-Portal 8. Developed an interactive pilot Visualising Sea level Rise tool. 9. It is looking at how DEM of varying resolutions can be stitched together. 10. It invested in national storm tide modelling with the Antarctic and Climate systems CRC and the UWA. 11. Invested in GA's NEXIS
Department of Innovation, Industry, Science and Research	DIISR mostly identified activities of the CRCSI. 1. CRC is coordinating the involvement of the Queensland Department of Environment and Resource Management (QDERM), Land & Property Management Authority NSW (LPMA), DIISR through the Space Policy Unit, Geoscience Australia, Department of Sustainability & Environment Victoria, and Landgate Western Australia to participate in the ongoing operational trial of a temporary mobile satellite reception and processing facility and its imagery products. The trial hopes to extend its capability to include very high resolution optical imagery from the Rapid Eye and Geo Eye satellites using the same mobile reception and mapping facility.

Department of Regional Australia, Regional Development and Local Government	1. The Department has not commissioned work on flood modelling. 2. It has used flood mapping from GA to identify projects impacted by recent floods 3. It produced a map of flooded areas
Department of Sustainability, Environment, Water, Pollution and Communities	1. Environment acquired a flood inundation data set from Centrelink using data from GA 2. It conducted projects on several areas to assess probable inundation patterns to assess wetland health 3. It has used different data types to support the TRaCK CERF Hub inundation modelling (using some free data). 4. It has other planned activities on land use by determining extent of dams and flood events. 5. There is a proposal to develop models for water use compliance purposes and delivery of processed imagery to State agencies.
Geoscience Australia	1. GA maintains archives of imagery and acquires low cost, public good imagery only. 2. GA has established the Optical Geospatial Radar and Elevation panel to help coordinate acquisition of commercial data. 3. GA coordinates access to radar data through an international charter. 4. It is involved in improving DEMs and making it available through the NEDF Portal. There are still gaps however. 5. It hosts an Australian Flood Studies Database on flood studies completed between1980 and 2004. Further work is proposed to enhance the database and improve capability. 6. Is it involved (providing secretariat support) in the National Flood Risk Advisory Group which has assumed responsibility for the database mentioned above. 7. It has developed the National Exposure Information Systems (NEXIS) for generating national exposure data and can be used to estimate the socio-economic impact of natural disasters (including flood). 8. GA often deploys post disaster teams to collect information on flood damage amongst other things. 9. GA and the ANU developed the ANUGA software. It was originally developed for storm surge modelling and was expanded to handle tsunamis. The tool is being continually developed to make it at least comparable with commercial models and is provided free. 10. GA has developed flood damage curves to estimate economic cost to repair a building under different conditions (with appropriate data). It has also developed other vulnerability models. 11. GA uses satellite data to derive flood extents using automated analysis. 12. GA is working with other agencies to clearly define user requirements for satellite products in emergency response. 13. GA also uses flood hazard modelling tools and is validate ANUGA (already used for tsunami modelling). 14. GA performs flood risk by combining information on flood hazard, exposure and vulnerability.

Insurance Council of Australia (ICA)	1. The ICA has collated flood data (and mapping products) from across LGAs in Australia. 2. Insurance companies can use this for pricing insurance. 3. It has developed a National Flood Insurance Database 4. It has some concerns about data access, quality and standards.
Murray-Darling Basin Authority	1. MDBA conducts flood modelling projects over specific areas. Projects include assessment of floodplain inundation under a range of conditions including consideration of structures like weirs and regulators. Also, they include dam break studies and studies in relation to construction of a rail and highway bypass. 2. It has gathered and uses a wide range of data types including hydrometric and bathymetric data, elevation data (of varying types), climate and imagery. 3. It uses the RiM-FIM. 4. It also uses commercial flood modelling software of varying complexities – MIKE 11, MIKE 21 and MIKEFLOOD. It also uses post-processing tools. 5. MDBA also uses a monthly water balance model (MSM-Bigmod) and a daily flow and salinity routing model (BIGMOD). 6. MDBA has produced various reports over project areas including a Hume Dam Assessment of Hydrologic Risk and Dam break inundation maps.
Natural Disaster Insurance Review (NDIR) Panel	The NDIR is looking at issues surrounding access to flood insurance as part of its review. It is not involved in flood modelling itself.
New South Wales	1. Flood mapping is developed and used through the Floodplain Risk Management Process and recommended to local governments to determine and manage the flood risk in their communities. 2. Floodplain management is achieved through the development and implementation of Floodplain Risk Management Plans by local councils. This plan provides inputs into the council Local Environment Plan and Development Control Plans, to support planning and mitigation activities. 3. The floodplain management process is the responsibility of the relevant local council which may establish a Floodplain Risk Management Committee. Specialist technical assistance, advice and funding are provided to councils through the NSW Office of Environment and Heritage. 4. A Floodplain Risk Management Plan is reviewed as works are implemented, more flood data or advanced modelling techniques become available, and flood events occur. 5. The SES is assigned the responsibility to coordinate the collection, analysis, mapping and distribution of spatial information regarding floods, storms and tsunami as prescribed in the NSW State Disaster Plan. As such the NSW SES maintains the SES Hazards Library, which includes an extensive list of publications, maps and data. 6. The data contained in the Hazards Library is classified 'SES - In Confidence' in accordance with the SES Information

	Classification Policy and should be used under guidance of trained and qualified emergency management personnel. Appropriate extracts may be shared with other Emergency Service Organisations and support agencies for emergency services use with approval.
Queensland	1. QLD has a majority of communities captured through the Protecting Our Coastal Communities project (POCC) (should be finalised this year). 2. Inland flooding data is being collected, subject to council participation. QLD currently has around 25 areas already tendered and more than another 50 or more areas nearly ready to tender in the next few weeks. Data will likely be available late this year or early next year subject to weather. 3. Coastal inundation from storm tide or tsunami is relatively easy to map at a broad scale using the bathtub approach. Some Councils prefer to do proper modelling of these events which would give more accurate results. Different councils will bring different methodologies and obtain different results. These councils would also likely express concern with the 'bathtub' approach being released for their jurisdiction. 4. Inland inundation using the bathtub approach is less accurate. Modelling would therefore need to be a council responsibility. This has the same issue, as different councils may apply different methodologies resulting in inconsistencies. 5. The Digital Elevation data acquired from POCC is available for sale through the Dept. of Environment and Resource Management (DERM).
South Australia	1. Adelaide, the Mt Lofty Ranges and the River Murray are identified as areas that have significant digital elevation data. Other areas such as the South East do have DEMs, but a very high level of resolution is required over large areas given the very flat terrain. Other regions have limited data that may not be sufficient for needs. 2. Floodplain mapping studies are generally undertaken by Local Councils, usually with some funding support from the State Government. The work is therefore not undertaken in a strategic manner (e.g. Zone by Zone, catchment by catchment), and to date SA has not seen it has a responsibility to do so. As a result, there is a patchwork of floodplain studies of various ages across SA, often using different methods. 3. The main impediment to a more strategic approach is the lack of resources across State and Local Governments to have a single uniform mapping program. This has been considered a medium priority in flood hazard management. Higher priorities including risk assessment, monitoring and warning, intelligence, and response capacity are being pursued. 4. Further floodplain mapping projects are currently managed by the Stormwater Management Authority and Local Councils, and there is no plan to alter these arrangements in

	the short term.
David Hocking - Spatial Industries Business Association (SIBA)	1. SIBA represents business interests in the spatial industry. 2. It has an interest in addressing a range of spatial infrastructure issues, including how spatial information supports pricing of insurance.
Victoria	1. Victoria has indicated that its flood mapping data is spread across to agencies, the Department of Suitability and Environment (DSE), and Melbourne Water. 2. DSE has available a series of GIS layers called the Victoria Flood Database (VFD) that captures the extent of known available flood information for Victoria outside the area managed by Melbourne Water. The data applies to riverine flooding. It does not include storm surge, storm water flooding or coastal inundation. 3. Copies of the VFD can be provided free of charge (licensing restrictions apply.) 4. Electronic copies of flood studies which contain flood mapping information and an explanation of how the mapping was obtained are being provided the Australian Flood Studies Database. 5. Older studies often only looked at the 1% AEP standard. More recent studies consider a range of events, including ones rarer than the 1%. 6. Melbourne Water also has available a series of GIS layers within Victoria's GIS that captures the extent of known available flood information for the region. The flood extents for 1% AEP events have been incorporated into Local Government Town Planning Schemes via overlays either Land Subject to Inundation Overlay (riverine flooding) or Special Building Overlay (storm water flooding). The data applies to riverine and storm water flooding. It does not include storm surge or coastal inundation. 7. Copies of this information are provided to companies conducing work for developers. 8. Electronic copies of flood studies which contain flood mapping information and an explanation of how the mapping was obtained are held by Melbourne Water. The older studies often only looked at the 1% AEP standard. More recent studies consider a range of events, including ones rarer than the 1%. 9. In addition some mapping was done in the late 1980s and early 1990s are has been based on recorded flood levels rather than being derived from model studies. There is a process to gradually review this mapping and update using today's standards.
Western Australia	1. Landgate (Western Australia's primary source of land information and geographic data) aims to provide elevation data to government, business and the community on a three tiered solution. a) SRTM 30m hydrologically enforced DEM for the interior of the State b) SPOT 10m for the coastal 100km buffer; and c) LIDAR for targeted areas 2. The Department of Water (DoW) is the State

	Government's lead agency in floodplain mapping and providing floodplain management advice. This advice includes the development of floodplains with the object of promoting the wise use of floodplains while minimising flood risk and damage. DoW holds digital elevation data including LIDAR data sets to meets its needs. The main LIDAR data set collected and processed by DoW is for an area that includes the Swan Coastal plain to Busselton. There are other targeted LIDAR data sets near a number existing river gauging sites. 3. Main Roads WA also holds LIDAR data sets but the extent of their holdings are unknown. The only data set that is known is for an area around the town of Fitzroy Crossing in the Kimberley. Other State agencies and Local Government agencies may also hold data and information sets that would be of use to the insurance industry and other users including the communities at risk.

Australian Government

Attorney-General's Department

Guidelines for the Development of Community Education, Awareness & Engagement Programs

AUSTRALIAN EMERGENCY MANUALS SERIES

MANUAL 45

Guidelines for the Development of Community Education, Awareness & Engagement Programs

First edition

ISBN 978-1-921152-22-2

Edited and published by Attorney-General's Department

Written by G Elsworth, J Gilbert, K Stevens, P Robinson and C Rowe, School of Global Studies, Social Science and Planning, RMIT University.

Basic editing and typesetting by Rebecca Carey

Printed in Australia by GEON Impact Printing, an ISO14001 and FSC accredited printer

Cover images courtesy of Australian Emergency Management Institute and iStockphoto

Copyright

Enquiries related to copyright should be addressed to:
Attorney-General's Department
3 – 5 National Circuit
BARTON ACT 2600

Telephone +61 (0) 2 6141 6666

Disclaimer

This publication is presented by the Commonwealth Attorney-General's Department for the purpose of disseminating emergency management information free of charge.

The Commonwealth Attorney-General's Department in consultation with emergency management professionals and subject matter experts exercised care in the compilation and drafting of this publication, however, the document and related graphics could include technical inaccuracies or typographical errors and the information may not be appropriate to all situations.

In no event shall the Commonwealth of Australia (acting through the Attorney-General's Department) be liable for any damages whatsoever, whether in an action of contract, negligence or other tortious action, arising out of or in connection with the use of or reliance on any of the information in this publication.

The Attorney-General's Department periodically updates the information in this publication. Before using this publication, please check to ensure that this edition is the most recent and updated version of the publication.

Intellectual Property Statement

In contributing to the development of this manual, it is acknowledged that no ongoing rights to the information are retained by individual contributors. The information contained within this manual is not owned by individuals or State/Territory organisations but is held in trust by the Commonwealth on behalf of the Australian community. The information contained within this manual is current as at December 2009.

Australian Emergency Manual Series

The first publication in the original Australian Emergency Manual (AEM) Series of mainly skills reference manuals was produced in 1989. In August 1996, on advice from the National Emergency Management Principles and Practice Advisory Group the AEM Series was expanded to include a more comprehensive range of emergency management principles and practice reference publications.

The AEM Series has been developed to assist in the management and delivery of support services in a disaster context. It comprises principles, strategies and actions compiled by practitioners with management and service delivery experience in a range of disaster events.

The series has been developed by a national consultative committee representing a range of State and Territory agencies involved in the delivery of support services and is sponsored by the Commonwealth Attorney-General's Department.

Details of the AEM Series are available on at www.ema.gov.au

Australian Emergency Manual Series structure and content

Principles and reference manuals

Manual 2 Australian Emergency Management Arrangements

Manual 3 Australian Emergency Management Glossary

Manual 4 Australian Emergency Management Terms Thesaurus

Manual 18 Community and Personal Support Services

Manual 29 Community Development in Recovery from Disaster

Manual 15 Community Emergency Planning

Manual 27 Disaster Loss Assessment Guidelines

Manual 9 Disaster Medicine

Manual 28 Economic and Financial Aspects of Disaster Recovery

Manual 8 Emergency Catering

Manual 1 Emergency Management Concepts and Principles

Manual 23 Emergency Management Planning for Floods Affected by Dams

Manual 5 Emergency Risk Management—Applications Guide

Manual 43 Emergency Planning

Manual 11 Evacuation Planning

Manual 20 Flood Preparedness

Manual 22 Flood Response

Manual 21 Flood Warning

Manual 44 Guidelines for Emergency Management in Culturally and Linguistically Diverse Communities

Manual 25 Guidelines for Psychological Services: Emergency Managers Guide

Manual 26 Guidelines for Psychological Services: Mental Health Practitioners Guide

Manual 45 Guidelines for the Development of Community Education, Awareness and Education Programs

Manual 13 Health Aspects of Chemical, Biological and Radiological Hazards

Manual 6 Implementing Emergency Risk Management—A facilitators guide to working with committees and communities

Manual 42 Managing Exercises

Manual 19 Managing the Floodplain

Manual 17 Multi-Agency Incident Management

Manual 31 Operations Centre Management

Manual 7 Planning Safer Communities—Land Use Planning for Natural Hazards

Manual 14 Post Disaster Survey and Assessment

Manual 10 Recovery

Manual 24 Reducing the Community Impact of Landslides

Manual 12 Safe and Healthy Mass Gatherings

Manual 41 Small Group Training Management

Manual 46 Tsunami

Manual 16 Urban Search and Rescue—Capability Guidelines for Structural Collapse

Skills for emergency services personnel manuals

Manual 38 Communications

Manual 39 Flood Rescue Boat Operation

Manual 37 Four Wheel Drive Vehicle Operation

Manual 35 General and Disaster Rescue

Manual 33 Land Search Operations (refer to website http://natsar.amsa.gov.au/Manuals/index.asp)

Manual 32 Leadership

Manual 36 Map Reading and Navigation

Manual 34 Road Rescue

Manual 30 Storm and Water Damage Operations

Manual 40 Vertical Rescue

Contents

List of Figures

Foreword

A project titled 'National review of community education, awareness and engagement for natural hazards' (hereafter, the review) was commissioned in August 2006 by the then National Community Safety Working Group of the Australian Emergency Management Committee (AEMC). The project was carried out over two years by a research team from the School of Global Studies, Social Science and Planning at RMIT University. The review was tabled and noted at the AEMC meeting of 31 March 2009. This volume in the Australian Emergency Manual Series provides an account of the results of the review, and:

- analyses the thinking behind what has become known as the 'community safety approach' to natural hazard safety in Australia and overseas
- outlines preliminary policy theory and program theory models for the community safety approach that provide a foundation for program design
- summarises in detail publicly available evaluation studies of 14 Australian community safety programs for natural hazards, with an emphasis on 'what works, for whom, in what settings'
- describes the results of six case studies of community safety programs and critical issues

especially conducted for the review

- presents an overarching program theory model for the community safety approach to natural hazards drawn from a synthesis of the program evaluation summaries and the case study work
- suggests six 'principles of effective practice' in developing and implementing programs of community education, awareness and engagement for natural hazards
- discusses the central importance of community participation in the development and implementation of programs.

This publication is also available on the Emergency Management in Australia website, www.ema.gov.au.

Martin Studdert, AM
First Assistant Secretary
National Security Capability Development Division
Attorney-General's Department

Acknowledgments

Initial members of the research team were Gerald Elsworth and John Gilbert. They were quickly joined by Kaye Stevens and later by Catherine Rowe and Peter Robinson. All members of the research team variously contributed to the design, data gathering and analysis of each component of the work reported here; John Gilbert and Gerald Elsworth conducted the initial consultations with emergency services managers and community safety staff, and Kaye Stevens took major responsibility for the analysis of government inquiries and development of the resulting policy theory that provided the framework for the project. Subsequently, John Gilbert and Kaye Stevens compiled the initial inventory of almost 300 community safety programs and developed a program typology. Gerald Elsworth and Catherine Rowe conducted the synthesis of the available evaluation studies. Those primarily responsible for researching and writing the case studies were John Gilbert, for the studies of the Bureau of Meteorology's programs about warnings and the flood awareness and preparation program in South Australia; Peter Robinson for the 'culturally and linguistically diverse (CALD) communities' and 'recovering from bush fires' studies; John Gilbert and Kaye Stevens for the study of the All West Australians Reducing Emergencies (AWARE) program in Western Australia; and John Gilbert and Catherine Rowe for the study of cyclone preparation for itinerant populations. Catherine Rowe also assisted with document research for a number of other case studies, and Peter Robinson, Gerald Elsworth and Kaye Stevens compiled and edited the final case study

report. Gerald Elsworth coordinated the research team and compiled the final report of the review and this volume of the Australian Emergency Manual Series.

The review commenced with a series of consultation workshops with emergency managers and community safety staff in each Australian State and Territory. The research team would like to thank the many people who gave their time to participate in these consultations and who subsequently provided information on their agencies' programs and recommended further contacts. We are also deeply indebted to the many people who agreed to be interviewed for the case studies, and acknowledge the valuable support we received from personnel from the various natural hazard response agencies and local governments who provided detailed information on their programs and helped us organise the interviews that formed the basis for the case studies reported here. As a number were also interviewed for the case studies, we have respected their anonymity by not naming them personally, but we are no less grateful for their cooperation and help.

We would also like to thank the members of the then National Community Safety Working Group for their ongoing support and encouragement for the duration of this project. Finally, we would like to acknowledge the important contribution of our colleagues Helen Goodman, post-doctoral fellow on the 'Evaluating bushfire community education programs' project of the Bushfire Cooperative Research Centre and Alan Rhodes, Country Fire Authority Victoria and Bushfire Cooperative Research Centre
for the many discussions that helped shape and sharpen our ideas over the duration of the review.

Gerald Elsworth
on behalf of the Research Team.
Editor - Guidelines for the Development of Community Education, Awareness & Engagement Programs

Section A. Introduction

CHAPTER 1

CHAPTER 1

Overview of the 'National review of community education, awareness and engagement for natural hazards'

Background to the review

A research project to review community education, awareness and engagement programs and activities designed to enhance safety for natural hazards in Australia was commissioned by the National Community Safety Working Group in August 2006. The project was undertaken by a research team from the School of Global Studies, Social Science and Planning at RMIT University. The development of the project was an outcome of the recommendations of the 2002 report to the Council of Australian Governments (COAG) on natural disasters in Australia (Department of Transport and Regional Services 2004). In response to the recommendations, the National Community Safety Working Group was tasked by the Australian Emergency Management Committee to look at ways of developing improved national practices in community awareness, education and warnings that could be tailored to suit State, Territory and local circumstances.

The COAG report on natural disasters identified the following natural hazards as having the potential to cause serious disasters in Australia: bushfire; earthquake; flood; storm; cyclone; storm surge; landslide; tsunami; meteorite strike; and tornado. Government department (including local government) and agency-generated programs and activities dealing with one or more of these natural hazards formed the scope of the research project. More specifically, the focus was on programs that utilised community education, awareness and/or engagement (EAE) activities and strategies to achieve desired community safety outcomes.

The review examined evidence from recent and current community EAE programs and activities based on both publicly available evaluation reports and six case studies especially conducted for the project. The review had a national focus, and agencies in every jurisdiction were involved to ensure that the findings reflected both the range of programs on offer across the country and the range of natural hazard risks that vary across Australia. The project looked at both urbanised and rural communities and localities, and specific attention was given to examining programs for culturally and linguistically diverse (CALD) residents. Overall, the research approach aimed to answer the question, 'What program approaches and specific programs and activities work, for whom, in what

circumstances, and how?'

The review project was undertaken in three phases that provided the following outputs.

- Phase One:
  - national inventory and typology of significant programs and activities
  - preliminary review of program effectiveness
  - preliminary policy theory and program theory models.
- Phase Two:
  - theory-based review of publicly available evaluations of Australian programs
  - case studies of current practice
  - tested program theory model
  - evidence-based principles for effective practice.
- Phase Three:
  - inventory of concise descriptions of 100 selected programs.

This volume in the Australian Emergency Management Series reports on the findings of the first two phases of the project. It is designed to present the detailed information that led to the review conclusion, and describes those programs and activities that achieved beneficial outcomes and some that were less successful. It thus contains:

- a summary of aspects of the work undertaken in Phase One, including the policy review, program typology, and preliminary policy theory and program theory models (principally, Chapter 2)
- a brief account of the research methods used in the review (Chapter 3)
- summaries of publicly available Australian evaluation studies, with a focus on 'reconstructing' the underlying theory of each program or activity (Chapters 4, 5, 6 and 7)
- a detailed account and discussion of each of six case studies conducted for the review, followed by a brief discussion (Chapters 8, 9, 10, 11, 12, 13 and 14), and, to conclude

- a summary and conclusions from the whole project, including an overarching theory model for effective community EAE programs and activities, a list of suggested principles of effective practice in the field, and a final discussion of community participation in program development and implementation (Chapters 15, 16, 17 and 18).

Overview of the review findings

The COAG report on natural disasters in Australia appeared to be sceptical of the present value of community EAE programs, stating that:

> Public awareness of natural hazard issues is arguably the least practised and most poorly funded mitigation measure in Australia. With very few exceptions, it is undertaken as a limited auxiliary activity to other disaster management initiatives, rather than as a sustained strategic measure to raise public consciousness and understanding of hazard risks, impacts and minimisation.
>
> Genuine efforts in public awareness are certainly made from time to time. However public awareness programmes are generally limited by the following deficiencies:
>
> - low levels of resources
> - lack of professional design and delivery
> - limited audiences being targeted
> - few programmes being subject to evaluation to assess success or otherwise, and
> - efforts being sporadic rather than sustained (Department of Transport and Regional Services 2004, pp 124–5).

The review gathered descriptive information on close to 300 separate programs and activities for natural hazard community EAE. Evaluation studies of 14 of these initiatives were located and analysed in detail, and the review also conducted six specially designed case studies of additional programs, activities and emerging issues.

The review conclusion

Addressing the apparent scepticism in the COAG report on natural disasters (and comments by some

social scientists), the central conclusion of the review was that *the diverse EAE initiatives for natural hazards presently developed or planned have considerable potential to achieve appropriate desired outcomes at the individual (resident, household, family) level and, more broadly, for localities, communities and agencies.* The review was not commissioned to provide an economic assessment of current EAE initiatives; hence, conclusions are not drawn about the adequacy of present levels of funding. The review did, however, advocate that the development and implementation of EAE programs and other activities for natural hazards should be more systematically planned and evaluated, and based more directly on available evidence and theory.

The range of present EAE programs and activities

The programs and activities on which descriptive information was available were organised into five broad categories that fell along a continuum from centralised 'top-down' warnings and information dissemination to 'bottom-up' community participation strategies. The classification clearly depicted the wide diversity of current community EAE practice by Commonwealth, State and Territory agencies and local government.

General alert and warning systems, together with the communication strategies designed to inform the public about their meanings and encourage appropriate response, were located at the 'top-down' end of the continuum (the category was named 'Warning systems and associated community EAE activities').

A wide range of information dissemination strategies was also identified, including media campaigns, printed materials and an increasing use of interactive media such as DVDs and public information telephone lines ('Public information provision').

These generic information provision strategies were also found to exist in a variety of locally developed and adapted forms ('Localised information provision').

Next was a diversity of 'Localised community engagement and education activities and programs'. Face-to-face presentation and/or interaction was the common element in this group of activities, which could also be segmented into 'one-off' (street and community hall meetings and one-on-one consultations with households) and 'continuing' activities. Continuing activities consisted of ongoing community safety groups and recently developed 'community briefings' that may be held regularly in the same locations for the duration of an event.

Finally, towards the 'bottom-up' pole of the continuum, various 'Community consultation, collaboration and development approaches' were identified. Along with the community briefings, this group of activities represents the more recent and emerging strategies. They include integrated

planning systems that contain (sometimes mandate) community consultation as a critical element and much more localised community development activities, including those that seek to capitalise on existing community strengths and organisations.

What are the desired outcomes and how are they achieved?

A major outcome of the review is a schematic representation (theory model) of the key causal processes generated by successful programs and activities and the outcomes thus achieved (an outline of the model is shown in Figure 1:1).

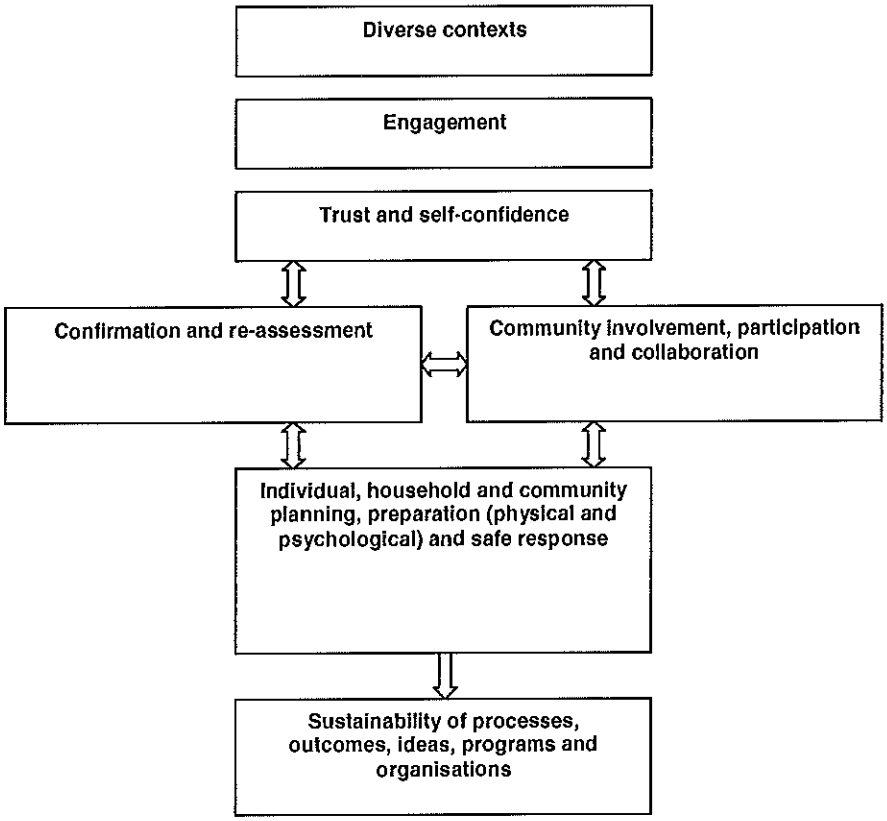


Figure 1:1 **Summary program theory model of successful community EAE programs for natural hazards**

An additional feature of the theory model is the richness and diversity of the contexts that are described or discussed in the evaluations.

An expert consultation conducted prior to an early series of evaluation studies of a Victorian bushfire education program (Rhodes, 2001, 2003) identified a comprehensive list of the specific short- to medium-term outcomes at the individual/household level that might be achieved through community

EAE initiatives. They were:

- awareness and recognition of the wildfire risk
- knowledge of fire behaviour and fire safety measures
- planning for the event of fire
- physical preparations of property and household, and
- psychological readiness involving confidence and self-reliance.

This broad conception of individual and household outcomes of community EAE programs for bushfire is equally applicable to the other natural hazards and to multi-hazard programs.

Positive reports of outcomes across this full spectrum were found in the programs and activities reviewed. The majority of available evaluation reports highlighted positive changes in awareness and knowledge of the potential threat of natural hazards, along with physical preparedness; and a range of program types was found to have the potential to generate these desired outcomes. Positive changes in planning and psychological preparedness were less frequently reported. There is sufficient indication in the reviews, however, that these desired attributes are amenable to change strategies, but may require a more focused approach. Positive outcomes that were achieved for communities and agencies were also reported.

The final section of the model mentions aspects of the sustainability of programs, processes and outcomes etc for natural hazard community safety. One important theme that has emerged from recent research on program sustainability is the idea that 'sustainability begins with first events'; that is, events that occur in the planning and implementation phases of behaviour change programs. Thus sustainability can (and should) be actively planned from the beginning rather than towards the end of the program's initial cycle.

The key causal processes for achieving these outcomes were identified as:

- engagement
- trust and self-confidence
- confirmation and re-assessment, and
- community involvement, participation and collaboration.

Engagement is a broad idea that includes individual curiosity and interest, and the motivation to learn more, think carefully, and form the intention to commence appropriate planning and preparation activities. The idea of engagement as used in the review also includes processes at the community level such as agency personnel seeking out, listening to and utilising local knowledge, and community participation activities that are inclusive, respect and value local needs and viewpoints, and incorporate community members into program design and planning processes.

The generation of trust and self-confidence is proposed to result from successful engagement. Residents need to be assisted to overcome possible initial hostility to agencies and their staff so that agencies can be seen to be offering credible advice, so that negotiated solutions continue to be accepted, and so that agencies with finite resources can be seen to be making sound decisions, taking coordinated action and doing their best for communities that are threatened by a hazard. Trust and self-confidence also suggest the idea that residents believe they can rely on themselves, their families and their neighbours during an event; that they come to believe in the efficacy of what they know and have learned; and that they understand their own and others' capacities and limitations so that they have the confidence to make appropriate safety decisions.

The confirmation and re-assessment process of using new information to confirm, elaborate, re-assess and/or re-negotiate prior decisions is a critical causal process at the individual and household (and potentially community) levels. Confirmation, elaboration, re-assessment and re-negotiation can be supported by both formal (eg media, face-to-face agency events) and more informal sources of information and it is very likely in some communities that informal local sources may be critical for this process, particularly during an event.

Processes of community involvement, participation and collaboration (such as planning and working with neighbours, generation of shared understandings of the nature of the threat in a locality and possible mitigation approaches), and collaborative planning, decision making and action, are actively encouraged by a small but diverse group of EAE programs and activities as a key causal process in achieving both household and community-level outcomes.

Principles of effective practice

Six 'principles of effective practice' were generated from the studies reviewed. Importantly, these principles are not asserted as specifications for 'best practice'. Best practice recommendations are typically context free, based on the idea that there must be 'one best way' to 'solve' a social problem. This assumption was incompatible with one of the central tenets of the review—*that context is not just important, but critical, in determining when and how the causal processes that lead to positive program outcomes in social settings are generated.* Hence the limits to the generalisation of any

notions of good practice must be clearly understood and articulated.

The recommended principles of effective practice are:

- Principle 1: 'localise' programs and activities where possible.
- Principle 2: develop a program theory model for present and new programs and activities that will provide a template for detailed planning and implementation, a 'roadmap' for evaluation and a permanent record of the thinking that occurred during program development.
- Principle 3: develop a small suite of programs and/or activities that focus on achieving different intermediate steps (processes) along the pathway from 'risk awareness' to 'preparedness' (planning, physical preparation, psychological preparation) and that are integrated into a general plan for enhancing natural hazard preparedness in a locality or region.
- Principle 4: where appropriate, consider an integrated approach to planning, program development and research.
- Principle 5: conduct and report frequent evaluations of programs and activities to continually enhance the evidence base for what works in particular contexts in community safety approaches.
- Principle 6: seek to optimise the balance between 'central' policy positions, agency-operational requirements and specialist expertise on the one hand and community participation in planning, decision making, preparation and response activities on the other.

The principle of community participation

It is argued that community participation is both the most important and most general of the recommended principles. Community participation in natural hazard safety might be viewed in at least three ways:

- active participation by community members in the design and implementation of agency and government programs
- programs that, themselves, entail the active involvement and participation of community members, and
- community members actively participating in planning and preparation to enhance their own (and family and neighbours') safety.

The review demonstrated that not all successful community EAE programs necessarily entail face-to-face involvement and interaction with community members (that is to say, carefully designed media-based approaches can be effective for some desired outcomes). The community safety approach to natural hazards does, however, entail the active involvement of individuals, families, households and communities in planning and preparing for natural hazard risks. The review also argues, crucially, that programs and other activities that seek to achieve desired safety responses across the full spectrum of those described would be greatly improved if they encouraged and facilitated active and open community participation during their development and implementation.

CHAPTER 2

Understanding the community safety approach to natural hazards

The community safety approach

Among the COAG list of natural hazards mentioned in Chapter 1, tropical cyclones, floods, severe storms (including lightening strikes, hail, wind gusts and tornados) and bushfires (wildfires) are major sources of loss of life and property in Australia (Blong 2005; McAneney et al 2007; Australian Bureau of Statistics 2008). Several recent events have taken a heavy toll on human life and/or resulted in extensive property and environmental damage; for example, bushfires in Canberra and the Victorian alpine regions in 2003 and the Lower Eyre Peninsula, South Australia, in 2005, cyclone Larry in far-north Queensland in 2006, floods in Newcastle and East Gippsland in 2007, and, most recently, the devastating bushfires in Victoria in February 2009.

Government-initiated inquires in recent years (frequently following major events) have addressed a range of common themes relating to improved natural hazard safety, many embracing the broad premise of community responsibility and self-reliance. Relevant agencies also increasingly state openly that they do not have the resources to defend or protect every property that may be in danger when a major event occurs. Thus in the past decade or so there has been a clear shift in thinking to acknowledge that reducing the risk from natural hazards will be enhanced by the willingness and ability of individuals, households and community groups to plan and prepare effectively. As a consequence, many emergency service agencies in Australia have adopted a risk management approach with a greater emphasis on prevention, mitigation and community preparedness (Smith, P, Nicholson & Collett 1996).

This transformation in Australian thinking from response and reaction (including recovery) to

anticipation, mitigation and preparedness (Templeman 2004) parallels international thinking in emergency management, crime prevention and public health and has become known as the 'community safety paradigm' (or 'community safety approach'). Defining characteristics include the general themes of shared responsibility, identifying and protecting those at risk, securing sustainable reductions in the source of the danger and the unreasonable fear of it, and the development of community-based programs and multi-agency partnerships (Hughes 2002; Squires 1997; Steelman & Burke 2007). Community-level engagement, responsibility and empowerment are emphasised, and residents are seen as being responsible for coordinated action within their own localities in partnership with statutory agencies and the voluntary sector (Chess et al 1995; Labonte 1994). Writing on recent thinking about crime prevention in Great Britain, Hughes (2002, p 3) summed up the general shift in thinking towards 'crime prevention, risk management and safety politics' in a manner that equally applies to the emerging policy response to natural hazards in Australia.

> Overall, the promotion of crime control *in* and *by* the community, and by means of multi-agency partnerships of both the state and civil society, represents a major shift in how we think of the governance of crime specifically and social order more generally. With 'partnership' now inscribed as the primary symbolic and organizational means of delivering community safety politics, a broader rearticulation of the responsibilities between national and local government, public and private agencies and groups in local communities has begun to occur (emphasis in original).

The community safety approach thus represents a critical shift away from those perspectives that have been characterised as relying first and foremost on the 'professionalisation' of responsibility for hazard management and response and the consequent vesting of 'accountability for community safety within a professionalised bureaucracy' (Barnes 2002, p 15). In contrast, a central component of the community safety approach is active engagement with and empowerment of the community to investigate its own risks and develop its own solutions. In this sense, the conceptual shift in emergency management is similar to the approach in public health that aims to realise, in practice, the ideals of community 'empowerment' and 'ownership' of problems and possible solutions within the ambit of national, State and local government planning and provision of professional services (Labonte 1994; Laverack & Labonte 2000).

Increasingly, therefore, agencies are seeking ways to work more effectively with communities by promoting increased involvement through a diverse range of EAE programs for natural hazard safety that emphasise community-level engagement, risk appreciation, forward planning and preparedness. There is also a wide variety of communication products and media-based campaigns intended to raise

awareness and provide advice. Information may also be provided in community briefings and through the media immediately before and during an event to assist the public to make appropriate decisions about how to interpret warnings and respond to the threat.

The emerging community safety approach to natural hazards can be simply summarised by the box-and-arrow diagram in Figure 2:1.

Central organisation and policy-level concepts
Principles underpinning program development and adult learning
Policy framework for agency and organisational roles
Use of incentives to achieve preparedness
Understanding/application of regulations for bushfire safety
Community and local agency-level concepts
Neighbourhood and community networks and partnerships
Agency/inter-agency responsibilities and coordination
Appropriate information/education activities
Community and agency responsibilities to address specific needs
Agency/community interaction
Effective communication of information during bushfire
Greater community ownership and responsibility for bushfire safety
Individual household and neighbourhood concepts
Individuals/communities have a realistic understanding of risk
Deciding and planning for 'stay or go'
Household/neighbourhood planning and preparation

Figure 2:1 **Summary of the shift to a community safety approach in emergency management**

Foundational values and operational principles

Two recent reports to COAG discussed approaches to community EAE within broader disaster mitigation and management frameworks. *Natural disasters in Australia: Reforming mitigation, relief and recovery arrangements* (Department of Transport and Regional Services 2004) was concerned with mitigating the impact of all types of natural disasters. The second report, *National inquiry on bushfire mitigation and management* (Ellis, Kanowski & Whelan 2004) was commissioned following the severe fires in the 2002–03 bushfire season. The main themes and issues discussed that relate to community EAE were analysed in detail in the Phase One report for this review (Stevens, Gilbert & Elsworth 2008). Similar analyses of four additional bushfire-specific inquiry reports were

incorporated in a comprehensive description of the emerging community safety approach prepared under the aegis of the Bushfire Cooperative Research Centre (Stevens 2007).

The purpose of the analysis was to make explicit the multiple (contrasting and possibly conflicting) values that might underpin the community safety approach. Following the work of Morris-Oswald and Sinclair (2005, p 10) in the context of floodplain management, values were characterised as *socially shared and enduring beliefs, preferences and/or principles that are shaped by existing physical and social systems, communicated by and between people within these social systems, and showing a commitment to existing (and, in the present case, emerging) social and political arrangements.* Additionally, values themselves were thought of as constituting systems of beliefs that were either 'foundational' (that is, justified directly and independently by, for example, perception, observation or empirical study) or 'second-order' (that is, derived from other values). Extending this foundational/second-order distinction, values could be organised as 'values-to-practice chains' such that the foundational values logically led to principles of 'effective practice' (Paton, M Q 2001) and general recommendations for the design of programs.

The approach to identifying values and principles was iterative, unfolding during the review process. Initially, the recommendations from each report were reviewed to identify those that related to community EAE, and the consolidated list of relevant recommendations was then grouped into themes. The limitations of this approach soon became obvious, however; recommendations often did not reflect the depth and substance of discussions nor the range of findings presented in the reports, and if current practices were not found to be problematic, no recommendations for improvement were made.

The reports were re-analysed to expand and build on the themes identified in the initial analysis of the recommendations. The re-examination of the reports started with the sections that focused on community EAE activities and programs and was expanded to include factors in the context of national policy and planning that influenced community safety, as well as relevant operational (response and recovery) issues. At this stage the pertinent concepts were also sorted into whether they related to planning or activities that occurred before, during or after a natural hazard event. The final step in the review was to identify the foundational and second-order values and principles as outlined above that guide policy development and planning of community safety programs.

Six foundational values were identified from the analysis. They were that:

- community safety in natural hazards is a shared responsibility between householders, communities, agencies and governments
- while responsibility is shared, individuals and households have a specific responsibility for taking

action to mitigate their own risks

- people and communities differ in terms of their values, risks, assets and capacities
- priorities differ between individuals and communities, and include environmental, social and economic considerations that may be competing or inter-related
- increasing community safety requires a risk management approach, and
- natural hazard policy and practice should be evidence-based.

Seven general second-order operational principles derived from the foundational values that directly inform policy development and planning for community safety interventions were also identified:

- adopting a comprehensive emergency management approach
- working in partnership
- understanding local people and communities
- identifying and prioritising risks and assets
- planning locally to mitigate risks
- household planning and preparation, and
- building and using knowledge through research, monitoring, evaluation and improved information management.

Finally, the analysis uncovered a small number of general recommendations for effective practice that were closely linked to the operational principles. These recommendations suggested that programs and other activities should be:

- targeted to residents and communities at high risk
- characterised by diverse approaches that are tailored to the priorities and capacities of local individuals and communities
- flexible and responsive to differences and changes in individuals and communities
- evidence-based but innovative, and

- monitored and evaluated and thus able to add to an accumulating knowledge base about effectiveness for different communities in different contexts.

The links between the foundational values, second-order operational principles and broad recommendations for effective practice were not simple, one-to-one relationships. The operational principles and practice recommendations were often informed by two or more foundational values. In some cases foundational values appeared to inform not only what *should be done*, but also the process for *doing*. For example, applying the values of risk management, shared responsibility and differences between people and communities informs how emergency management planning should be implemented. Identifying, prioritising and subsequently managing risks results in an inclusive process that involves a range of stakeholders and takes into account the fact that priorities differ between and within communities. This inclusive process would, in turn, result in programs and activities that were diverse, flexible and responsive to differences and changes in individuals and communities.

Similarly, improved knowledge (by building the evidence base about 'what works') is a mechanism for supporting a shift to an integrated emergency management approach, the development of partnerships, and shared decision making about local risks and priorities for action. This should result in effectively and efficiently targeted programs that are also flexible and responsive to local needs and, when evaluated, to successive improvements in the evidence base of what works best for different individuals and households in different localities and communities.

While the principles were common across the reports, there were also differences in the detail of how they were discussed and their suggested application. For example, the views that responsibility should be shared *and* that individuals have primary responsibility for mitigating their own risks were often expressed in the reports. Perspectives on *primary responsibility* varied between the reports, however, and in different contexts within reports. Statements about the need for agencies to support individuals and communities to take responsibility for managing their own recovery from natural hazards contrasted with discussions about the need for individuals to support the responsive work of agencies by undertaking preparedness measures.

Current community safety programs and their intended outcomes

A program classification

In a similar manner to recent work in the United States (Reams et al 2005; US Forest Service), an inventory of community safety activities and programs for natural hazards in Australia was assembled by the research team. Approximately 290 distinct programs and activities are represented. Program development has been rapid over the past few years and, in many instances, little systematic

information beyond website descriptions and examples of media materials is readily available from public sources. The manner in which community safety initiatives are implemented 'on the ground', the causal processes involved, and the householder and community-level outcomes desired or achieved are infrequently researched and reported.

Employing an iterative approach similar to that used to analyse the inquiry reports, the content of the available program descriptions was analysed and synthesised to develop a classification scheme. In developing the scheme, it quickly became apparent that a wide range of types of initiative exists and a wide range of outcomes is desired. The strategies used by agencies across Australia have a lot of similarities but there are also many differences, which frequently reflect differences in localities and the threat from natural hazards around Australia. Where there are similarities, it has often been the case that programs developed by one agency that have been perceived to be successful are replicated by other agencies, and occasionally for other hazards, and adapted to the new administrative structure and specific high-risk localities.

This wide variety of programs was usefully organised into five main categories that fell along a continuum that could be roughly described as ranging from 'top-down' hazard warnings and information dissemination approaches to 'bottom-up' community engagement and development strategies (see Appendix). The categories are:

- warning systems and associated community EAE activities
- public information provision
- localised information provision
- localised community engagement and education activities and programs, and
- community consultation, collaboration and development approaches.

The process of classifying programs for educating, raising awareness and engaging the community raised questions about how to define a program or activity for the purpose of the review. Many agencies and local governments have adopted comprehensive risk-based approaches to planning for natural disasters, and 'community education' is commonly identified as a treatment for mitigating risks. Is the inclusion of community education in a planning document sufficient to assume that there is a community education program? The steps taken by agencies and local governments to raise community awareness and to educate and engage the community in reducing risks from natural hazards seem to vary widely. The type of action taken includes developing information for agency and municipal websites, including information brochures on natural hazards in information kits for

new residents and discussing natural hazards in council newsletters. Some agencies and local governments have developed more focused and targeted strategies to educate communities, such as programs that focus on mitigation and preparedness for flooding on a specific floodplain, information materials specifically designed for CALD communities and local strategies for potentially vulnerable groups such as people with disabilities or older people.

Thus categorising programs and activities was not straightforward for a variety of reasons, including challenges associated with:

- defining the boundaries of what constitutes a community EAE program or activity
- defining the boundaries of the five broad categories
- differentiating between processes and outcomes when describing activities
- programs often consisting of multiple activities, and
- activities that may be applied in different contexts and for different natural hazards.

Critically, categories within the classification overlapped and some programs and activities were found to fit more than one category. There are many examples. The ongoing community bushfire education groups that are supported by rural fire agencies in a number of States might be thought of as pivotal examples of 'localised community engagement and education activities and programs'. Closer investigation of the development of these groups in some States, however, indicates that many may have used a range of community development principles and strategies, suggesting that these groups could also be appropriately classified as examples of the 'community consultation, collaboration and development' approach. Another example is the case study focused on cyclone awareness for independent travellers and mine workers. This focus suggests that it may well have been classified as 'localised information provision'. But, while the 'audiences' for the activities were specific populations in a particular locality, the general nature of the materials and strategies available and used suggested that the issues were those confronted by travellers and mine workers in any cyclone-prone locality. Hence these activities were classified more generally as 'public information provision'.

Sometimes, also, an activity or approach can be utilised by different types of programs. Although its initial focus was tropical cyclones, the *Awareness, endurance, recovery: Psychological preparedness kit for natural disaster warnings and natural disasters* (see Chapter 4) can be used to promote psychological preparedness and coping regardless of the type of hazard, and can be used by residents independently, delivered to an audience in a one-off workshop or meeting, or used by an ongoing group involved in

increasing household preparedness and capacity to respond.

Finally, several of the types of activities represented in this classification may be combined into an integrated program made up of multiple strategies. For example, a flood awareness program may involve media coverage, flood markers showing the height of past floods in public spaces, the distribution of general publications and community events, as well as the face-to-face delivery of household-specific information about flood risks. Similarly, a bushfire awareness campaign may involve State and local media advertisements, broad dissemination of hardcopy or electronic information, targeted invitations to community meetings in high-risk areas and even visits to homes. Community meetings may be tailored to specific locations and take the form of street corner meetings, 'gum tree' meetings, or meetings in a resident's home or at a local community venue. In addition to providing information to support higher levels of preparedness, 'one-off' community meetings may promote the establishment of ongoing community groups.

Warning systems and associated community EAE activities

General alert and warning systems, together with the communication strategies designed to inform the public about their meaning and encourage appropriate response, were located at the 'top-down' end of the continuum.

Whenever possible, providing timely and accurate information about an imminent threat from a natural disaster gives people the opportunity to prepare by either evacuating or taking other action to reduce the level of risk for themselves and dependent others. A sudden traumatic event that occurs without warning has a greater impact, as people do not have the opportunity to prepare physically or psychologically. Early warnings may reduce levels of stress and panic if people have enough time to take appropriate action.

While not providing information about a specific event, general forecasts and warnings are intended to increase community awareness of the risk of natural hazards. Advance warnings provided by the Bureau of Meteorology of the possibility of a cyclone affecting coastal communities, for example, alert people of the need to stay informed about the progress of the event.

But warnings and advanced forecasts have limited impact (or may even have undesirable consequences) in the absence of a clear community understanding of their meanings and the actions necessary to increase individual and household safety (Handmer 2000). Community education material that provides resources for individuals and households to anticipate the likelihood and to track the development of a hazard event, to take necessary immediate preparations, and to respond appropriately and in a timely manner are designed to facilitate understanding of warnings and

encourage and enhance a safe response.

Public information provision

A wide range of information dissemination strategies was also identified, including media campaigns, printed materials, and an increasing use of interactive media such as DVDs and public information telephone lines.

Emergency management agencies in all Australian States and Territories utilise various forms of public information provision as a major component of the suite of activities and programs for community safety for natural hazards. Media campaigns and a wide range of publications, in particular, provide a convenient strategy to get information to a large audience in a practical and timely manner. Many forms of media are utilised, including television commercials, radio commercials and phone-ins, as well as press advertising, feature articles in local and regional newspapers, leaflets, brochures, booklets, DVD presentations and websites.

The main outcomes that agencies expect from a well-organised and targeted public information provision program appear to be an increased knowledge and understanding of hazard risk and possible preparedness activities (particularly among members of the general public with limited prior experience or knowledge). Recovery strategies may also be emphasised (what to do after a storm, for example) and some more recent multimedia and/or DVD packages have also attempted to portray the reality of the event (the Tasmania Fire Service (nd) *Prepare to survive* DVD presentation is one example), possibly to enhance psychological preparedness.

The presentation of information in this form is frequently seen as a necessary precursor for residents living in high-risk areas to find out more locally specific information and undertake preparedness activities, formulate plans and choose options (eg between 'stay and defend' or 'leave early' in the case of bushfire[1]) that are appropriate for their circumstances and locality. This might also include

---

[1] A unique aspect of the Australian approach to bushfire with wide-reaching implications for fire management and community safety was the formal recommendation by the Australasian Fire Authorities Council (Bushfire Cooperative Research Centre and Australasian Fire Authorities Council, 2006) that householders should 'stay and defend or leave early'. Although recently criticised in the interim report of the Victorian Bushfires Royal Commission, the recommendation has been 'widely endorsed, at least on paper, by most Australian fire authorities and other emergency services' (Handmer & Tibbits 2005, p 82). It is based on the view that in the event of fire, residents are less vulnerable if they stay with their prepared property and defend it, or leave well in advance of the fire front arriving. Australian research has shown that most fatalities in bushfires have been the result of people fleeing at the last moment, either in vehicles or on foot, and succumbing to the intense radiant heat (Krusel & Petris 1992). Research has also shown that a well-prepared home that is actively defended by able-bodied residents before, during and after a bushfire has a high probability of survival and provides a safe refuge while the main fire front passes (Wilson & Ferguson 1984). Given that not everyone is capable, either physically and/or mentally, of actively defending a property, leaving well in advance of a bushfire is a necessary alternative strategy and for many is a far safer option. The message is complex and success is likely to depend on a mix of factors including an understanding of what 'stay and defend or leave early' actually means, being able to plan and prepare accordingly, and the nature of the particular circumstances that are confronted before and during a fire.

motivating residents to attend a local meeting, request an information pack from their emergency services agency or explore an agency website. The ubiquitous nature of most forms of media results in the messages being disseminated to people outside high-risk areas. However, this has the potential benefit of exposing more people to the key messages and making them aware of the need to be mindful when visiting high-risk localities (eg high bushfire risk areas during the bushfire season, camping grounds and caravan parks that are vulnerable to flood or storm surge).

Localised information provision

These generic information provision strategies were also found to exist in a variety of locally developed and adapted forms. Providing localised information can potentially increase the relevance and meaningfulness of information and advice as messages can be adapted for specific circumstances and audiences.

Information that has been tailored for a specific locality and/or target group is often distributed through a range of activities and community networks to increase the likelihood that it will contact people who may not be reached by more mainstream information dissemination methods. Tailoring information for a specific locality or target group may therefore increase the likelihood that people will act to reduce their risks. Further, these linked activities by local agencies may activate different causal processes and short-term outcomes that include:

- one-on-one interactions that allow individuals to ask questions relevant to their circumstances and levels of knowledge
- people actively seeking out information rather than having it delivered to them; they may then be more motivated to act on the information provided, and
- enhancing the credibility of local agency members and subsequent trust in their willingness to support the community to the maximum extent possible during an event.

Localised information provided during an emergency via telephone services and websites can potentially enhance the value of Bureau of Meteorology warnings by providing more detailed, locally relevant information about both the event and the resources available to support residents. Once people have been alerted to a threat, it is possible that having the option of seeking further information via telephone or on a website gives some people a greater sense of control and thus may help to reduce panic responses. In the case of telephone services, operators may also be able to reassure callers who have high levels of uncertainty and anxiety.

Localised community engagement and education activities and programs

Local community engagement and education activities and programs represent diverse and flexible approaches to community EAE that may range from didactic, scripted presentations of information in group meetings to one-on-one engagement activities designed to respond to individual householder circumstances and needs. Face-to-face presentation and/or interaction was the common element in this group of activities, which could also be segmented into 'one-off' (street and community hall meetings and one-on-one consultations with households) and 'continuing' activities. Continuing activities included ongoing community safety groups and recently developed 'community briefings' that may be held regularly in the same locations for the duration of an event.

While the content of community hall and street meetings may be similar, community hall meetings are generally considered to be less effective at conveying locally specific information compared with street meetings and consequently less effective at encouraging households to undertake specific preparedness activities on their properties. The nature of the venue and the larger number of attendees may also result in a more didactic environment in hall meetings that is less conducive to learning. Street meetings provide similar information but in a locally specific environment, making it potentially easier for residents to envisage the dangers they might face and the benefits of preparedness activities such as vegetation management around their properties. The meeting size tends to be smaller; this may encourage more interaction between households and the presenter, as well as between neighbours. The influence and encouragement of neighbours is also seen as a possible causal process in people taking steps towards planning and preparedness.

Continuing community safety groups such as those developed for bushfire preparedness (eg Community Fireguard action groups, Chapter 6) contain a blend of 'top-down' information provision and 'bottom-up' community participation activities. After the groups are established, members are typically encouraged to investigate their own (and community) risks and to develop their own local mitigation, preparedness and response strategies.

Ongoing community groups are designed to address barriers to effective community engagement and response such as:

- residents not believing that they are *personally* at risk
- agency advice that conflicts with resident values (eg those with a strong conservation ethic)
- lack of understanding of hazard safety messages, and of the limitations that some households have in applying them.

Thus these groups have the potential to help residents and households:

- understand why individual households and properties are at risk
- understand the realities of hazard behaviour in a locality
- appreciate the limitations that emergency services have in protecting every home and/or assisting every household
- appreciate that there is much residents can do to reduce their vulnerability without destroying their lifestyles, and
- develop and implement survival plans that fit their values (Boura 1998b, p 60).

Community briefings immediately before and during a hazard event are designed to minimise the level of uncertainty among the general public about what they can realistically expect and need to be doing during an event. Briefings are also believed to help increase the level of transparency about what the emergency services are doing and to bridge the gap between information flow at the incident management level and information at the community and household level. The desire among threatened communities is for timely, reliable and realistic information. Hearing it from people working closely with a bushfire Incident Management Team, for example (see the discussion of the Moondarra Fire Information Unit, Chapter 5), adds to the credibility of the information. It is also anticipated that people may well be more receptive and likely to act on information related to hazard preparedness and response if the risk is real and imminent. Therefore, this approach may be particularly useful in motivating more passive householders to take action to mitigate their risk.

Community consultation, collaboration and development approaches

Along with the community briefings, programs and activities based around community consultation and development activities are among the more recent and emerging strategies. They include integrated planning systems that contain (sometimes mandate) community consultation as a critical element and much more localised community development activities, including those that seek to capitalise on existing community strengths and organisations.

Programs and activities that utilise community consultation, collaboration and/or community development approaches include:

- programs where emergency management agencies initiate local community consultation and/or development processes

- community development activities generated during recovery from a natural disaster
- processes and activities that are initiated by a community, and
- specific-issue partnerships that are formed to address a local issue.

Programs that seek to develop and implement integrated State-level risk management planning have also been classified under this general heading, as they increasingly emphasise community consultation or participation.

Community consultation, collaboration and development approaches set out to empower local communities to develop local solutions to local problems. A central characteristic is the attempt to generate active and equitable participation of local residents in the full spectrum of planning, mitigation, preparation, and response and recovery activities. These approaches seek to utilise local knowledge and expertise and, frequently, existing formal and informal community networks. Through these strategies programs and activities are anticipated to contribute to increased community resilience, community efficacy, local and cost-effective mitigation, and integrated, inclusive community preparation and response.

The COAG natural disasters report identified local communities as being best placed to identify risks and prioritise treatment options to increase community safety. The report also discussed the importance of community development processes during recovery from natural disasters:

> It is not easy to re-establish resilient, functioning communities after severe disasters. A community development focus, which builds community resilience, is important in supporting the disaster-affected community's involvement in its own recovery (Department of Transport and Regional Services 2004, p 37).

D Paton (2000) has also concluded that community participation in identifying shared problems and developing and selecting problem-solving strategies that are consistent with the community's needs, systems and values potentially supports the development of problem-focused coping and a sense of community and commitment to action and fosters a sense of collective and individual efficacy.

Understanding the potential outcomes of programs—a concept mapping study of community safety for bushfire

A concept mapping study, described in detail elsewhere (Elsworth, Anthony-Harvey-Beavis & Rhodes 2008), was designed to elicit ideas about the changes that engaged and knowledgeable

informants believed should occur to make households and communities safer from bushfires.[2] The rationale, method and results of the study are briefly described below.

One general way to surface and articulate (reconstruct) the implementation logic, causal theory and/or anticipated outcomes of a social program is to select from a variety of approaches to generating 'mental models' or 'cognitive maps' of the program by working with implementation staff and/or recipients (Leeuw 2003). The use of structured concept mapping (Trochim & Kane 2005; Trochim 1989a, 1989b; Trochim & Linton 1986) has been suggested as one possible source of these mental models. An evident strength of this approach to program theory development is that the activities and implicit theories of practitioners provide a potentially rich source of ideas and hypotheses about program processes and outcomes and the ways they might usefully be classified and linked.

Bushfire agency personnel with general responsibilities for community safety, and community members who were participants in local bushfire safety groups, took part in one of 11 concept-mapping workshops, six of which were held with fire agency personnel and five with members of community groups. Workshops were held in each of the five more southerly States in Australia (those where bushfire is most likely to result in loss of life and/or significant property damage). Statistical analysis of the data generated in each workshop yielded 11 separate concept maps that were subsequently consolidated into a single list of constructs by the project team in a process that involved both individual classification and a consensus-seeking workshop. This synthesis of the workshop maps yielded 14 general desired outcomes of the community safety approach; 12 from the results of both community and agency workshops, and one from each of the community and agency workshops only. Thirteen of the 14 general concepts were derived from the results of more than one workshop (Figure 2:2).

An important feature of these 14 generic community safety concepts is that they extend across at least three 'levels' of desired change: (a) individual, household and immediate locality; (b) community and local bushfire and other agencies; and (c) central agency and policy institution. Workshop participants also appeared to take a very comprehensive view of the desired changes in community safety practice; concepts were identified at clearly different points along a continuum from policy and program development to implementation and then outcomes. A small number described aspects of the policy or program implementation context ('policy framework for agency and organisational roles', 'principles underpinning program development and adult learning', and (existing) 'neighbourhood and community networks and partnerships'). Other concepts identified specific program strategies (eg

---

[2] The study was carried out as part of the work of Program C7 ('Evaluating bushfire community safety programs') of the Bushfire Cooperative Research Centre; see <http://www.bushfirecrc.com/research/program/programc.html>.

use of incentives to increase preparedness, appropriate information/education activities), while relatively short-term and longer-term outcomes were also highlighted (eg individuals/communities have a realistic understanding of risk, deciding and planning for 'stay–go', householder/neighbourhood planning and preparation).

Central organisation and policy-level concepts
Principles underpinning program development and adult learning
Policy framework for agency and organisational roles
Use of incentives to achieve preparedness
Understanding/application of regulations for bushfire safety
Community and local agency-level concepts
Neighbourhood and community networks and partnerships
Agency/inter-agency responsibilities and coordination
Appropriate information/education activities
Community and agency responsibilities to address specific needs
Agency/community interaction
Effective communication of information during bushfire
Greater community ownership and responsibility for bushfire safety
Individual household and neighbourhood concepts
Individuals/communities have a realistic understanding of risk
Deciding and planning for 'stay or go'
Household/neighbourhood planning and preparation

Figure 2:2 **Community and agency conceptions of the desired community safety outcomes for bushfire**

As part of the concept-mapping process, participants were asked to rate each concept generated in their workshops according to the 'importance of the issue in making households and neighbourhoods safer from bushfires' and according to how easy or difficult it would be to achieve the change 'among a group of people or in a particular neighbourhood'. Focusing specifically on the 'importance' ratings, both agency and community participants, on average, viewed the concept 'greater community ownership and responsibility for bushfire safety' as the most important change they believed should occur. The workshops with agency personnel also viewed the concepts 'individuals/communities have a realistic understanding of risk', 'neighbourhood and community networks and partnerships', and 'household/neighbourhood planning and preparation' as being of considerable importance. Interestingly, there were two other concepts that were accorded moderately high importance by agency personnel: 'appropriate information/education activities' and 'principles underlying program development and adult learning'. Their view of important community safety outcomes thus appeared to be sharply focused on the potential direct household and neighbourhood outcomes of the programs with which they were associated, together with the means for achieving these outcomes.

Turning to the 'difficulty' ratings, the concepts 'individuals/communities have a realistic understanding of risk' and 'household/neighbourhood planning and preparation' were perceived to be the most difficult to achieve by the workshop groups involving fire agency personnel, while the concept 'policy framework for agency and organisational roles' was seen as the most difficult to achieve by the community-based workshop groups. Achieving 'greater community ownership and responsibility for bushfire safety', the concept regarded as the most important, appeared to be seen as moderately difficult by both groups.

Policy and program theory models for the community safety approach

In an original and challenging paper, McClintock (1990, p 1) urged program evaluators to become 'applied theorists', as well as applied methodologists, by 'advancing understanding of how programs function in a specific context, and how generalizations of program effects are contingent upon organizational, community, and cultural settings'.

As well as emphasising the importance of context and causal processes—the cornerstones of the 'what works, for who, in what settings, and how' approach to program planning and evaluation (Pawson & Tilley 1997)—the 'evaluators as applied theorists' approach also made the values that informed program practices explicit and prominent, and program practices and outcomes conditional on these values. McClintock presented a 'concept map' for a multi-site hospice program that

recognised the distinctive 'guiding philosophy' of hospice programs generally, as well as detailing the service providers, program components and causal processes that were believed to result in positive benefits for clients and to realise the final goal of 'improved quality of life' for clients and their families. McClintock's concept map provided a template for integrating the results of the policy analysis, program classification and analysis of desired/intended outcomes described above into a comprehensive model of the implicit *policy theory* of the community safety approach to natural hazards in Australia (Figure 2:3).

In building the model, the review team found a high level of coherence between the values and principles derived from the analysis of government reports, the descriptions of programs and activities in agency materials, and the desired outcomes drawn from these descriptions and the Bushfire Cooperative Research Centre concept-mapping project. Perhaps this is not surprising, as submissions and evidence from community members and agency personnel informed most of the government inquiries, and active community members and agency community education personnel were the participants in the concept-mapping project. It does suggest, however, that there is a clear understanding and acceptance among agency personnel and engaged community members of the values, principles and implications for practice of the community safety approach, even if specific values and activities are accorded different levels of importance.

The values and principles are arranged in the first two rows of Figure 2:3. They are seen to inform the development of activities and programs that utilise a small number of general practices (third row). As discussed above, analysis of the inventory of specific EAE programs provided the classification scheme for the wide range of activities developed across Australia that forms the fourth row of Figure 2:3. A condensed selection of the more important desired processes and short- to medium-term outcomes of these programs and activities, as revealed in the policy analysis, program documentation and concept-mapping studies, is included in the next two rows of the model. Those relating to policy, agencies and communities are listed first, followed by those relating to individuals and households. The desired long-term impacts of increased community resilience leading to a reduction in the loss of life and property, general themes that underpin the discourse in all the government reports and many agency statements of program intent analysed, form the final two steps in the policy theory model.

The *policy theory model* represented in Figure 2:3 provides a detailed representation of the coherence of the Australian community safety approach to natural hazards and provides an overview of the possible contingent relationships between community safety policy, the activities and programs designed to implement or support the policy, and the potential short-term and longer-duration outcomes and impacts that lead to a decrease in the loss of lives and property. Yet the theory model does not provide a sufficiently explicit view of the way the values informed programs and activities might generate the

anticipated processes and outcomes portrayed in the model (that is, *how* the programs are meant to work).

Drawing on a wide variety of sources, including, particularly, an initial reading of program descriptions and evaluation reports analysed in Chapters 4–8, a preliminary *program theory model* was also developed (Figure 2:4). The model follows 'what works and how' program theory principles (Pawson & Tilley 1997; Tilley 2004) in distinguishing between:

- the 'macro-mechanisms' potentially operating at the policy institution and community/organisational levels that might be provided by (or drawn on to support) the program or activity, and
- the 'micro-mechanisms' potentially operating at the individual and household level.

Also portrayed are a 'primary' causal pathway (from, as we understand it, the perspective of many agency community education personnel), represented by the beige-coloured boxes and arrows, and alternative 'secondary' causal pathways, represented by those coloured green.

The primary causal pathway portrays what Tilley (2004) has designated 'supposed to do' theory. The programs and activities are hypothesised to provide the 'opportunities', 'resources' and (possibly ongoing) 'support' to individuals and families that activate changes in their thinking and the choices they make and initiate specific actions (eg discussions with family and neighbours, drawing up a 'things-to-do' check list etc). These changes, in turn, result in effective planning, property preparation, safe response during a hazard emergency and resilient recovery, finally resulting in increased overall resilience to the threat and actuality of a natural hazard, a reduction of lives and property lost, and improved community safety.

Alternatively, the opportunities, resources and support may initiate (or utilise and/or further encourage existing) community processes such as self-organisation, sharing and/or further development of local knowledge, and neighbourhood support that may, in turn, also lead to improved householder planning and preparation and thus to the longer-term desired impacts of the community safety approach. There may also be feedback to government and agency policies from successful programs and activities, which, in turn, can be expected to influence further program development. These 'secondary' causal pathways represent aspects of Tilley's (2004) 'Otherwise/also does' theory. Additionally, the model recognises the critical influence of context (persons, households, communities and neighbourhood settings) on program implementation, and the strong possibility that programs and activities will be adapted as they are implemented within these local settings.

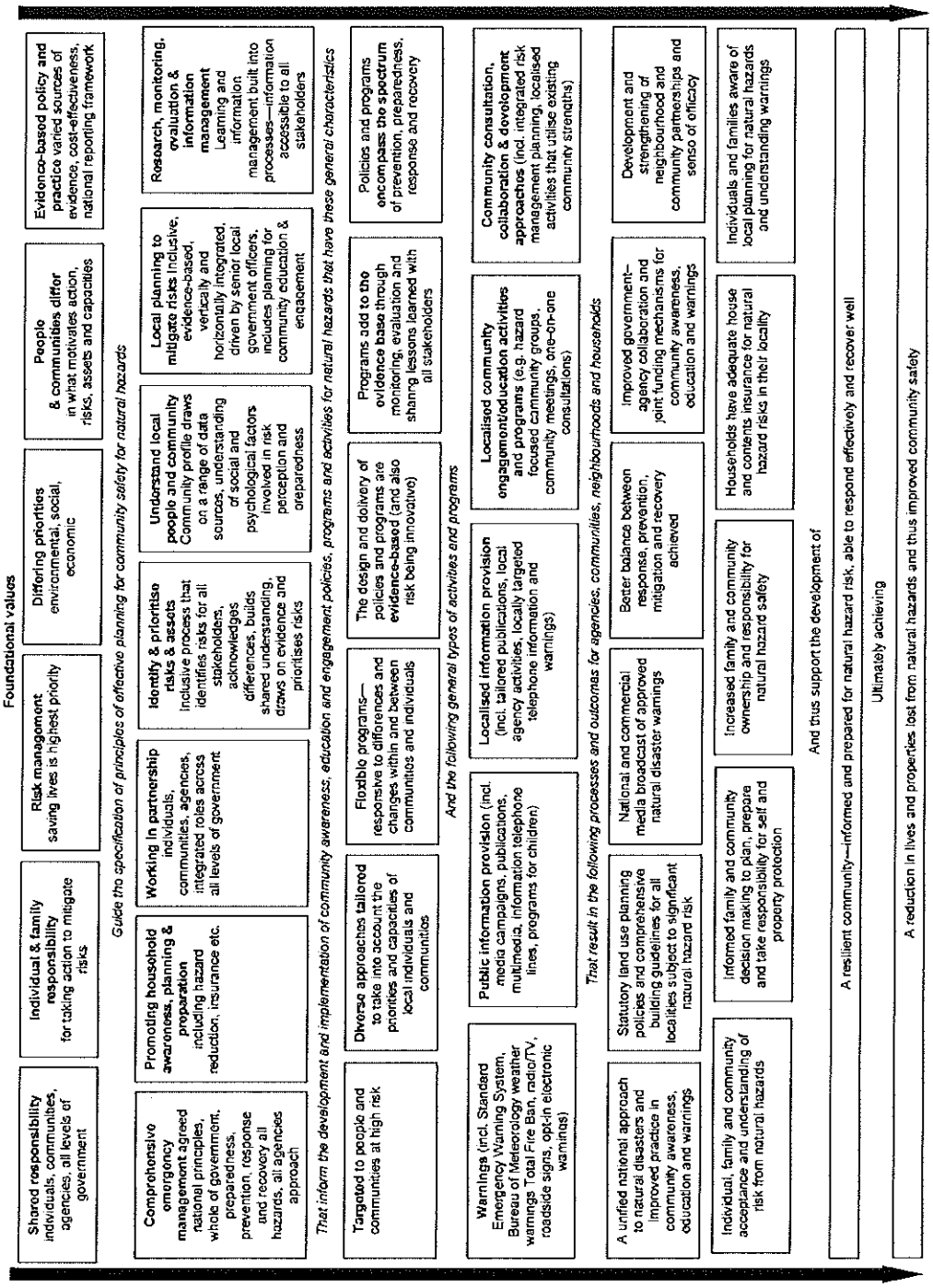


Figure 2:3 **A policy theory model of the community safety approach to natural hazards in Australia**

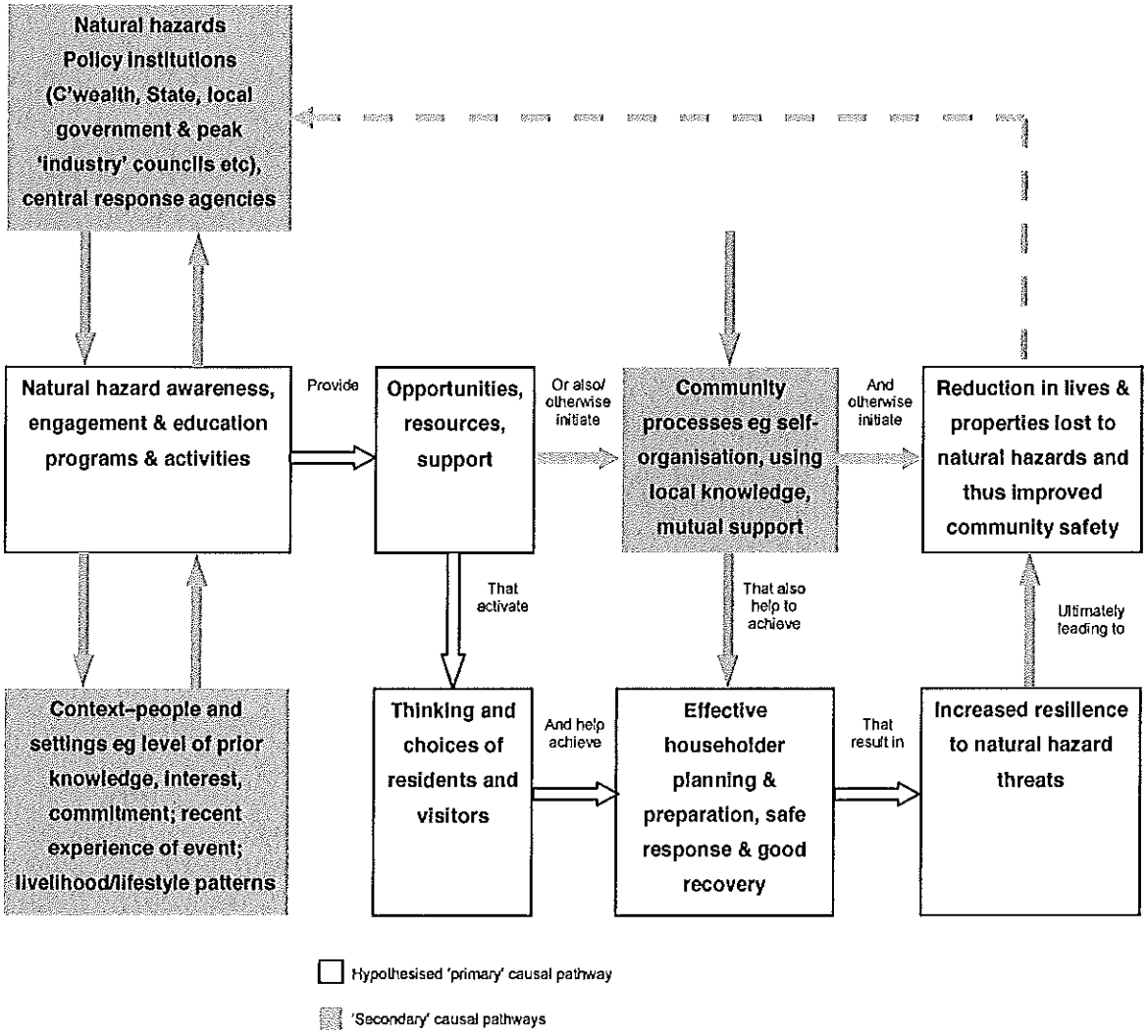


Figure 2:4 **A program theory model of the community safety approach to natural hazards**

Section B Review of evaluation studies

CHAPTER 3

Evaluating community safety programs and activities—review and synthesis

'Theory-based' research synthesis

'Realist synthesis', developed in recent years by Pawson and colleagues (Pawson 2002, 2004, 2006; Pawson et al 2004), is a new approach to the review of research and evaluation studies that is based on the philosophy of 'scientific realist' inquiry as applied to the social sciences. The procedure focuses on the 'small' theories (frequently provisional or unstated) that underpin social programs and other change activities. This approach, with some modifications, was used to develop a review and synthesis of the findings of publicly available evaluation studies of Australian programs for natural hazard safety and to integrate the findings with those of the case studies especially conducted for the review.

An explicit aim of realist (or theory-based)[3] research synthesis and review is the generation of preliminary patterns ('configurations') of contexts, mechanisms and outcomes for the general kind of initiative being studied.

> So, for example, in order to evaluate whether a training program reduces unemployment (O), a realist would examine its underlying mechanisms (M) (eg have the skills and motivation changed?) and its contiguous contexts C (eg are there local skill shortages and employment opportunities?). Realist evaluation is thus all about hypothesising and testing such CMO configurations (Pawson et al 2004, p 2).

And further:

---

[3] As specific aspects of realist synthesis were modified somewhat to suit the purposes and context of the review, we use the more general idea of 'theory-based synthesis' to characterise the work reported here. In particular, in contrast to Pawson et al (2004, p 3), while the goal of our research was indeed explanatory and directed towards understanding the process chains that lead to desired outcomes and impacts of community safety programs and activities within particular contexts, it has also been designed to yield principles and guidelines for effective practice that natural hazard agencies might adopt, a goal avoided by realist synthesis. Additionally, the search for relevant literature was, as far as could be achieved, exhaustive and 'systematic' in that, as a starting point, a common set of terms was used to search a wide range of appropriate online bibliographic data bases. The results were then augmented from search-engine searches for 'grey' literature and by scanning the reference lists of retrieved studies. Thus the recommended iterative process occurred within the group of studies that was finally assembled rather than extending outside it to locate new studies.

> Realist evaluation asks of a programme, 'What works for whom in what circumstances, in what respects and how'? Realist review carries exactly the same objective, namely *program theory refinement*. What the policy maker should expect is knowledge of some of the many choices to be made in delivering a particular service and some insights into why they have succeeded and/or failed in previous incarnations (Pawson et al 2004, p 3, emphasis in original).

As outlined by Pawson et al (2004, p v), realist synthesis comprises a number of critical steps that differentiate the process quite sharply from either the statistical approach of meta-analysis and the (perhaps more closely related) procedures of narrative literature review. The steps are, in summary:

- define the scope of the review, typically with the commissioners of the study or the decision makers who are its intended audience; this step also involves 'a careful dissection of the theoretical underpinnings of the intervention, using the literature in the first instance ... to map out in broad terms the conceptual and theoretical territory' (Pawson et al 2004, p v)

- search the literature for 'evidence to "populate" this theoretical framework with empirical findings, using the theoretical framework as the construct for locating, integrating, comparing and contrasting' the evidence (Pawson et al 2004, p v)

- use an iterative process such that new evidence is allowed to change the 'direction and focus' of the review and open up new areas of theory

- combine both theoretical thinking and empirical evidence in the final review, and closely involve decision makers in shaping the conclusions and recommendations to be drawn.

Further, realist synthesis follows a number of principles derived from the viewpoint that programs and other initiatives designed to bring about social change are, themselves, theories that actively engage with individuals (and families, households etc) and involve long and complex causal chains. The principles are that:

- realist reviews should be expected to pick up, track and evaluate the program theories that implicitly or explicitly underlie families of interventions

- in tracking the successes and failures of interventions, the review will find at least part of the explanation in the reasoning and personal choices of different participants, and

- realist reviews should inspect the integrity of the implementation chain, examining which

intermediate outputs need to be in place for successful outcomes to occur, and noting and examining the flows and blockages and points of contention (Pawson et al 2004, pp 4–6, paraphrased a little from original).

The review process

Approximately 30 separate documents that described evaluation studies of 14 distinct Australian community EAE programs for natural hazards were intensively reviewed. Following the above general outline and principles of theory-based review, the policy and program theories for the community safety approach were used to provide the conceptual starting point of the synthesis. Evaluation reports were searched for information on:

- the context of the intervention
- outcomes at the level of the individual and household
- outcomes at the level of the community, local (implementing) organisation and policy institution
- causal processes at the individual/household level—both enabling and constraining
- causal processes at the community and/or agency levels—enabling and constraining, and
- evidence that these causal processes may have operated successfully in some contexts rather than others, or constrained successful implementation in some contexts rather than others.

Summaries of this assembled information on each intervention were then written up in the form of a brief case study. A visual representation (model) of the important context – causal process – outcome relationships discovered was developed for the majority of the interventions.

The activities and programs included in the review are sorted into the five broad categories of program outlined in Figure 3:1. Subsequent chapters in this section provide a summary account and discussion of the theoretical underpinnings of each initiative (including, for most, an individual theory model). For convenience in structuring the chapters, programs in the categories of 'warnings' ('Warning systems and associated community EAE activities') and 'public information provision' are considered together in Chapter 4, while those classified as 'localised information provision' are dealt with in Chapter 5. 'Localised community engagement and education activities and programs' are considered in Chapter 6, and 'community consultation, collaboration and development approaches' are discussed in Chapter 7.

As a final step in the analysis, information from the six case studies especially conducted for the

review was abstracted in a similar form to that used to analyse the available evaluation studies. The brief accounts and program theory models from the 14 program reviews and the six case studies were then synthesised to develop an overarching theory model for community EAE programs for natural hazards that provides a summary of the salient contexts, causal processes and outcomes. Full accounts of the case studies are presented in Chapters 9–14 (Section C) and the model is presented in Chapter 15 (Section D).

Warnings (involving community consultation, education or information provision)	**Public information provision**	**Localised information provision**	**Localised community engagement and education activities and programs**	**Community consultation, collaboration and development approaches**
Bushfire programs and activities—publicly available studies				
	Bushfire safety media materials, including the Internet	Moondarra Fire Information Unit	Operation Bushfire Blitz (Fire Ready Victoria street meetings) Street FireWise Community Fireguard Community Fire Units	Ferny Creek Fire Alert Siren
Programs and activities for other natural hazards—publicly available studies				

Telstra multi-hazard Community Information and Warning System trial	Cairns psychological preparedness trial	Woronora flood preparedness strategy FloodSmart (Benalla) and StormSmart (Wodonga) pilot studies FloodSmart (East Gippsland) 2007		East Gippsland floodplain management strategy Coffs Harbour floodplain management community consultation
Case studies conducted for the present project				
Australian Bureau of Meteorology programs for community education about warnings	Cyclone awareness programs for independent travellers and mine workers	Programs and activities for culturally and linguistically diverse (CALD) communities	Pilot community flood awareness and preparedness program in Adelaide municipalities	Western Australian AWARE program (All West Australians Reducing Emergencies) Community education and engagement in recovery programs and activities

Figure 3:1 Programs included in the review and synthesis

CHAPTER 4

Programs for education about warnings and public information provision

Telstra multi-hazard Community Information and Warning System trial

A trial of a public hazard warning system based on 'innovative spatial and telecommunications technology' was conducted by the Victorian Office of the Emergency Services Commissioner (OESC) in May through September 2005 (OESC 2006) in three localities in urban-fringe and rural Victoria (Mt Evelyn, Stawell and Halls Gap). The trial combined a technical assessment of the data transfer and telecommunications technology (collectively, the Community Information and Warning

System—CIWS) with a community awareness, engagement and consultation process and a comprehensive process and outcomes evaluation. Uniquely, a central purpose of the evaluation study was the design of a program logic model that was intended to 'map the application of the CIWS technology and to integrate this map with operational response decisions about risk communication and community behaviour' (OESC 2006, p 8). This synopsis of the evaluation is largely focused on the household, community and organisational-level outcomes of the trial (and not the more technological aspects) and their broader implications for telephone warning systems.

Program background and rationale

Based on the premise that 'effective public warning dissemination enables residents and business owners to make informed decisions about their safety and preparedness', the trial and evaluation of CIWS was designed to test the proposition that:

> The ability to simultaneously telephone all properties within a defined geographical area could ease the logistical problems for police and emergency services needing to provide timely information to a targeted cluster of people in an emergency incident (OESC 2006, p 10).

Additionally, the trial and evaluation recognised the critical importance of 'robust partnerships' between emergency services organisations, State and local governments, the telecommunications provider, community businesses and local residents to 'harness local knowledge and ensure that safety and mitigation strategies are relevant'.

The community involvement strategies used in the trial drew on the experience of the OESC in earlier community engagement work related to warnings systems, including the evaluation of the Ferny Creek Fire Alert Siren (reviewed later in this section) and the Coode Island Telephone Message System Trial (OESC 2004). This previous work 'highlighted the importance of integrating technology with stakeholder engagement, awareness and consultation' (OESC 2006, pp 16). More specifically, these previous research studies supported the value of considering the following activities, issues and concerns:

- the use of both formal and informal sources of information from the community
- the provision of relevant information to the community through extensive consultation and education activities
- the development of shared meaning and trust among community members, and

- the importance of collaboration between multiple stakeholders including industry, emergency services, local governments and community resident groups.

Evaluation methods

Based on principles of 'triangulation', various social science research approaches were used to evaluate the trial, including:

- a pre-trial questionnaire to all participants in the three selected localities who opted-in to participate in the trial
- a log-book in postcard format to be returned after each telephone message was sent out during the trial
- a telephone survey of a sample of participants after each message send-out
- a post-trial survey of all participants after completion of the trial
- semi-structured interviews with stakeholders from the key emergency services agencies involved in the trial
- observer feedback from a questionnaire distributed with information packs to trial observers from Victoria and interstate
- observations of the work of the simulated 'Incident Control Centre' during trial sessions (OESC 2006, p 31).

Strategies and activities

In outline, the trial involved the following processes:

- following a presentation by Telstra, establishment of an initial stakeholder partnership group including Telstra (the telecommunications provider), a small number of government departments and agencies, and ABC Radio
- establishment of a trial steering group and initial development of the parameters and 'proof of concept' aspects of the trial
- augmentation of the stakeholder group to include additional government departments and agencies, together with the two shire councils that covered the three trial localities

- formation of a 'data transfer sub-group' to oversee the simulated transfer of data between the Telstra operations centre, a simulated Incident Control Centre and additional community information sources (a CIWS 'hotline', shire websites and ABC Radio)
- community profiling, followed by development and implementation of a detailed community consultation process in the three selected localities (see more detail below)
- residents 'opting-in' to participate in the trial
- the delivery of six simulated telephone warning messages over a period of three months
- various data gathering activities associated with evaluation of the trial.

The community consultation and engagement process included the following activities:

- community profiling based on data gathered from community meetings and the pre-trial survey, together with Australian Bureau of Statistics and local government data
- community meetings to present the plan of the trial (central concerns that emerged from these meetings involved trust that organisations would treat names, addresses and telephone numbers confidentially, and that communities would be kept informed during the duration of the trial)
- the opportunity to 'opt-in' to participate in the trial, a process that was required to follow the provisions of Victorian privacy legislation (7.6%, 2.5% and 15% of residents in Mt Evelyn, Stawell and Halls Gap respectively opted in)
- a CALD forum based on a workshop to explain the technology to a group of adult students (not necessarily residents of the selected localities) from varying cultural and linguistic backgrounds
- similarly, a 'hearing impaired workshop' with senior adult members of a Melbourne-based hearing impaired social group (OESC 2006, pp 29–30).

Context

The CIWS trial was held in three localities: Mt Evelyn, an urban-fringe township in the Dandenong Ranges east of Melbourne, and Stawell and Halls Gap, a regional town and township in the tourism region of the Grampians Ranges in western Victoria. While the report of the trial does not specify the hazard focus of the warning messages, the three localities are in high bushfire risk regions of the State and there are some indications in the report that a specific focus of the trial may have been a bushfire

emergency.

Individual/householder-level causal processes and outcomes

The social, technological and organisational issues resulting from the CIWS trial are discussed in the last section of the OESC evaluation report. Some salient aspects of the discussion are summarised below.

Public safety decisions and behaviour

The pre-trial questionnaire indicated that people who had made a decision to live in a high hazard risk locality (specifically bushfire) had a realistic awareness of risk situations. Respondents also indicated that they would undertake some planning, including accessing a variety of information sources to assist decision making. It was reported that the residents of one locality (Halls Gap) would be quite likely to 'stay and defend' their properties in the case of bushfire.

The samples in two localities (Mt Evelyn and Stawell) were described as having a 'very strong connection and communication with family, friends and neighbours' (OESC 2006, p 35). While it is apparent that there would be a strong reliance on family, friends and neighbours as sources of information during a hazard event, there was some apparent ambiguity in the extent to which residents would rely on local newspapers, ABC Radio and local television. This appeared to be quite strong in the Grampians Ranges localities, but was not so clearly evident in Mt Evelyn (the urban-fringe location).

It was concluded on the basis of this analysis of householder perceptions and intentions that:

> The success of a community information and warning system underpinned by the CIWS technology will depend on the public having the resources and knowledge to make appropriate decisions about their safety (OESC 2006, p 71).

Public risk communication

The evaluation study identified that householder:

> decisions to prepare and plan a response to an emergency event were more likely to be influenced by both collective community activity and the emergency service agency's education campaigns on safety and preparedness (OESC 2006, p 72).

Further, a level of disagreement between emergency service and community expectations about the content of a warning message was identified. This was interpreted from the perspective of achieving a 'shared understanding' of warning message intent and content and thus as a challenge to the emergency management sector to find an appropriate balance between agency and community perceptions. For example, the residents of the more rural localities of Stawell and Halls Gap expressed a need for warnings to contain detailed 'date and time' and weather information, together with advice on actions to take.

Information from two post community meetings

Following the CIWS trial, 50 people from Halls Gap and Stawell and 70 people in Mt Evelyn attended a community meeting in the area to express their views of the trial. It was reported that, 'Overall the participating residents from both meetings generally supported the operation of the CIWS and believed a system would be beneficial to their communities during an emergency incident' (OESC 2006, p 39).

Additionally, the trial prompted people to ensure they had the proper preparedness items, raised awareness of the type of events that could be experienced and also brought attention to the needs of those who are vulnerable in the community. Finally, it was reported that a warning system such as that trialled could be particularly helpful but that, if it was to be introduced, the warning system should 'be supported by an effective media and awareness campaign, to ensure that the system could become part of general household emergency safety plans' (OESC 2006, p 40).

Conclusions relating to householder response to the trial

The following conclusions were drawn about individual and household response to a telephone warning system.

- When people have a level of planning and preparedness knowledge about emergency events, combined with a realistic perception of their risk and a multi-faceted communication network (multiple access to information sources), then a telephone emergency warning message is more likely to trigger appropriate decisions and behaviours, thereby increasing their safety and confirming their self-reliance to be prepared.

- Even if the telephone message is only partially heard, the evaluation results found that its value for an informed and prepared community would be high because it still represented one source of trusted information and planning within the total approach to community safety preparedness.

- People with limited understanding and awareness of their emergency risk and community safety

who had not considered preparation and planning for emergency events were consequently more likely to be wholly dependent on a telephone emergency warning message, which they believed would provide them with specific instructions about required actions. In these situations, rather than triggering increased self-reliance and informed decision making, the telephone message is more likely to become a source of information, which could increase their dependence on emergency services and contribute to an uncertainty about decisions and behaviours (OESC 2006, p 73).

It is apparent from this discussion that a telephone warning system cannot operate effectively *in vacuo*, particularly for residents of high-risk localities who have a limited understanding of the risks and appropriate safety responses. Rather, a fair conclusion seems to be that a telephone warning system will work well only if it is carefully integrated within a wider system of community engagement and education about local risks, including a clear understanding of the role and resource limitations of emergency services during an event.

Community-level/organisational causal processes and outcomes

Supporting the above observation, it was reported that emergency services personnel voiced concern about community expectation of the services as a result of the trial. It was believed that the telephone warning system may increase community dependency on being told what to do by emergency services, when the agencies may not have the resources to deliver the level of information that is expected. On the other hand, it was recognised that the warning system may promote community members to feel they are getting "'good value" from emergency services, and many in fact might become more aware of the role of emergency services and how to source reliable information' (OESC 2006, p 42).

Further, communication implications for CALD and hearing-impaired communities that would present a challenge were identified, especially as the warning system lacked interactive qualities.

Theoretical and policy considerations

Three related logic models were presented in the evaluation report focused on the decisions and procedures of the operational components of the trial, the technological and community components, and the evaluation process. The logic models are organised as flow charts of events classified by organisational and individual participants. Unfortunately, from the perspective of reconstructing an underlying theory of the community engagement and communication processes activated during the trial, the models tend to emphasise specific activities and their operational linkages rather than causal

Print materials examined in Rohrmann's 2000 study included two leaflets and three brochures. Some difficulty was experienced in retrieving the documents that were examined in Rohrmann's study. Only one—'Living in the bush—Bushfire survival plan workbook'—could be unequivocally identified, while another—'Will you survive? A guide to lowering you risks before and during bushfires'—was probably correctly determined. These two documents both address bushfire risk and preparedness issues in general. Both have comprehensive text and graphics (photographs and diagrams/ illustrations) that portray in some detail the nature of a bushfire event and appropriate responses to it. In addition, the 'Living in the bush' workbook has a three-page self-completion planning worksheet that takes the householder through a planning sequence, including hazard identification and associated maintenance and/or modification activities, and action plans for staying and defending or leaving early if threatened by an event.

Along with the printed material, two video presentations were investigated. These videos were titled *Bushfire hazard* (Emergency Management Australia (EMA/DNDR) and *Living with bushfire* (Country Fire Authority (CFA)). Their features are described (Rohrmann 2000, p 16) respectively, as follows: 'Residents and a fire officer present information; strong footage of fires; text listing key points' (15 minutes); and 'Several residents report their personal experiences; strong footage of fires; some use of computer simulation graphics' (20 minutes).

The six websites examined in the first Internet study were reported to 'differ considerably in their style and purpose' (Rohrmann 2003, p 23). None 'solely or explicitly' focused on the general public but all included information relevant to residents and employees. Four websites were based in Australia, and one each in Canada and the United States. Of the Australian websites, two were the official sites of rural fire services, one was operated by an association of volunteer rural fire brigades in the Australian Capital Territory and one was the website of a metropolitan fire brigade. The Canadian site investigated was the 'forest fire' section of the Canadian Forest Services website, while the United States site comprised the fire pages of the American Red Cross. The three websites investigated in the second study (Rohrmann 2007) were all Australian State rural fire services sites. While not solely focused on fire information for residents and communities, these sites all feature explicit links on their home pages to relevant information.

Evaluation methods

Rohrmann's studies (including his evaluation of Community Fireguard (Rohrmann 1999), described later in this section) are noteworthy in that they are explicitly based on a coherent and detailed evaluation framework derived from risk communication theory (Rohrmann 1992, 1998). The framework includes:

- an analysis of the risk communication process (including a program theory model)
- an examination of criteria for content, process and outcome evaluation, and
- a discussion of methodological considerations (measurement, study design) while advocating a multi-method approach.

Rohrmann's (2000) studies of printed media materials and videos used data derived from:

- a longitudinal survey study of residents of a fire-prone area (a pre-test followed by two post-test waves with intervening exposures to selected bushfire information materials; N = 120, 113 and 57 respectively)
- a focus group discussion with residents and fire experts, and
- expert appraisal of the materials.

His first study of the utility of the Internet was based on systematic assessment of the six fire agency websites by a group of 16 fire experts, disaster researchers, psychologists, website experts and residents (Rohrmann 2003, p 23). Rohrmann's (2007) second study of the Internet also involved systematic assessment by a panel knowledgeable about bushfires. This panel comprised six students from diverse cultural backgrounds (Australia, Hong Kong, China, Germany and the Netherlands). The panel assessed the information available in three Australian rural fire agency websites over a one-month period during summer and compared the available information with that in two newspapers published during the same period.

Program context

Media materials (including Internet sites) from the main high fire-risk States in eastern and southern Australia were studied.

Individual/householder-level outcomes and causal processes

Rohrmann (2000, p 17) provides a consolidated list of 15 'viewpoints' raised by respondents who were exposed to the bushfire materials in the longitudinal survey study and focus group. The points covered issues associated with the content and length of the communication material, the presentation layout and style of brochures, the usefulness of videos when viewed at home, attitudes to the use of the public media (television, radio, newspapers) and information derived from the Internet. Broadly, the respondents preferred:

- factual, concise, ordered lists of information that was relevant to the specific audience
- information relating to personal safety, evacuation, animals and emergency telephone numbers and to the particular community, and
- compact leaflets/brochures; there was also a suggestion for booklets with detachable brochures on specific topics (so that material of particular relevance could be retained while the rest was discarded).

In printed material, coloured illustrations, diagrams and drawings were seen as very important. Pictures and photographs (to attract attention and add 'emotional tone') were seen as 'essential' but diagrams and drawings were often regarded as more instructive than photographs. There appeared to be a mixed response to videos. On the positive side, videos were seen to be more instructive and easier to understand than brochures (concepts presented both orally and visually), it was possible to include a range of information (general to in-depth and technical) and 'real-life' footage achieved a greater impact than photographs. On the negative side, videos were seen to be potentially time-consuming and had the disadvantage that information could not be referred to instantly in an emergency.

Residents reported a positive attitude to television advertisements relating to bushfire safety and expected to see a range of media used. Short information presentations on radio to remind residents to prepare for the fire season were appreciated. Finally, responses to the use of the Internet appeared to be generally negative; residents who were not connected could not imagine how the Internet could be used and those who were connected appeared to be sceptical about its possibilities.

When asked to rate the printed materials, residents regarded all the materials presented positively, but the longer workbook-style brochure was clearly the most strongly preferred. It was seen as the most interesting and reliable of those appraised and also stood out, particularly, on the criteria of 'answered questions of concern', and 'enjoyable to look at'. This brochure was also the most strongly preferred by the expert panel.

In his first reported study of the Internet, Rohrmann (2003, p 25) concluded that 'the appraisal substantiates the potential of WWW-based fire preparedness programs'. There was reported to be a considerable range in the average ratings given to the six websites that were appraised, however, and the experts were quite critical of the suitability of the sites for the relevant target groups. Reasons given for preferring the most favoured website included comprehensive; good visual appeal; clear, concise, understandable; addresses necessary actions for fire preparedness; easy to navigate; links well organised; and up to date. Reasons given for disliking the least favoured included information

not relevant to target groups; information on important issues lacking; too much, too technical information; language difficult to understand; not visually appealing; difficult to navigate; outdated sections (Rohrmann 2003, p 25).

The following broad conclusions were drawn from the second reported Internet study (Rohrmann 2007, p 11–12):

- all three sites were generally rated positively, including navigation features; however, some basic information such as the agency name and contact provisions were not always transparent
- all sites were generally found to be helpful and informative—particularly positive evaluations were reported for 'understandability', 'comprehensiveness', 'good examples given' and 'clarity of fire safety actions'
- all sites were also seen as a 'reliable source of information', as meeting 'own information need' and could be 'recommended to lay people'.

Notwithstanding the positive appraisals listed above, all participants identified shortcomings in the websites and suggested improvements (Rohrmann 2007, p 13). Shortcomings included (paraphrased from the report):

- some information too 'texty'
- information about present fires not as current as newspapers
- some sections difficult to understand for CALD recipients
- technical terms sometimes hard to understand
- '.pdf' attached information inconvenient if printer needed.

Suggested improvements included:

- materials should reflect the (restricted) awareness and knowledge of residents
- more maps, pictures, charts, diagrams etc should be used to convey information
- downloadable videos highlighting risk and preparedness information could be incorporated into website
- facilities for those with poor vision should be provided

- material for children should be included
- up-to-date information on current fires should be prominent
- core information should be made accessible by those with limited Internet facilities (restricted download, no printer, no Flash Player)
- access for wider potential audience should be enhanced by providing information in translation.

Rohrmann (2007, p 13) concluded (perhaps arguably for some points) that:

> WWW-based risk communication has considerable advantages: The information to be provided can be updated regularly and quickly; users can bookmark and store relevant hazard info.; access is fast; and blockage is unlikely (unlike telephone contacts).

The potential value of hazard websites for CALD residents and those living in remote regions was highlighted.

Community-level/organisational outcomes and causal processes

Rohrmann's studies of media-based bushfire preparedness information sources focus on the individual and household. There is little mention of the possible use of these information sources in group settings or their potential impact on community-level processes. While Rohrmann (2000, p 15) recognised in one research question the potential use of materials of this kind in fire-safe group activities, this issue does not appear to have been systematically followed up in his work.

Theoretical models of risk communication

Rohrmann's studies of the effectiveness of media materials are based on complex causal models of the risk communication process, including a detailed model of the proposed link between information and behaviour (Rohrmann 2000, p 15). Steps in this linking process include exposure ('actually getting it'); attention ('attending and reading it'); comprehension ('understanding the message'); confirmation (possibly, 'searching for complementary information'); acceptance ('adopting message as personally relevant'); retention ('memorising content, eliciting information/material when needed'); and realisation ('implementing advised action or behaviour change'). In summary, the following desirable characteristics of media materials were identified in his surveys and consultations: concisely presented factual information, relevant to a local community; containing meaningful information on personal safety, evacuation, animal issues; attractively presented with engaging 'real-

life' video footage or photographs and instructive graphics; and a 'workbook-style' format with the opportunity to 'fill-it-in-yourself' (although it is noted that this option may not be frequently utilised). The necessity for material to be accessible to a CALD audience and others from specific groups (older residents, children) was also highlighted.

This list of desirable characteristics suggests attributes of materials that operate at different points in the 'process-chain' between initial exposure to the communication and subsequent action. These links are summarised in Figure 4:1.

Cairns psychological preparedness trial

The study of psychological preparation in relation to natural hazards is a very under-researched field. Rather, research on natural hazards from a psychological perspective has focused on post-traumatic stress following disaster events and related organisation preparedness and response issues (where there is a large volume of international research, particularly following recent major disasters such as the Ache tsunami and hurricane Katrina).

A unique study in the Australian context of a psychological preparedness approach for cyclone warning and response was reported by Morrissey and Reser (2003). The aim of the study was to:

> trial, evaluate and refine an innovative natural disaster public education and warning communication intervention focusing on tropical cyclone preparedness and response ... [that] involved the dissemination of selected psychological information designed to enable individuals to better cope with themselves and others in an increasingly threatening situation (Morrissey & Reser 2003, p 47).

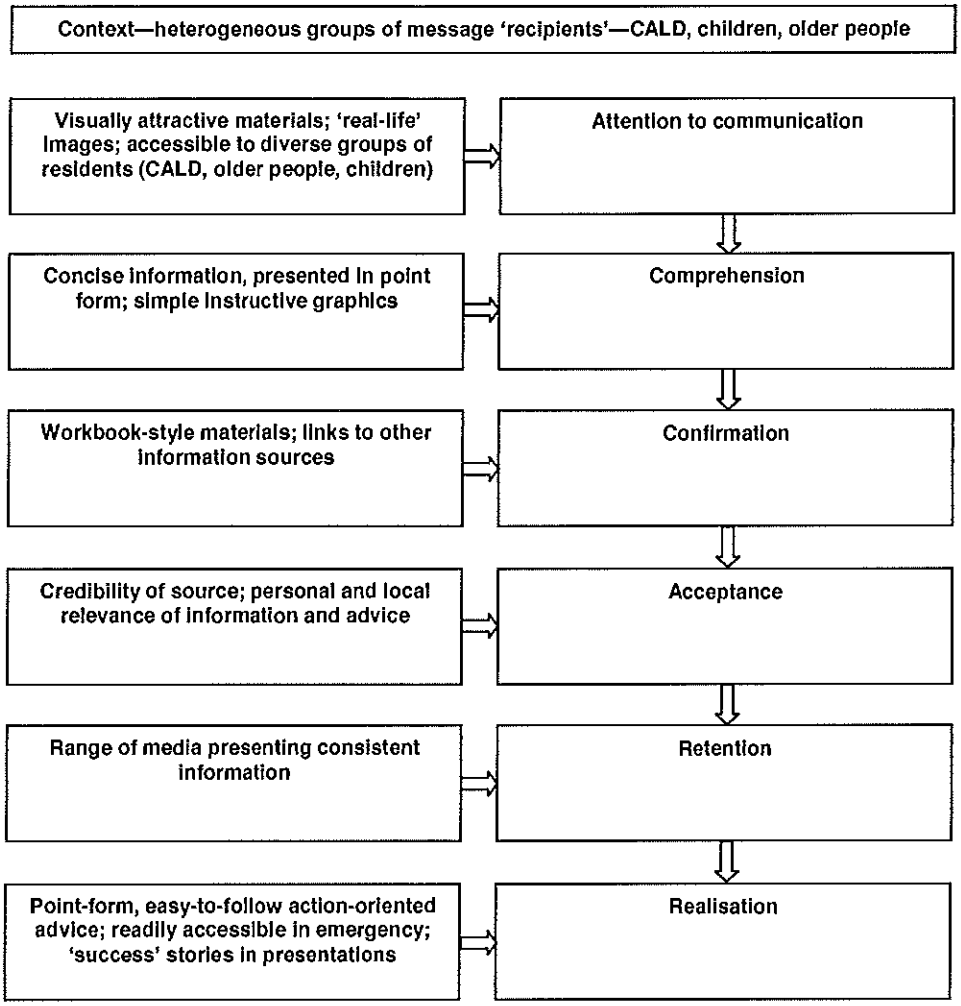


Figure 4:1 **A model of the relationship between media materials and the risk communication process**

The study describes an evaluation of the James Cook University *Awareness, endurance, recovery: Psychological preparedness kit.*[4]

Program background and rationale

There is strong support for this emerging field of program development and research from key professionals in the sector, suggesting that 'adequate information and preparation for recurrent natural disasters can empower individuals and assist in the prevention of physical and psychological devastation and distress' (Morrissey & Reser 2003, p 55).

---

[4] The current version of the psychological preparedness guide, with other materials that together constitute the 'Awareness, Endurance Recovery Kit', is available (16 July 2010) at: <http://www.jcu.edu.au/cds/disasterresources/JCUTST_056254.html>.

The rationale for undertaking the project was the idea that anxiety is a barrier for individuals to take appropriate preparation steps, and that:

> being able to anticipate, recognise and manage such anxiety and other emotional responses to natural disaster will enhance successful coping, promote more adequate preparedness, and ensure that preparedness measures are reinforced by experienced stress reduction and competence in an emergency situation (Morrissey & Reser 2003, p 47).

Evaluation methods

The study was designed as a randomised experimental trial using a pre- and post-test control group design, with an additional 'hanging control group' (a group that received neither pre-test nor intervention). A sample of 440 residents completed two consecutive surveys (pre- and post-test), and 200 residents (the hanging control group) completed only the post-test survey. Half of the 440 residents who completed the two consecutive surveys received a copy of the psychological preparedness guide (the intervention group). The remaining half received no further information and completed only the sequential surveys (the control group).

Participating households were selected using a stratified 'street and house' random sampling procedure and were then randomly assigned to the three experimental groups. The authors reported a 'return rate' of 72% for the study and attributed this good response rate to 'a drop-off/pick-up procedure and careful non-return follow-up', together with a high level of resident interest in the study (Morrissey & Reser 2003, p 48).

The study was conducted in selected suburbs of Cairns from December 1996 to March 1997. It was designed so that delivery of the psychological preparedness guide would be (hopefully) followed by a significant cyclone warning to the region. While some cyclone warnings that included the Cairns region were received during January 1997, the research team waited for a warning that was judged sufficiently threatening to occur (for cyclone Justin on 7 March). This cyclone was an extensive system that hovered east of Cairns for about a week before appearing to move northwards towards Papua New Guinea. The research team administered the post-test to the three groups on 13 March on the basis of Bureau of Meteorology advice that the cyclone was moving away from the region. (In the event, the cyclone intensified off the coast of Papua New Guinea about four days later and returned to cross the coast at Cairns on 22 March, although by that time its intensity was reduced considerably.) The authors commented that:

> Respondents therefore completed their post-event questionnaire

approximately three months after the pre-season survey, and following six days of a very large cyclone system sitting off the coast of Cairns, with attendant watches and warnings (Morrissey & Reser 2003, p 48).

Context

The Cairns region of north Queensland has a tropical climate with generally hot, wet and humid summers and milder, drier winters. Cairns typically experiences two seasons—the wet summer season, from November to May, and the dry winter season; most rainfall occurs between January and March. The cyclone season is normally between December and April. The study was conducted in the 'Northern Beaches' suburbs of Cairns, a locality that is particularly vulnerable to the impact of cyclones and the threat of storm surge.

Strategies and activities

The key strategy of this intervention was the dissemination to the intervention group of a 'brief self-instruction guide on managing emotions' (Morrissey & Reser 2003, p 54). The content of the guide was informed by Meichenbaum's 'stress inoculation theory', a cognitive-behavioural approach to stress management (see, for example, Meichenbaum 2007). In its present form on the James Cook University website, the guide has approximately 20 pages that briefly cover topics such as:

- how individuals respond to stressful events and the importance of coping
- understanding and dealing with feelings
- common psychological 'traps'—such as 'confusion of uncontrollable events with controllable circumstances', and 'the Gambler's fallacy', each covering one page of the guide and containing a brief description of 'what happens' and 'what to do'
- negative thinking
- strategies for preparing for an emergency
- dealing with anxiety and worry during an emergency situation
- physical cyclone preparation recommendations—an 'action checklist'
- checking how one coped and what worked (after the event).

Individual/householder-level outcomes

The post-event survey found that the intervention group showed substantially lower reported levels of *concern* and higher levels of reported *confidence* compared to the control group. It was concluded that, 'This provides strong support for the effectiveness of the psychological preparedness guide' (Morrissey & Reser 2003, p 50).[5] Also, while residents demonstrated a fairly high level of *preparedness* in the pre survey (measured by a composite index based on a checklist of 12 items), those in the intervention group demonstrated a 'modestly higher level of physical preparedness than those in the control group in the post survey evaluations' (Morrissey & Reser 2003, p 52).[6]

When the intervention and control groups were compared for their responses on the post survey to three questions relating to how they would feel about a subsequent event, those in the intervention group reported being more *confident at being able to cope* and less *concerned about another threat* than those in the control group.[7] Participants in the intervention group also reported that they were more able to *anticipate feelings* and *identify feelings* than those in the control group.[8] Also, 60% of the intervention group reported that the guide made them feel less anxious during the cyclone and 74% found the guide very useful.

The researchers also investigated whether the impact of the intervention differed for different individuals. Some theory suggests that the use of a stress inoculation theory intervention may not be sufficient for individuals with pre-existing chronic anxiety and/or those who had experienced a very stressful prior event. On the basis of this section of the study, the authors concluded:

> These variables [anxiousness and prior traumatic experience] in particular appear to reduce the efficacy of a psychological preparedness intervention

---

5 The standardised 'pre-post' effect size (Cohen's d) for *concern* was 0.1 (negligible) for the intervention group and 0.24 for the control group (representing a 'small' increase according to the conventional guidelines for interpreting this effect size statistic), while the effect size for *confidence* was 0.86 (a 'medium' increase) for the intervention group and 0.23 (a 'small' increase) for the control group. While these changes are highlighted in the paper, there were also somewhat smaller differences in the pre–post change effect size between the two groups on the other 'mood states' measured (*anxiety*, *fear* and, particularly, feeling *helpless*), all of which decreased after the event but showed a greater decrease in the intervention group.

6 The difference between the intervention and control groups appears to be particularly strong for levels of preparedness; the pre–post effect size for the intervention group was 1.92, a notably 'large' standardised effect size, compared with 0.70, a 'medium' effect size, for the control group.

7 'Medium' (0.39) and 'small' (0.26) effect sizes respectively.

8 'Medium' effect sizes of 0.65 and 0.62 respectively.

such as that trialled, notwithstanding its overall positive role in enhancing community physical and psychological preparedness (Morrissey & Reser 2003, p 56).

Community-level/organisational outcomes

Community and organisational level outcomes were not explicitly addressed in this report. The most significant role of an intervention of this kind is to provide individual residents with the appropriate tools to manage their emotions during a period that may induce high anxiety. If individuals are able to be psychologically prepared, they will, in theory, be better equipped to look after themselves and others during an emergency situation. Being better psychologically prepared should also influence the ability to react rationally and undertake more physical preparation tasks, including collaborative preparation with neighbours.

From an agency perspective, it is also argued that psychological preparedness information can help form a significant partnership with current preparedness campaigns that may assist to bridge gaps in existing information material. The authors commented that:

> One of the most important implications of these research findings is a non-obvious one. We have evaluated the utility of psychological content in community education and preparedness materials, but what happens when such information is not there? The current findings strongly suggest that the provision of preparedness information which heightens the salience, nature, likelihood and magnitude of a natural disaster, *without providing adequate and concrete information about what to do and how to deal with such a situation*, is likely to result in either a diminished adaptive response to the risk communication or an erosion of existing preparedness motivation and resolve (Morrissey & Reser 2003, p 57, italics added).

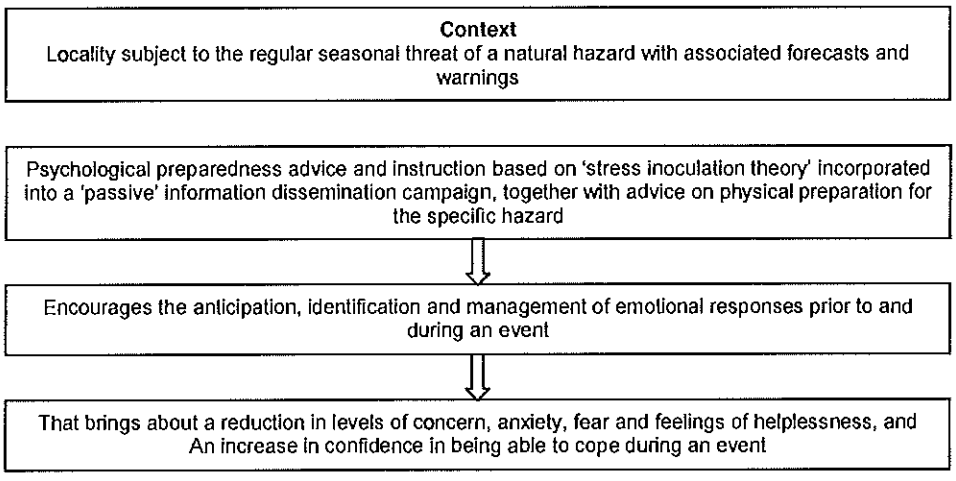
The evaluation identified the significant role that psychological preparedness information can play in supporting households in a location that experiences a recurring natural hazard threat. Providing people with the ability to anticipate, recognise and cope with their emotional responses to an emergency situation will potentially enhance the effectiveness of current physical preparedness campaigns. The project identified significant differences between the intervention group and the control group that indicate that the intervention was effective in managing levels of concern while increasing levels of confidence and physical preparedness activities. Thus the psychological preparedness intervention appeared to improve the individual's ability to *respond* rather than *react* to a cyclone warning incident. However, caution must be exercised for those individuals who

demonstrate chronic anxiety or trauma from a previous event; they may need to be targeted for a more complex intervention.

In summary, a psychological preparedness education and awareness campaign may enhance an individual's ability to respond and prepare both physically and mentally for a cyclone warning and threat. Incorporating a psychological aspect into existing physical preparation campaigns may be central to minimising chronic anxiety, avoidant coping styles and post-traumatic experiences, while enhancing the ability to undertake preparation activities. The study demonstrates that community members are able to learn effective cognitive behavioural management techniques through passive information dissemination and are able to apply these techniques to a high-anxiety situation.

A tentative theory model of the psychological preparedness trial

The Cairns psychological preparedness trial was based on a well-researched approach to stress management with a strong supporting theory. The intervention was anticipated to enhance the *'anticipation, identification and management* of emotional responses', rather than necessarily 'reduce the anxiety and apprehension which are normal and adaptive human responses to a threatening emergency situation' (Morrissey & Reser 2003, p 50, italics in original). The evaluation found a reduction of concern and an increase in confidence at being able to cope, as well as decreases in anxiety, fear and feelings of helplessness. The reductions in concern, anxiety, fear and helplessness and increase in confidence were, in turn, anticipated to assist individuals overcome psychological barriers to undertaking physical preparedness activities in the form of maladaptive defence mechanisms and distorting beliefs (Morrissey & Reser 2003, p 51). The study found a strong effect of the psychological preparedness materials on preparedness activities (which also increased, but not as strongly, in the control group), but it is unclear whether this was due to the activation of a causal chain through the reported psychological changes or whether it was a direct effect of the physical preparedness advice contained in the materials. These ideas are incorporated in the reconstructed theory model for a psychological preparedness program outlined in Figure 4:2.



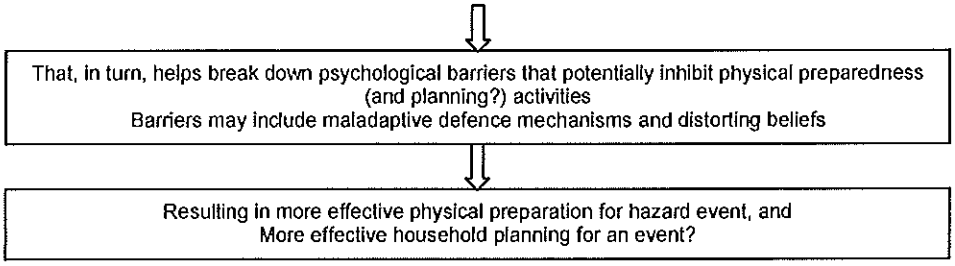


Figure 4:2 **A reconstructed theory model for a psychological preparedness program or activity**

CHAPTER 5

Localised information provision

Moondarra Fire Information Unit

A Fire Information Unit (FIU) was established for the duration of a long-running bushfire in January/February 2006. The FIU is classified as a 'localised information provision' project. A case study (Drummond 2007) of the Moondarra Fire Information Unit is available on the Victorian Department of Sustainability and Environment (DSE) website,[9] and the unit is also discussed in a debriefing report to Victorian agencies on the 2005/06 fire season (Smith, R 2006).

Program background and rationale

The case study report noted that experience gained by relevant agencies during an extended period of fires in the alpine regions of Victoria in 2003 was used to develop 'a number of new tools, processes and concepts' relating to information flows during a fire incident (Drummond 2007, p 1). The report appears to suggest that fire information units were in operation prior to the 2005/06 fire season, but this could not be verified. However, the debriefing report on the 2005/06 fire season does explain that:

> Trained and effective Information Units are now an integral component of the community engagement process and are based in incident control centres during incidents. Their roles include collation and distribution of pertinent information to a range of outlets, including media, [Victorian Bushfire Information Line] ... and direct to communities either during community meetings or through recognised information centres where residents could either view information sheets or collect a copy (Smith, R 2006, p 22).

It is also apparent from the debriefing report that the FIU was part of a rapidly evolving development in community engagement activities during fire events in Victoria.

> The 2005/06 campaign saw the emergence of the next phase of community engagement in the form of direct and regular contact with threatened communities either through the Victorian Bushfire Information Line, access to Internet websites maintained by CFA and DSE or directly by Incident

---

[9] See <http://www.dse.vic.gov.au/dse> and search for 'case study Moondarra Fire Information Unit'.

> Management Teams, in a bid to keep residents as aware as possible about fire movement, behaviour and potential threats. Much of the direct engagement occurred between ignition and when fires rapidly went out of control with arrival of adverse weather (Smith, R 2006, p 4).

The Moondarra FIU was designed to go beyond 'just providing for the flow of information to the community' and to adopt 'community engagement principles to assist in the development of positive and lasting relationships beyond the immediate event' (Drummond 2007, p 1). Three objectives were adopted for the FIU:

- inform the community by providing timely, relevant, accurate and authorised incident information relating to risks, fire safety messages, firefighting strategy, weather predictions, relevant local community messages, rehabilitation and recovery processes
- seek relevant local knowledge from the community by consulting with them about the fire, its effect and impacts to better inform the Incident Management Team: listen, record and respond to community needs and concerns
- empower the community to respond and implement personal fire plans through provision of relevant, timely and accurate information to assist them in their decision making (Drummond 2007, p 2).

Strategies used to inform and engage with the community included:

- core advice and immediate threat messages
- media community updates
- community meetings—31 separate community-based meetings held at seven different locations during the fire period (Smith, R 2006, p 80)
- daily visits to local communities (including street walks and organised times for one-on-one meetings in one township)
- school visits
- community-bus shopping trips (through traffic controls to assist isolated residents access supplies).

Evaluation methods

No detail about evaluation methods is provided in the available reports. The DSE case study report appears to have been written by a member of the FIU. It is noted that the FIU established a database to log communications with the community. As the report contains a number of direct quotations, it is possible that this database was the source of some of the information used. The debriefing report (Smith, R 2006) was prepared by an independent consultant.

Context

The Moondarra FIU was established in the township of Erica, one of three townships in the close vicinity of a State park. The deliberately-lit fire burned for three-and-a-half weeks over an area of 15,000 hectares. While the burnt area was very largely State-owned and administered forest and there was little eventual impact on private land, community interest in the fire was high due to the potential threat it posed to private land and assets (Smith, R 2006). The Moondarra State Park, where the fire started, is situated approximately 160 kilometres east of Melbourne and approximately 20 kilometres north of the main eastern highway. The park has extensive areas of open forest and provides a variety of recreational facilities for camping, bushwalking, fishing etc. The surrounding areas include actively logged State forest, private forests and farmland. During the early stages of the fire, the roads that lead south (towards the highway) from the main townships in the region were closed. This required residents to make an early decision whether to stay on their properties or leave. Additionally, absentee land owners were unable to return to access and defend their properties. Local businesses were also unable to replenish stocks.

Individual/householder-level outcomes and causal processes

Causal processes at the individual/household level highlighted in the report can be classified under three headings: community information provision, community support, and seeking local knowledge and feedback.

Community information provision:

- coordinating information from different fire agencies (DSE and CFA)
- providing this information in a form that was understandable
- utilising a variety of channels including community meetings, community updates, presentations, notice boards etc
- where possible, considering physical and social barriers that inhibited residents from receiving information

- logging all requests for information and contacting residents within an agreed timeframe with an answer and details of who the matter had been referred to, or re-scheduling if an answer was not immediately available.

Community support:

- maintaining a presence in the community
- listening to and supporting local residents
- providing access to incident controllers at community meetings ('putting a face' on decision makers)
- being honest (about the course of the fire, availability of response teams etc) and empathetic
- helping community members find needed support
- assisting residents in transition from the fire event to recovery, balancing the need to support those entering the recovery phase while others were still being impacted by the event.

Seeking local knowledge and feedback:

- establishing community contacts, networks and processes to give and receive information
- listening to community knowledge to help inform decisions in the Incident Management Team
- senior officers attending a community meeting to discuss options to control a specific aspect of the fire.

Comments from residents provided in the report suggest that a number of these potential mechanisms were effective. The comments ranged across:

- the value of advice provided at the community meetings
- the value of face-to-face contact and the opportunity to talk and ask questions on an individual basis (as community meetings were felt to be overwhelming for some residents)
- residents feeling listened to, taken seriously, cared about and supported, and
- the value of up-to-date knowledge about the fire (in one comment to support a stay–go decision, while another highlighted the value of information provided at community meetings, on the

Internet, and, particularly, on ABC Radio—the official broadcaster—for 'those of us who were feeling vulnerable and isolated').

Community-level/organisational outcomes and causal processes

An early decision was made to take a community engagement approach to the operation of the FIU to encourage the development of lasting positive relationships with the community. The case study suggests that the community meetings were a critical link with the community and that the portrayal of the fire as a 'community fire' (and not an 'agency fire') was 'a very powerful message' (Drummond 2007, p 3). Early in the fire period it became apparent that the community at one township (where the FIU was based) was 'using the meetings to check on community wellbeing after difficult nights and pass on local messages'. It is noted that members of a community who are not volunteer or professional firefighters may feel helpless during an event. At the meetings, residents were encouraged to look out for others, to visit neighbours to see if they needed help, and to share information gained at the meetings as a way to contribute. A shopkeeper from one of the townships commented that, '(t)he community updates helped me to help others' (Drummond 2007, p 4).

It was also reported that the strategy of logging concerns, information requests etc and providing timely feedback overcame initial community scepticism ('why bother talking to you, no one ever gets back to us').

> People were genuinely pleased and thankful even when we hadn't been able to help them. This process enabled a lot of issues to be resolved immediately rather than allowing them to linger. Consequently community concern in the weeks and months following the event was low (Drummond 2007, p 4).

While a large number of 'stakeholders' in the FIU are mentioned in the report, it is apparent that the FIU was a partnership jointly staffed by DSE and CFA officers. The Victorian Department of Human Services was also reported to be involved during the recovery phase. (Smith, R 2006, p 80). R Smith (2006, p 80) noted that:

> One of the most remarked issues by the community was having a 'face' to DSE, as usually an [Incident Management Team] representative and a DSE representative attended each meeting. The community focus changed quickly from a negative to a positive note when [Incident Management Team] representatives attended meetings and were able to explain what was happening. Communities were pleased to get input from the 'decision-makers'.

R Smith (2006, p 80) also commented that the FIU contained a:

> Great mix of skills between DSE and CFA Information Officers resulting in [a] dynamic team working in [the] Information Unit. [The] Information Unit was well resourced with equipment to do the job and was supplied with quality maps that were an excellent resource for Community Briefings and Information Points set up in localities.

It is apparent from these comments that the collaborating agencies resourced the FIU well and that the partnership arrangement, particularly the link with the Incident Management Team, facilitated the attendance of incident controllers at the community meetings, a feature of FIU activities that was positively regarded by residents.

A theory model for the Moondarra Fire Information Unit

The Moondarra FIU was a complex partnership initiative between community education and information officers from two responsible fire agencies and an Incident Management Team of officers from the same agencies. Through a strategy of listening to and acknowledging as legitimate the concerns and knowledge of members of the local community, the FIU endeavoured to, in effect, incorporate residents into the partnership and thus develop 'positive and lasting relationships beyond the immediate event' (Drummond 2007, p 2). An attempt is made to capture the important elements of the causal processes activated by this partnership and the anticipated outcomes of the process in the theory model presented in Figure 5:1.

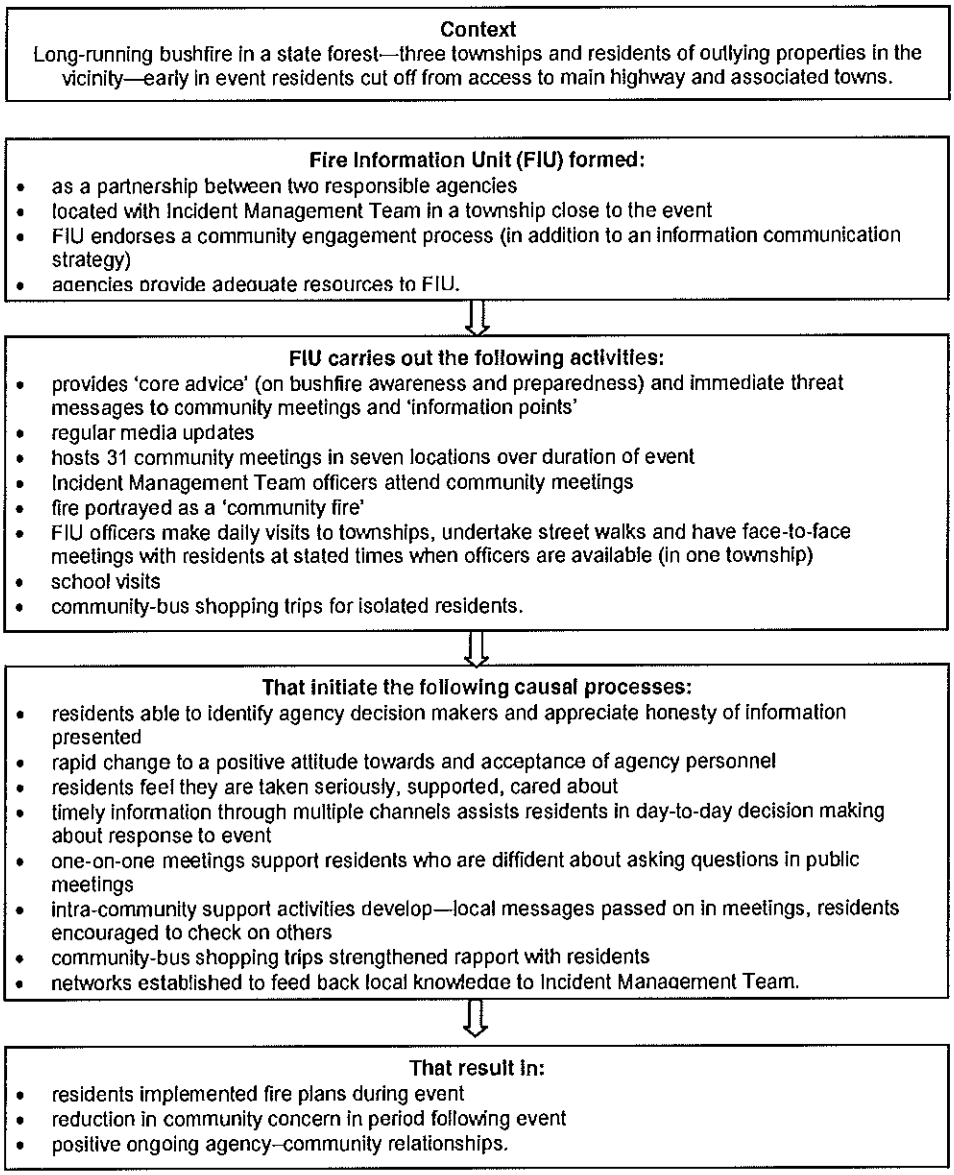


Figure 5:1 A reconstructed theory model of the Moondarra Fire Information Unit

Woronora flood preparedness strategy

A Community Preparedness Strategy was developed for the Sutherland Shire Council and Woronora Flood Alert Working Party for residents of the Woronora valley in the south of Sydney in 1998, and elements of the strategy were implemented during the period from 1999 to 2003. An evaluation of the strategy was conducted by Molino and Huybrechs (2004) of Molino Stewart Pty Ltd, with funding support from EMA.

Program background and strategies

The evaluation report indicates that the Community Preparedness Strategy was part of a package of measures designed to reduce flood risks to people and property in the Woronora Valley; however, no further information is readily available about the other measures in the package.

The Community Preparedness Strategy was designed to include the following elements:

1 two flood signs—one on an approach to a low-level bridge across the Woronora River (a major access to the locality), the other in a recreation reserve

2 painting coloured bands corresponding to four flood categories on street sign posts

3 placing individually printed labels in electrical fuse boxes showing the floor level of a house in relation to the four flood categories

4 distribution of a household kit containing a booklet, children's colouring sheet, fridge magnet and brochure

5 public meeting following distribution of the household kit

6 implementation of the use of the standard emergency warning signal

7 hot-stamping wheelie bins with a short flood message

8 events to launch the strategy

9 media releases

10 implementation of a computer-based automated telephone dial-out system

11 display materials

12 Flood Awareness Week.

The evaluation report indicates that elements 1, 3, 4, 6 and 9 were fully implemented, while element 2 was partially implemented (17 rather than the planned 50 colour-code bands were attached—not painted—on metal street sign posts) and element 5 occurred before rather than following distribution of the household kit (Molino & Huybrechs 2004, p 13).

Evaluation methods

The effectiveness of the strategy was evaluated by:

- reviewing the strategy measures implemented by the council, along with other floodplain information available to residents, and
- undertaking a post-implementation telephone survey of 100 residents of the floodplain (approximately 20% of flood-affected households) (Molino & Huybrechs 2004, pp 2, 9).

Four outcomes of the strategy were assessed against approximately ten indicators:

- information was delivered to residents (number of kits distributed, house labels attached to electricity box etc)
- information was received by residents
- information was understood and retained by residents
- residents were prepared for flooding (Molino & Huybrechs 2004, pp 9–10).

Context

An extensive description of the context of the project is provided in the evaluation report. The Woronora River lies to the south of Sydney, forming a narrow floodplain before it joins the Georges River, which then enters Botany Bay. More than 500 houses were identified in the study area, defined by the limits of a possible flood. Approximately 80% of the flood-prone properties were located in the suburb of Woronora, with others in the downstream suburbs of Bonnet Bay and Como. The locality along the river is tidal and some houses in Como were reported to be built close to the high-water mark. Many of the houses in Woronora do not have direct vehicular access. The most recent significant flood on the Woronora River occurred in 1969 (Molino & Huybrechs 2004, p 6).

Data from the 2001 census were summarised in the evaluation report. It was reported that, at the time of the census, close to 70% of the Woronora population had been in their present homes for more than five years and that more than 90% of the homes were owner occupied. It was also reported that 93% of the population had education to Year 10 or above. Data from the Sutherland Shire Council website also indicate that, in 2001, substantial proportions of the residents of Woronora were born in Australia (82%) and spoke English as their only language (37%) or *well* or *very well* if English was not their primary language (50%). For the purposes of the evaluation it was assumed that information communicated in written or spoken English should be understood by most of the target community (Molino & Huybrechs 2004, p 6).

Individual/householder-level outcomes and causal processes

Strategy implementation and 'outputs'

It was reported that:

> elements of the strategy delivered some or all of the following messages to flood affected residents in the Woronora Valley:

- They [the residents] live in a flood prone area;
- There are different categories of flooding;
- There is a plan to help them; and
- The plan includes actions by them (Molino & Huybrechs 2004, p 12).

Two flood signs were erected in mid-1999 to show the actual levels of historic floods in relation to the colour-coded flood categories and the message, 'The Woronora Floods. Are You Ready?' The signs were erected on a footpath on the 'old' Woronora Bridge and in a reserve in Bonnet Bay. Significant placement issues were reported for both signs, including (a) that a new high-level bridge over the Woronora River was constructed in 2001 (while the old bridge remained in use, it was subsequently used only for access to the suburb of Woronora); and (b) the reserve sign was moved after resident complaints, so it was subsequently only visible to some park users (Molino & Huybrechs 2004, p 14). Nonetheless, it was estimated in the report that the signs 'deliver their messages on a daily basis to at least 75% of flood affected residents' (Molino & Huybrechs 2004, p 14).

The 17 flood totems erected on street sign posts did not deliver a specific flood message but were reported to be in place 'mainly for reference during a flood' (Molino & Huybrechs 2004, p 16). It was estimated that about half of the potentially flood-affected residents of the locality would be likely to pass the totems.

Survey results indicated that 64% of respondents had seen the flood signs and totems. Ninety percent of those who had seen flood signs indicated that they had seen the one near the Woronora Bridge, leading the authors of the report to conclude that this sign 'has been highly effective in not only delivering the flood awareness messages but also ensuring that they are received' (Molino & Huybrechs 2004, p 22). It was believed that the effectiveness of the other sign was reduced because of its compromised location. However, while 90% of survey respondents recalled seeing the flood signs, 27% of this group did not recall the messages. It was concluded that 'only 66 percent of the population is understanding and retaining messages from the signs' (Molino & Huybrechs 2004, p 23).

The household kits and flood labels were delivered to residents by State Emergency Service (SES) volunteers during a nine-month period from October 2000. The kits contained a brochure, children's sheet, fridge magnet and an EMA booklet, *What to do before, during and after the flood.* The personalised flood label, with an indication of what level of flood would enter the building, was affixed to the household electricity meter box if the householder agreed. Delivery of the kits and labels had not been completed at the time of the evaluation. While it was reported that 90% of those households visited had agreed to receive a label, it was estimated that only 60% of flood-affected homes would have labels.

More than 50% of survey respondents nominated, unprompted, brochures as the flood information they had seen, compared with 8% who mentioned the meter box label and 4% who nominated the fridge magnet. Subsequent probing suggested that 75% of householders visited recalled receiving a kit. It was also estimated that 58% of those people with labels in their meter boxes were aware they had them.

These levels of awareness of the kits, brochures and labels were regarded by the authors as 'high' and attributed to the following factors:

- personal delivery by the SES
- residents needing to give explicit approval for the label to be affixed
- the label being seen every time a meter box is opened (assumed to be 'from time to time' for most residents) (Molino & Huybrechs 2004, p 23).

A second brochure and fridge magnet were distributed (by post or hand delivery to letterboxes) in 2002.

One two-hour public meeting was held in November 1999. The meeting was advertised by two notices in the local newspaper and by letterbox flyers. The meeting provided considerable detail about the four flood messages and allowed questions and answers. Twenty-four residents attended. Four percent of survey respondents referred, unprompted, to the meeting, similar to the proportion of the target group who attended.

In addition to the meeting notices, two articles on flooding were published in the local newspaper in late 1999 and a smaller article was published in the shire newsletter. Only one survey respondent referred, unprompted, to any newspaper information on flooding.

Message recall

The most commonly recalled message was that the river floods (an estimated 56% of the population). It was reported that only 11% of the population recalled unprompted that there were different coloured flood categories; however, 62% recalled that there were colour codes when prompted. Of this group approximately two-thirds did not know the colour code of their house. When only householders with a meter box label were considered, almost 60% knew the colour code of their house, or where to find it. Finally, however, only nine survey respondents (approximately 10%) were able to correctly indicate what the colour codes meant.

Household planning and response

Significant proportions of the survey respondents believed that being prepared for a flood would reduce property losses (62%) and that preparation would improve personal safety (80%). However, considerably smaller proportions of respondents (estimated at between 20% and 37%) understood that there was a municipal flood plan to help them. These results were interpreted to suggest that, while residents understand that they need to take action in relation to flooding, 'they don't necessarily see this as part of a planned response but rather a spontaneous one on their part' (Molino & Huybrechs 2004, p 26). Similarly, 60% of respondents did not refer to official flood warnings but, instead, indicated that they would rely on their own observations of rainfall and river heights. It was concluded that residents had a 'generally low understanding' that there was a municipal flood plan ready to help them.

While a high proportion of respondents were able to nominate at least one appropriate flood response (eg self-evacuation and raising furniture and other possessions), a significant proportion indicated inappropriate responses (eg evacuate by boat) and only 5% indicated they had an emergency kit for floods (no respondent indicated possession of an emergency kit unprompted). Further, it was estimated that 10% of residents would take no action in the event of a flood.

Community-level/organisational outcomes and causal processes

The report does not contain any evidence of causal processes and outcomes at the community or municipal levels that might have resulted from the flood preparedness strategy.

A theory model for the Woronora flood preparedness strategy

While it is not made explicit in the study report, the general theory that appears to underpin the Woronora flood preparedness strategy is a version of a 'K-A-B (Knowledge–Attitude–Behaviour) socio-cognitive' learning model. That is, an improvement in householder *knowledge* of the likelihood and possible severity of a flood in the Woronora River, specifically in relation to their properties, was

assumed to result in changes in their *attitude* to the possibility of a flood (risk appreciation, beliefs that preparation increases personal and property safety etc) and thus to appropriate *safety responses*.

The evidence in the study report suggests that (possibly as a result of the preparedness strategy) residents had high levels of relevant knowledge about the likelihood of a flood in their locality and of (at least one) appropriate action to take. Also, moderately high proportions of residents believed that taking preparedness actions would increase their personal and property safety. They were considerably less knowledgeable about the specific nature of the flood risk to their properties, however (eg while aware of the colour-code system, residents, typically, did not know what levels the specific colours referred to, nor what colour applied to their properties). There is also less convincing evidence that these relatively high levels of knowledge about the general likelihood of flooding and what might be thought of as 'appropriate' attitudes would lead to safer behaviour in the event of a flood. Very few households had an adequate flood emergency kit, for example, and many nominated risky responses in the event of a flood (eg self-assessment of the level of the risk, risky evacuation by boat, not responding at all).

In general, evidence for a causal path from knowledge changes, mediated through attitude change to changes in behaviour is weak (Baranowski et al 2003). It is argued that while the primary resource for change in models of this kind is knowledge, the concept is not well specified and increasing knowledge by itself does not appear to be useful in promoting behaviour change. More generally, there is doubt in the psychological literature that a purely 'rational' approach will result in behaviour change in desired directions for many people in many situations; emotions also have an important influence on evaluative responses such as perceived risk, as well as on judgments and decisions (Shafir & LeBoeuf 2002). A possible K-A-B theory model for a floodplain preparedness strategy is represented in Figure 5:2.

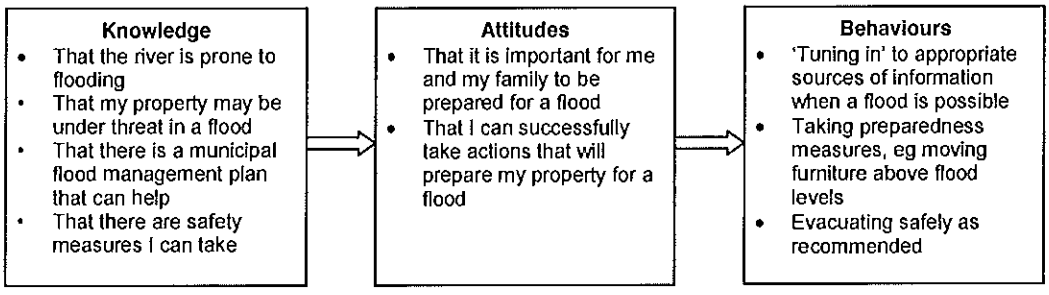


Figure 5:2 A hypothetical K-A-B model for a flood preparedness strategy

FloodSmart (Benalla) and StormSmart (Wodonga) pilot studies

Pilot studies of FloodSmart and StormSmart were conducted in Benalla and Wodonga (respectively)

in northern Victoria commencing in late 2006. This summary account focuses on evaluation of the FloodSmart program in Benalla. Two documents were available: an independent evaluation of the program (along with the Wodonga StormSmart pilot) prepared by independent consultants Molino Stewart Pty Ltd (Molino Stewart 2008a)[10] and an internal Victoria State Emergency Service (VICSES) implementation report, focused on project 'outputs' (VICSES 2008). Extensive information on the background and implementation of the Benalla FloodSmart pilot is also provided in the internal VICSES implementation report, while more general information on the Victorian Floodsmart program and examples of the Benalla pilot materials are available from the VICSES website.[11]

Program background, rationale and strategies

Introductory Victorian FloodSmart program materials emphasise that spring traditionally brings heavy rain (and, by implication, the possibility of flooding), that flood preparation is 'every resident's responsibility', that floods cause more loss of life and property damage than other natural disasters in Australia, and that floods cannot be 'fought'. As a consequence, FloodSmart recommends a three-stage response: prepare, evacuate, relocate.

FloodSmart materials include:

- an introductory one-page flyer
- an Emergency Toolkit—a practical guide to flood safety integrated with StormSmart materials containing before, during and after action-oriented advice for floods and storms, emergency contact information and advice on putting together a home emergency kit
- a brochure localised to the region (eg 'Benalla is at risk')
- a poster
- a six-page flip-chart with similar information to the FloodSmart materials in the toolkit.

---

[10] Thanks to Neil Dufty of Molino Stewart and VICSES for providing access to this and other recent Molino Stewart reports.

[11] <http://www.ses.vic.gov.au/CA256AEA002F0EC7/HomePage?OpenForm&1=Home~&2=~&3=~>.

A three-colour flood zone system was also developed for Benalla. The zones are yellow, orange and red, referenced to the Benalla Gauge Height at 5.25 metres, 4.85 metres and 4.25 metres respectively. This information was included on a meter box sticker delivered to properties during the Benalla trial.

The program was developed and implemented in three phases (VICSES 2008; Molino Stuart 2008a) as outlined below.

Phase 1

This was the program development phase. The program drew on elements of the New South Wales Business FloodSafe toolkit, Victorian fire services community engagement programs and international models. VICSES staff coordinated a steering committee that included VICSES staff, volunteers and representatives of Benalla Rural City (the municipal council). The steering committee met monthly. Concurrently, a 'community development group' was formed to 'keep community groups, other agencies and the broader community involved and engaged' with program development and to 'provide guidance regarding tools and strategies' (VICSES 2008, p 6).

Phase 2

Phase 2 consisted of the distribution and display of the 'static elements' of the program. These static elements were 'aimed at introducing product branding, raising awareness, confirmation of messages and to provide residents with a point of reference for ongoing reaffirmation of programme objectives' (VICSES 2008, p 7). They included several 'static engagement tools':

- FloodSmart action brochure
- FloodSmart signage
- FloodSmart posters
- FloodSmart website
- community mail out, and
- Benalla FloodSmart zoning.

Phase 3

This was the 'dynamic component' of the program, consisting of an intensive eight-week local campaign with the following elements:

- community presentations, service club and community group meetings, focus groups and door knocks
- community events coordinated by SES volunteers and supported by other community groups and specifically aimed at one-on-one involvement of residents and businesses, including free community barbeques, local market stalls and door-knocking days
- a pilot schools program, and
- 'rolling static displays' at two local banks and a supermarket (VICSES 2008; Molino Stuart 2008a).

The VICSES website indicates that the program is currently being 'rolled out' in Benalla and Gippsland and is under development for 2008 for Wangaratta and the Alpine Shire.

Program context

An account of the policy and local context of the program is provided in the VICSES (2008) project report. The program was developed in response to recommendations made to VICSES in 2005 by the Office of the Emergency Services Commissioner (OESC) and a report in the same year on flooding in Melbourne by the Victorian Flood Warning Consultative Committee (VFWCC). The OESC recommended that VICSES develop community education programs similar to those established by the fire services, while the VFWCC report contained two themes that VICSES felt 'align with and extend its responsibilities as control agency for flood response and as an advocate of emergency management planning and preparedness' (VICSES 2008, p 5). As a consequence of the observation in the VFWCC report that the responsibility for educating the Victorian community about flood risk and maintaining and updating that knowledge was not the clear responsibility of any stakeholder, VICSES has 'proactively "put their hand up" and taken on the role of champion for flood education' and 'actively sought partnerships with flood management agencies and local governments to improve and extend flood related community education programmes' (VICSES 2008, p 6).

VICSES secured a program grant from the Commonwealth Local Grants Scheme for the Benalla community flood awareness program in August 2006. Benalla is a major city in rural north-east Victoria, approximately 200 kilometres from Melbourne. There are more than 4000 properties in the municipality that 'are at risk of inundation or isolation due to flooding' (Molino Stuart 2008a, p 8). The VICSES report indicates that Benalla was chosen as the site for the flood engagement and education project for the following reasons:

- Benalla suffered significant and devastating floods in 1993
- Benalla Rural City (the municipality) had recently undertaken significant flood mitigation works
- Benalla Rural City was keen to develop a partnership approach to flood education
- Benalla Rural City was willing to provide support to the development and implementation of the FloodSmart program (VICSES 2008, p 5).

Evaluation methods

Molino Stewart described its methodology as a 'social research' approach involving (a) three cross-sectional resident surveys conducted before, immediately after and two months after the program (N = 120, 43 and 50 respectively); (b) a focus group with VICSES Benalla staff; and (c) telephone interviews with other VICSES staff involved in the program.

Individual/householder-level outcomes and causal processes

Findings from the evaluation in relation to outcomes for individual respondents (and, by inference, households) are reported by Molino Stewart (2008a) under a number of different headings. Here they are summarised as engagement strategies, awareness, preparedness, intended response and overall satisfaction.

Engagement strategies

It was reported that the Benalla FloodSmart program appeared to be easily accessed and understood by the community. All those surveyed in the 'three months after' survey were aware of the program, while 60% from the 'immediately after' survey found the information *very easy* to understand (30% found it *easy* to understand).

Among the specific engagement strategies, a magnetised flip-chart appeared to be particularly effective. Seventy-seven percent of respondents to the 'three months after' survey had placed it on their refrigerators, while 57% reported it to be *very helpful* in helping prepare their households for floods (43% reported it was *of some help*). A community-specific action guide containing localised historical information, prevention response and recovery information, check sheets, a template for a home emergency plan and local content information was also seen to be reasonably effective by the focus group and individual interviewees.

Additionally, the meter box stickers were reported to be 'reasonably effective as an engagement tool, especially when coupled with face-to-face distribution by SES and other community volunteers'

(Molino Stuart 2008a, p 14). Seventy-nine percent of respondents to the 'three months after' survey had affixed the sticker to their meter boxes, while 54% felt the sticker would be *very useful* in helping their households prepare for floods.

Overall, VICSES concluded that the most successful engagement strategies provided succinct, easily accessible information:

> Ultimately, it was found that the simple tools, which provided short sharp information, were the most successful, such as the fridge flip chart or the short check sheets found within the action guide (VICSES 2008, p 16).

The independent evaluation agreed with this conclusion.

Awareness

Increases were noted in the proportion of respondents to the 'before' and 'immediately after' surveys who responded positively to a number of statements relating to awareness, although, from the material provided in the report, it is not immediately apparent how these proportions were calculated for items with more than a 'yes–no' response or, indeed, from which survey items some of the inferences were drawn. The statements for which a greater than 10% change was noted (in order of extent of the apparent change) were *Use the ABC or other local radio station for flood warnings; Seen information about flooding; Live in a flood prone zone,* and *At risk of being flooded.* It is interesting to note that no change was recorded in the proportion of respondents (37%) responding positively to *Contact VICSES for emergency help,* despite what appears to be extensive VICSES 'badging' on the media materials.

Preparedness

Proportional changes in a general indicator of resident preparedness were reported for the three surveys. There were five response options ranging from *unprepared* to *extremely well prepared.* The proportions of respondents who reported that they were *unprepared* decreased from 31% to 2% across the three surveys, while the proportions of those reporting they were *very well* or *extremely well prepared* increased from 1% to 34%. Similarly, the proportion of respondents reporting that they had a home emergency plan increased from 8% to 24%.

Intended response

The following findings from the 'immediately after' survey were reported (Molino Stuart 2008a, p 12):

- the most popular way to receive a warning was through radio (60%) followed by VICSES (37%),

the Flood Information Line (35%) and television (16%)

- all respondents identified at least one action to prepare their properties (lift contents to a higher level, 88%; place valuables in a waterproof container, 28%; block points of entry for water, 26%)
- all respondents indicated they would warn someone else of an impending flood (neighbours were the most favoured, 84%)
- 63% indicated they would evacuate during a flood, the other 37% would not
- similarly, 63% of respondents indicated they would not drive or walk through floodwaters.

Unfortunately, no data on change in these intended actions were gathered during the evaluation.

Overall satisfaction

Sixty percent of respondents to the 'immediately after' survey were reported to be *extremely satisfied* with the flood information they received, while 19% were *satisfied.*

Community-level/organisational outcomes and causal processes

It was reported that 'Benalla FloodSmart used community networks and agencies in an effective way to help develop and implement the program' (Molino Stuart 2008a, p 13). Volunteers were reported to have actively sought the assistance of established community groups in a 'multi-pronged approach' (Molino Stuart 2008a, p 13). As an example of engagement with established community organisations, it is noted that Neighbourhood Watch members assisted with the distribution of the meter box stickers. A range of local and central government agencies and authorities was also reported to have contributed to the development and implementation of the program. Overall, the 'value of broader community participation in the program' was supported by the study (Molino Stuart 2008a, p 13).

There was a 'strong view' expressed by local VICSES personnel in the focus group study that the program should be extended beyond a short-term campaign and should include the use of a local flood education plan that was 'driven' by a local community/agency reference group (Molino Stuart 2008a, p 15). Further, 40% of the respondents to the 'three months after' survey expressed a desire to participate in future flood education planning and implementation.[12]

---

[12] In view of the low response rate to the follow-up surveys, this and other conclusions based on the survey responses should be treated with caution.

A theoretical perspective on the FloodSmart pilot

The Benalla FloodSmart pilot program extends the traditional 'risk awareness' media campaign in a number of ways including:

- the development of locally tailored materials, including, for example, brochures that contained a little of the local flood history and a meter box sticker that contained a 'zoned' warning for a specific property
- the use of a variety of forms of face-to-face contact with residents including, particularly, home visits to deliver flood awareness kits and the meter box stickers
- active strategies of engagement with local stakeholder groups and community organisations.

Unfortunately, the evaluation reports do not contain data or discussion about the possible causal processes that might be activated by these additional strategies. As they are a unique component of the FloodSmart strategy, it would, for example, be particularly interesting to know the impact on the thinking and choices of residents of the personalised household materials (eg the meter box colour-coded sticker) and their face-to-face delivery.

FloodSmart (East Gippsland), 2007

A second study of the VICSES FloodSmart community engagement and education approach was conducted by Molino Stewart in the townships of Newry and Tinamba in East Gippsland, Victoria, over a period of significant flooding in 2007 (Molino Stewart 2008b). This brief summary of the evaluation report also draws on a subsequent publication by Molino Stewart (*Building community resilience to floods: The role of education* (Dufty 2008)), which presents a model for community education for flood.

Program background, rationale and strategies

The program evaluated in this study is described as a 'clipped' version of the developing VICSES FloodSmart program (Molino Stewart 2008, p 15). It is apparent from the report that the general rationale and strategies of this implementation of FloodSmart were similar to those of the Benalla pilot study summarised in the previous section. There were, however, a number of distinct differences:

- the Gippsland FloodSmart program was initiated in response to a study by Molino Stewart in June 2007 following severe flooding in the region that suggested that the residents of townships along the Macalister River, downstream of the Lake Glenmaggie reservoir (particularly the township of Newry), were poorly prepared for flood
- the employment of a Community Flood Facilitator to disseminate the FloodSmart materials to the two townships in the period immediately following the June flood
- the occurrence of a second flood in the locality on 4/5 November 2007 following the release of water from Lake Glenmaggie
- organisation of a community meeting in anticipation of flooding on the morning of 4 November
- issuing community bulletins about the flood on a three-hour basis during 4/5 November that were made available by fax through the 'community distribution system' at local shops, hotels and service stations.

Program context

As mentioned above, the implementation of FloodSmart in East Gippsland was a response to a significant flood event in June 2007 and the observation that the residents of some affected townships were not well prepared. Twelve rivers in East Gippsland flooded during this event, and both general and specific flood warnings were issued by the Bureau of Meteorology. It was concluded on the basis of the study conducted in the period after this flood that, in some townships in particular, the risks were 'poorly understood by the community' and that, as a consequence, 'warning systems generally failed the community' (Molino Stewart 2008b, p 3).

Evaluation methods

As in the Benalla FloodSmart study, a social research approach was used to evaluate the intervention. Three data-gathering strategies were employed:

- two focus group meetings, one each in Newry (20 participants) and Tinamba (12 participants)
- a survey of residents and business owners in the two communities distributed at the focus groups and through local stores and mailed back to the researchers (a total of 17 completed surveys were returned—a response rate of approximately 24%)
- telephone interviews with nine agency and water company staff.

It was also possible to draw some limited comparisons with the survey conducted after the June flood.

Individual/householder-level outcomes and causal processes

Flood awareness

Flood awareness appeared to have improved modestly during the June–November period, with more residents believing that there was 'some chance of their property flooding'. There was a contrast between the two targeted localities, with, as on the previous survey, Tinamba residents being apparently more flood aware than their Newry neighbours. The Tinamba focus group recorded a stronger result than the survey, where it was reported that there was a 'general belief' that flooding was 'inevitable'. In contrast, it was reported that fewer residents in November felt that a flood would be 'life threatening'. While this might be interpreted as suggesting that the FloodSmart program had resulted in a more realistic assessment of the risk of flooding in the locality, residents of Newry, in the focus group, apparently felt that flooding was primarily due to the 'excessive' levels of water held in the reservoir by the water company and its 'slow response' in releasing water (Molino Stewart 2008b, p 10).

Planning, preparedness and safety response

It was reported on the basis of both survey and focus group responses that preparedness levels had 'increased significantly in Newry since the June flood'. On the other hand, residents of Tinamba believed they were 'extremely well' prepared prior to the June flood so there was little room to observe any improvement—residents of Tinamba were reported to feel considerable pride in their flood preparedness. Levels of planning for a flood event appeared to increase substantially in both communities. In the time between the two floods, the number of residents reporting they had a plan increased from four to 15 of the 17 residents surveyed (Molino Stewart 2008b, p 11).

Almost all residents surveyed in November indicated that they had taken some action to prepare for the flood as a result of the information they had received. Most popular responses were raising household items and sandbagging, with some putting important belongings in their cars and/or moving them to higher ground. Interestingly, the majority of residents surveyed did not heed the advice of a VICSES evacuation recommendation on the afternoon of the November flood; most who heard it sandbagged their houses and/or waited until it was 'really time to leave' (Molino Stewart 2008b, p 13).

Information dissemination and warnings

VICSES headquarters further developed a communication plan prior to the November floods.

Residents were equally divided on whether they felt that the information they received from VICSES was sufficient (with just over half indicating they did not receive enough information). Typically, respondents indicated that their preferred information source was radio, and both focus groups praised Gippsland ABC Radio for providing continual flood updates. This source of information appeared to be the most trusted, along with that available from VICSES flood wardens.[13]

Almost all survey respondents felt that the provision of flood warnings had improved by the November flood with, again, almost all finding the warnings either 'easy' or 'very easy' to understand. The level of satisfaction with warnings appeared to have increased in Newry (the more sceptical township), although half were still 'dissatisfied' with the warnings issued.

As with the Benalla FloodSmart evaluation, focus group participants from both townships felt that the FloodSmart action kit, more specifically the flip-chart and action guide, was the most useful of the materials disseminated. The personal contact made by the Community Flood Facilitator was also appreciated.

The source of the improvement in satisfaction with the flood warnings and, particularly, the ease with which they were understood might have been a direct result of the work done by VICSES on the warnings themselves, indirectly as a result of the material in the information supplied to residents, or a combination of these direct and indirect effects. More research on the FloodSmart program would be required to disentangle these possible 'paths' to improved understanding and satisfaction with the warnings issued, but it is likely that the combination of improved warnings with the community education materials was critical.

Community-level/organisational outcomes and causal processes

Perhaps the most interesting aspect of the evaluation report from the perspective of community-level responses and outcomes is the differences between the two townships. The community of Tinamba 'prides itself' on the ability to 'self-organise its response to a flood with the support of agencies such as VICSES and the CFA' and believes that it can 'recover quickly through its self-help mechanisms' (Molino Stewart 2008b, p 18). On the other hand, Newry is more vulnerable to flooding and does not appear to have the same degree of community capacity. It was reported that some improvement was made in the June–November period through the activities of the Community Flood Facilitator and 'some response and coping networks were built in the Newry community prior to the November

---

[13] In contrast, the information available through commercial radio and television was not highly regarded, with both focus groups commenting on the sensationalism and inaccuracy of commercial television (including the 'poor modelling' of appropriate behaviour by a reporter standing in the floodwater).

Flood' (Molino Stewart 2008b, p 18). It was felt, however, that more work needed to be done to assist in building the 'adaptive capability' of the community. This was probably not assisted when the one community meeting held in relation to the November flood was located in Tinamba. As a consequence, Newry focus group participants:

> felt that they were excluded from the community because many said they were not invited or believed the meeting was only for Tinamba. Apparently only four Newry residents attended the community meeting (Molino Stewart 2008b, p 16).

The author of the report concluded a discussion on the differences between the two communities with a comment that highlighted the crucial importance of the community context in program design and implementation:

> Understanding communities is a critical first step in any community education program. It provides context for the design of effective education programs tailored to local needs. It also provides a guide to how to develop community participation ... If possible, there should be more community participation in this design to enable more ownership of the local content, implementation and evaluation (Molino Stewart 2008b, p 18).

Awareness of the local communities' attitudes and sensitivities associated with issues such as the location and publicity for 'during event' meetings is an important benefit of careful attention to community engagement and participation in planning for natural hazard awareness and education programs.

An additional theoretical perspective on the VICSES FloodSmart program

In a subsequent publication, Dufty (2008) developed a theoretical model for flood education on the basis of the Molino Stewart experience in evaluating FloodSmart and similar programs. The model combines Douglas Paton's work on developing and validating a complex 'socio-cognitive' model of disaster preparedness (eg Paton, D 2003; Paton, D et al 2006, 2008; Paton, D, Smith & Johnston 2000; Paton, D, Smith & Violanti 2000) with understandings generated from the Molino Stewart evaluations. The model is mapped onto a four-step conception of the 'flood cycle': pre-flood, flood, restoration and long-term (also 'pre-flood' in the next cycle). It is based on the premise that 'most [flood and other natural hazard programs] appeared to be largely ineffective in preparing communities for flood events', along with five 'underlying principles':

- sustainability
- community participation
- lifelong learning
- continual improvement, and
- integration (Dufty 2008, p 10).

The desired long-term outcome ('aim') of flood education is seen as helping to build 'flood resilient communities', with 'resilient' defined as 'how well a community can anticipate, prepare for, respond to and recover quickly from floods but also its ability to learn from and improve after flood events' (Dufty 2008, p 15). Elements of the Dufty model derived from the work of Paton include:

- socio-cognitive 'precursors' (to change)
- 'intention formation', and
- 'conversion' to preparedness (Dufty 2008, pp 18–19).

Preparedness conversion, a 'pre-flood' process, is seen as the first, critical, prerequisite and motivating step for flood education to achieve. It is defined as 'Helping people, organisations and communities learn how to commence and maintain preparations for flooding'. Preparedness conversion is followed by:

- 'mitigation behaviours' (a process occurring across the pre-flood, flood and restoration periods—'Learning what to do before, during and after a flood')
- adaptive capability ('Learning how to change and maintain social systems and build community competencies (eg skills, leadership) to minimise the impacts of flooding'), and, finally,
- post-flood learnings ('Learning how to improve (the above steps)' related to long-term flood recovery.

Dufty points out that most current flood education focuses on the 'preparedness conversion' and 'mitigation' steps in his model, with 'little being done on building "adaptive capability"' and community learning after floods (Dufty 2008, p 17). Diagrammatic representations of the Dufty and Paton models can be found in the publications cited.

CHAPTER 6

Localised community engagement and education activities and programs

Operation Bushfire Blitz

Bushfire Blitz community street meetings (now known as Fire Ready Victoria street meetings) were classified as 'localised community engagement and education activities and programs'. The project manager published an evaluative report on the first year of the program (Hill 1998). Subsequently, Rhodes (2001) summarised the results of a number of unpublished internal agency research studies and developed a program theory for the initiative. Rhodes (2003) also discussed the results of the various evaluation studies in a later conference presentation.

Program background and rationale

Bushfire Blitz was a neighbourhood street meeting program delivered by the Country Fire Authority, Victoria. The program continued under that name until the 2003/04 fire season. Its format has since been incorporated, along with parallel community-hall meetings, under an expanded Fire Ready Victoria program.

Bushfire Blitz was first conducted during an eight-week period at the commencement of the 1997/98 fire season. During that season, approximately 1400 meetings attended by around 33,000 people were conducted (once in each locality) in identified high-risk areas in Victoria (Hill 1998). Meetings were between one and one-and-a-half hours' duration. Target areas for Bushfire Blitz were identified using GIS (geographic information system) technology. Fire intensity, population and housing data were utilised to generate the maps, which were then distributed to local fire brigades to validate and select specific locations. The program was managed and administered by a project manager. Seven program coordinators were employed for a 12–16 week period, and the program was delivered by 55 'community consultants', recruited from volunteer fire brigades, who worked for a period of eight weeks (Hill 1998). The community consultants were given a lesson plan to guide their presentations, and they and the program coordinators attended a two-day training session. The presentation was designed to cover the following issues: facts about bushfire risk; personal and family safety; preparing your home; helping your neighbours; risk identification and practical solutions; planning what to do

on high-risk days; what residents can expect from the fire brigade; and Community Fireguard (the CFA ongoing community group program, see later this chapter). The Bushfire Blitz session also incorporated a street walk.

Evaluation methods

The unpublished studies summarised by Rhodes (2001) reported the results of:

- a nominal group consultation workshop with ten fire services personnel in the areas of fire behaviour, risk management, education and fire prevention to elaborate an understanding of 'effective household preparedness for bushfire' (Rhodes 2001, p 59)
- eight focus groups with residents from outer metropolitan and rural areas of Victoria, and
- two multi-method studies (structured and semi-structured interviews, questionnaire surveys, participant observation of meetings) of presenters and attendees at Bushfire Blitz meetings across two fire seasons.

Context

In its first year of operation, Bushfire Blitz meetings were mainly targeted to high fire-risk localities within a 100-kilometre radius of Melbourne. This included localities that had experienced extremely low rainfall during 1997, and urban/rural interface localities where, historically, the majority of lives and properties in the State have been lost to bushfire. The program was extended to other, more rural, areas of Victoria in later years.

Individual/householder-level outcomes and causal processes

From survey data Rhodes (2001, p 64) concluded that the program appealed to both previous and new attendees and that there was a strong emphasis on obtaining contextualised information about bushfire among attendees. Almost half the respondents to one survey indicated the 'importance of having information about their environment' as their reason for attending the meeting, while the majority of respondents to the other survey highlighted their desire 'to develop their understanding of the risk associated with living in a fire prone area' (p 76). The latter responses also suggested that what residents valued most about the meetings were 'the opportunity to learn and test knowledge', the 'community interaction' and the 'personalised and local information'.

Two important outcomes were identified on the basis of a variable that categorised the pattern of meeting attendance. First, people who had attended previously and during the current fire season had

higher levels of knowledge about bushfire compared (in order) with those who attended during the current season but had not attended previously, those who had attended previously but not during the current season and, finally, those who had not attended a meeting. A similar pattern was observed for self-reported levels of bushfire preparation (both outcomes were measured by multi-item indices). While it is not possible to infer from these cross-sectional data that there was a causal relationship between attendance and knowledge and preparedness, the observation that, for both outcomes, recency of attendance, as well as frequency, was associated with knowledge and preparedness is persuasive in relation to a causal impact of program attendance.

Rhodes (2001) also tentatively identified a number of possible causal processes in relation to these outcomes, including:

- trust and credibility of the fire agency
- 'readiness' from recent experience of a bushfire
- two-way communication in meetings (albeit that audience participation in most meetings was found to be low, with most presenters using a didactic approach)
- a 'sense of obligation' resulting from the perceived commitment of the fire agency to the issue and the program
- positive reinforcement and encouragement of resident actions by the presenter
- peer influence, hearing other community members discuss their preparations and plans for bushfire
- an 'inspiration effect' of first attendance at this type of meeting resulting in motivation to take preparedness action, often for the first time.

Community-level/organisational outcomes and causal processes

Hill (1998, p 36) highlighted that one of the aims of the Bushfire Blitz program was to 'promote the concept of community interdependence'. He also noted that the agency approach to bushfire management was focused 'heavily on social solutions to safety and creating a partnership with the community, rather than a total reliance on technological solutions' (p 35). In assessing the outcomes of the program, Hill (1998, p 37) noted that:

- the decision to use trained volunteers as presenters was successful, as (among other factors) 'in

many cases [they had] an empathy with the local community and brigade'

- Bushfire Blitz had 'achieved a level of community development and interdependence that goes far beyond the direct benefits of fire safety', and
- during the first year of operation of the program, '250 brigades ... improved the relationship with their communities', including an increased recruitment of volunteers.

In conclusion, Hill (1998, p 38) emphasised the value of Bushfire Blitz as part of a range of programs offered by the agency: 'What is clear is that no one program has provided all the solutions in isolation. *It is the full suite of integrated programs and activities* that provides real benefits to the community' (emphasis added).

Specific aspects of context

Rhodes (2001, pp 71–2) highlighted the importance of differences between residents in high fire-risk localities. On the basis of the survey research, he identified sub-groups of:

- 'resistors'—residents who had done little preparation, had no plan except to leave if threatened, were least knowledgeable about bushfire, less interested in finding out, had low self-reliance, had never attended a bushfire safety meeting and were least likely to in future
- 'motivated'—residents who had undertaken up to moderate amounts of preparation but had no plan except to leave if threatened, were more knowledgeable and interested than the resistors, and had a higher level of self-reliance, had attended a fire safety meeting at least once and were more likely than resistors to attend one in the future (also includes residents new to the area with limited preparation but some interest), and
- 'actives'—residents who had high levels of preparation, including a plan with a clear intention to stay and defend their properties or to leave early before being directly threatened; they were the most knowledgeable, self-reliant and interested, had typically attended a fire safety meeting more than once and would attend in the future.

These sub-groups of residents also had a different response to the agency and level of acceptance of the agency programs. Rhodes (2001) speculated that different mechanisms might be in operation within the three sub-groups in relation to the Bushfire Blitz program but this idea of an interaction between 'resident type' and program was not investigated further.

Theoretical models for Bushfire Blitz

A primary purpose of Rhodes' (2001) study was to develop a program theory for Bushfire Blitz that would focus future evaluative work. Some aspects of this theoretical work are summarised below.

A comprehensive list of desired short/medium-term outcomes

Rhodes' (2001; see also Rhodes 2003) initial consultation study identified five 'key dimensions' of community preparedness that provide a broad and comprehensive list of the specific short/medium-term outcomes at the individual/household level that might be achieved through community safety initiatives. They are (Rhodes 2003, p 1, emphasis added):

- *awareness* and *recognition* of the wildfire risk
- *knowledge* of fire behaviour and fire safety measures
- *planning* for the event of fire
- *physical preparations* of property and household, and
- *psychological readiness* involving confidence and self-reliance.

A revised conception of preparedness

Rhodes (2001, p 79–80) argued that placing preparedness along a simple continuum from less effective to more effective is not appropriate. This is because what may be considered 'prepared' in one social or physical context may not be considered as prepared in another. Rather, he proposed that preparedness should be considered as a 'tiled mosaic' where 'different forms of preparedness are defined relative to each other and the context' and thus in relation to the circumstances of each household, the physical environment, the capacity of individuals and the community to deal with the risk, and the likely nature and severity of a fire event. Rhodes (2001, p 80) concluded that, 'To a large extent, only the residents, suitably informed about the nature of the risk and precautionary measures, are able to determine what is appropriate for their particular circumstances'.

A model of the decision-making process

Developing from this revised conception of preparedness, Rhodes argued that different forms of preparedness (some more effective than others) will be the outcome of different patterns of decision making. This process will be shaped by various influences, including the nature of the hazard, individual attitudes and prior beliefs, social influences and socioeconomic factors. Collectively, these factors are seen as constituting an 'orientation to the risk' that influences the decision-making process (the choices made and the ways available resources are used), which, in turn, shapes the decision to

adopt, and the implementation of, precautionary actions and thus results in a particular pattern of preparedness. Critically, the model suggests that a program such as Bushfire Blitz will, if successful, result in attendees re-tracing and re-examining risk appraisals and decisions previously made at the various stages of response to the risk and modifying the choices made to achieve a different, more effective pattern of preparedness.

A generalised model of program impact

In conclusion, Rhodes (2001, p 100) presents a simple four-step causal model for a program such as Bushfire Blitz. The model posits that a 'meeting with the appropriate qualities' will *engage* those who participate and subsequently *activate* a range of psycho-social mechanisms that will lead them to *revise* their prior decisions about responding to the bushfire risk and thus take 'appropriate additional actions'. Participant characteristics and the nature of the meeting are seen as possibly influencing the various psycho-social mechanisms directly but are also likely to be mediated through the level and nature of the active involvement of participants in the meeting.

A synthesised program theory model

A provisional program theory model for Bushfire Blitz (Figure 6:1) was developed for the review from a synthesis of the generalised theory model developed by Rhodes (2001), discussed above, and from a table in his report that identified the salient contexts, mechanisms and outcomes identified from the various studies of Bushfire Blitz that he summarised.

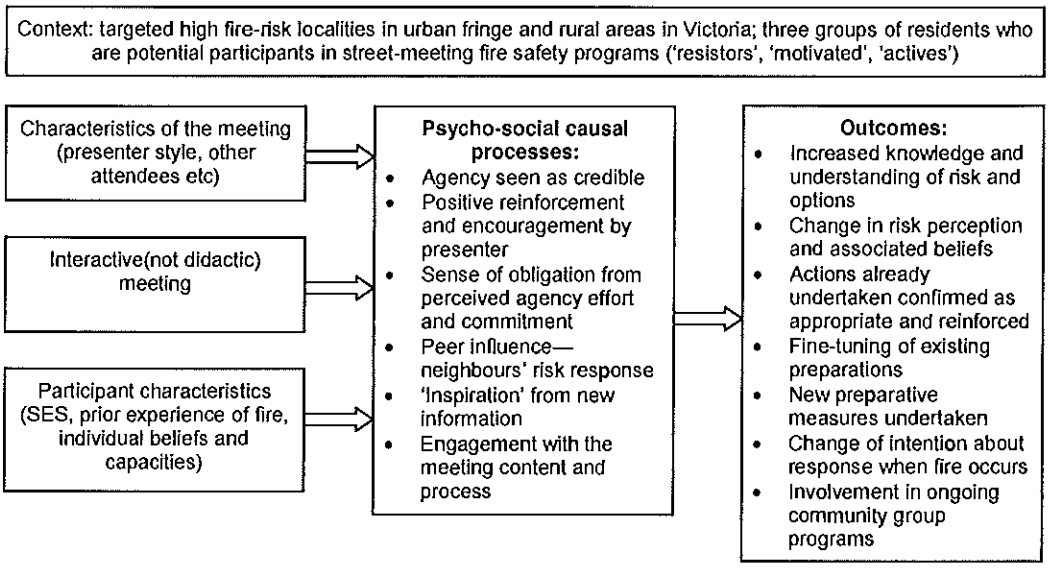


Figure 0:1 A synthesised program theory model for Bushfire Blitz

Street FireWise

Street FireWise community meetings in the Blue Mountains region of New South Wales were classified as 'localised community engagement and education activities and programs'. An evaluation of this program, conducted under the aegis of the Bushfire Cooperative Research Centre, was reported by Gilbert (2005).

Program background and rationale

Street FireWise is a bushfire community education program offered by the Rural Fire Service in the Blue Mountains region of New South Wales. It commenced as a pilot program in 2000. The number of meetings held peaked in the 2001/02 fire season (a little fewer than 50) and the number of attendees peaked in 2002/03 (300–350). Since that time meeting and attendance numbers have declined. The program is typically delivered as a 90-minute 'street corner' meeting on a Saturday by a volunteer presenter and members of a Rural Fire Service volunteer brigade, but has also taken the form of a community hall meeting. A mobile information trailer supports the program presenters.

Evaluation methods

Data were gathered by semi-structured interview with fire brigade captains, program presenters and a sample of residents, and were augmented by discussions with key members of the Blue Mountains Rural Fire Service Community Education Group (a management group consisting of volunteer representatives from local fire brigades). A range of other resources was used, including a report on a pilot program. Eight key anticipated/desired outcomes of the program were identified from the

discussions with the Community Education Group and arranged into an outcomes hierarchy. This hierarchy informed gathering and analysis of outcomes data from the semi-structured interviews and was gradually extended to a more comprehensive program theory as various conditions that either facilitated or constrained achievement of the outcomes were identified.

Program context

The Blue Mountains is a high fire-risk region in New South Wales and is between 55 and 95 kilometres west of the Sydney central business district (CBD). The region comprises about 26 towns and townships with a population of approximately 27,000, of whom about 20,000 live in high fire-risk localities. Topographically, the Blue Mountains area is an uplifted plateau dissected by numerous rivers and creeks that form a broken landscape of ridgelines, escarpments, deep valleys and canyons. Most settlements lie along the main highway that follows a ridgeline between two of the major river systems that dissect the plateau. The region experiences an average of 14 bushfires each year (range: two to 40). Since 1911, 580 houses have been destroyed by fire. Fourteen lives were lost in the period 1945–2000.

Locally, three sub-regions of the Blue Mountains are distinguished: 'lower', 'middle' (central) and 'upper' (see location map, Figure 6:2). The lower region is an urban-fringe locality continuing through the first seven or eight townships on the main highway, while the Central Blue Mountains largely consists of a collection of approximately eight towns and townships that lie further west on the highway up to the well-known tourist centre of Katoomba. The upper Blue Mountains region is constituted by a small number of townships still further west, together with some more isolated settlements. Significant demographic change has occurred in the region over the past 20 years, with many townships (particularly in the lower Blue Mountains) attracting young couples and retirees. These changes have been associated with the conversion of holiday homes to permanent accommodation and an increase in commuting to work in the Sydney region.

Climatically, the region is divided into 'dry' and 'moist' zones. The dry zone corresponds roughly with the lower Blue Mountains on the eastern escarpment and lower areas of the plateau and experiences a significantly higher incidence of fires. This complex geographic, climactic and socio-demographic context posed a significant challenge to fire brigades in selecting appropriate venues for Street FireWise meetings.

Individual/householder-level causal processes and outcomes

The focus of the report in relation to householder response is on interviewee perceptions of factors

that generate a positive householder response to the program.

Awareness of meetings

Hand delivery of flyers advertising meetings, word-of-mouth in close-knit communities and newsletters were identified as strategies that initiated and supported meeting attendance.

The following mechanisms were also identified as possible determinants of meeting attendance:

- credibility of the local fire brigade—this differs across the region and is lower in the more suburban localities where brigades are no longer a central part of a local community
- initial appreciation of bushfire risk in the region—again likely to be lower in the more urbanised localities
- residents' perceptions of meetings.

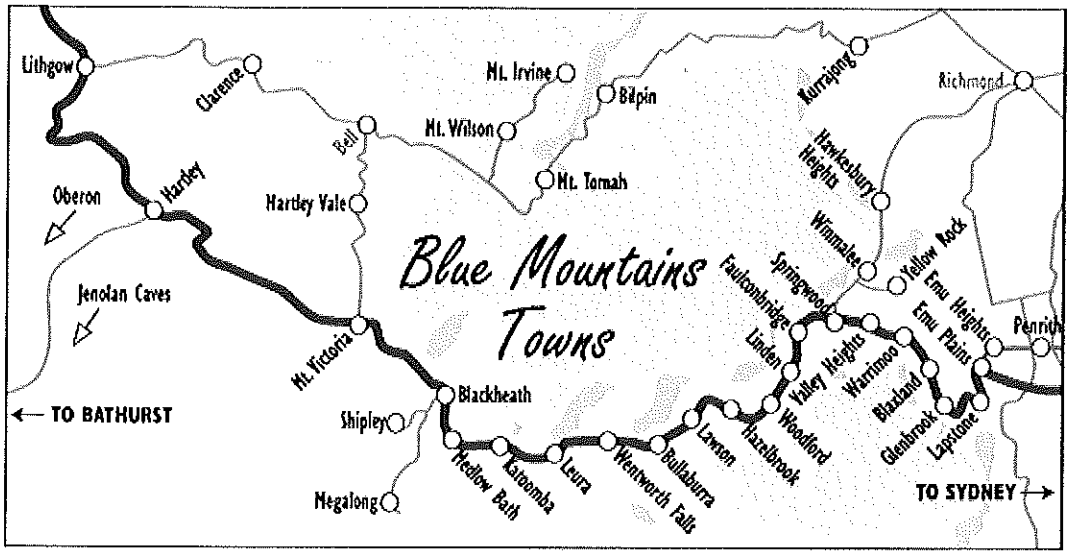


Figure 0:2 The towns and townships in the Blue Mountains, New South Wales

(reproduced from bluemountainsaustralia.com <http://bluemts.com.au/tourist/about/map-bluemountains.asp>)

Short-term outcomes

The following strategies were related to a positive resident response to the meetings:

- a two-way interactive meeting process (rather than a didactic presentation)—presenters who were

able to generate discussion were positively regarded by residents

- use of the information trailers
- use of a 'standard' script to ensure message consistency
- continuing amendment of the meeting script to enhance local relevance
- a focus on the key elements of the bushfire safety message
- use of positive reinforcement of householder activity rather than negative messages and 'scare tactics'
- the ability of the presenter to utilise local features in the presentation and discussion.

These strategies were believed to lead to an increase in resident awareness and understanding of bushfire risk, mediated by the following processes:

- building on existing resident knowledge
- changing misconceptions
- introducing new ideas
- contextualising issues to the local situation
- generating resident understanding of how they can contribute to mitigation
- generating a clearer understanding of the role of the local fire brigade.

Longer-term outcomes

The Street FireWise model assumes that the program is only one element in a change process leading to more effective resident planning and preparation for bushfire. It is seen as building on existing resident thinking and action through a process of re-examination of present plans and strategies, and discussion with family, neighbours and friends to facilitate empowerment and self-reliance.

The following were seen as possible enabling and constraining conditions in relation to this process:

- availability of time, money and resources—seen to vary across socio-demographic differences in the region

- ability to carry out necessary preparatory work—elderly or single residents may not have the necessary capacity
- motivational factors, the willingness to accept new ideas
- peer influence, triggered by enthusiasm observed and/or networks established at the meeting.

Community-level/organisational causal processes and outcomes

Approximately half of the 21 fire brigades in the region were characterised as 'active' in delivering the program. Levels of brigade participation varied considerably. Those brigades where involvement was greatest were, typically, those with membership links with the district Community Education Group and where there was an individual member who facilitated the program (a program 'champion'). Four groups of brigades were identified in the evaluation. Drawing on the description in the report, these groups might be characterised as:

- active fidelity adopters
- active adopters
- non-adopters who implement other community education initiatives
- non-adopters of community education generally.

While the level of acceptance of Street FireWise appeared to be associated with brigade participation in the program, there was reported to be generally good support among fire brigade members. While not all were supportive, there were generally sufficient interested members to attend meetings if required. It was also reported that Street FireWise in active brigades was becoming more widely accepted and 'seeping into the culture' (Gilbert 2005, p 14). The high workload of volunteer brigade members, a more general decline in volunteerism and the need for support at the district level to locate the right personnel for the program were mentioned as barriers to wider acceptance. A small core group of program presenters has been developed by the Community Education Group but recruitment of appropriately skilled volunteers and retention were identified as problematic. Reliance on a small group of presenters was perceived to impact negatively on the quality of meetings.

It was originally intended that Street FireWise meetings might facilitate the formation of formal ongoing fire-safe groups. This had not been successful and is no longer part of the scripted Street FireWise strategy. However, there is evidence that some less formal ongoing groups have formed and are, in some cases, assisted by Street FireWise presenters.

The importance of context

Adoption of Street FireWise was found to vary with context. In the words of the report:

> small/medium sized settlements in the middle region of the Blue Mountains have had the biggest uptake. The upper and lower Blue Mountains have had greater difficulties with implementing [Street FireWise]. The challenges in the upper Blue Mountains have been the isolated and spread out rural communities, which make a street meeting format unsuitable. Meanwhile in the lower Blue Mountains, the settlements are considerably larger in size and much more suburban ... (Gilbert 2005, p 14).

Geographic and socio-demographic context thus appeared to be critical in the adoption of the program. Additionally, the nature of the fire season had an impact on program delivery. Prior to the evaluation, the region had experienced a number of bad fire seasons and brigade activity had been diverted away from community education to operational work.

A theory model for Street FireWise

The Street FireWise evaluation was framed by an outcome hierarchy that was developed on the basis of early interviews conducted in the evaluation. This outcome hierarchy was linked in the evaluation report with many of the causal processes discussed above to form a revised program theory matrix of mechanism–outcome links. A modified version of this matrix is reproduced in Figure 6:3. It should also be emphasised that aspects of the socio-demographic and associated geographic context of the Blue Mountains region appear to be very important in moderating the effectiveness of the program. The more demographically stable central Blue Mountains, consisting of a number of townships that run along the main highway with a pattern of side streets, parks etc, appears to provide a generally supporting context for the successful implementation of the street meeting format.

Facilitating causal processes		Program outcomes (short to longer term)	

Availability of ongoing community fire-safe group in local brigade area. Sense of community. Level of community interaction.		Formation of neighbourhood networks.
Time, money and resources available to residents to undertake work. Ability to carry out necessary work. Motivational factors (eg peer influence, past experience, inspiration of new ideas). Support network. Residents re-assess previous decisions. Residents develop strategies and mechanisms to overcome limited capacities.		Residents use awareness and understanding to develop a realistic survival plan, decide whether to stay and actively defend or leave early, and adopt appropriate preparations around their properties, ie they become more self-reliant.
Presenters convey the relevant information (in an interactive rather than didactic manner). Residents 'take on board' the information. Presenters utilise local features.		Residents gain an increased awareness and understanding of bushfire risk and how it applies to their own specific context.
Atmosphere is conducive to learning. Quality of presentation. Content of meeting and quality of the script followed. Presenter provides positive and clear messages. Messages 'strike a chord' with residents.		Street FireWise meetings are positively received by residents.

⇨ Adequate provision of information about meetings. Timing of meeting convenient to the majority of residents. Credibility of the local brigades. People have a basic appreciation that there is a bushfire risk in the area.		Targeted residents hear about meeting, are motivated to attend and do so.	
⇨ brigade is willing and/or able to participate. Volunteers understand and recognise the benefit of Street FireWise treatment. Brigades identify clearly the high-risk areas. Availability of appropriately skilled presenters.		Brigades actively participate in Street FireWise by targeting high-risk communities and running meetings.	
Context: program facilitated by the geographic features of the locality and the socio-demographic characteristics of the central Blue Mountains			

Figure 0:3 An outcomes hierarchy for Street FireWise with associated causal processes

Community Fireguard

Community Fireguard, an ongoing group fire-safe program in Victoria, was classified as one of the 'localised community engagement and education activities and programs'. An evaluation of this program was conducted by Rohrmann (1999) and was also reported by Boura (1998a, 1998b).

Program background and rationale

Community Fireguard (hereafter 'Fireguard') is a program developed and supported by the Country Fire Authority (CFA), Victoria. The program commenced operation in 1993 and grew to include approximately 400 active groups by 1998 (Boura 1998a, 1998b). Fireguard involves the formation of ongoing groups of residents in fire-prone localities supported by professional facilitators employed by the CFA. As stated in the introductory brochure to the program, Fireguard groups are ideally small and made up of neighbours or residents 'living in a shared bushfire risk environment'. Usually the

groups meet in members' homes.

While Fireguard groups are encouraged to develop their own local bushfire safety strategies, the program has common elements that are covered during the first year of operation (typically in four or five meetings). The common elements include an introduction to the program; fire behaviour; personal survival; house survival; street walk; fire protection equipment; and developing personal and household bushfire survival plans. Additional ongoing activities might include organising fuel reduction working bees; planning a shared response and becoming familiar with other members' properties and equipment; making plans with the more vulnerable community members; establishing a telephone warning tree; working out new ways to share resources and information; and bulk buying personal protective clothing and equipment.

Fireguard groups are not volunteer firefighting units and there is no expectation that members will be active in responding to a bushfire beyond the protection of their own homes and their immediate surrounds (unless they are also members of a local volunteer brigade).

Evaluation methods

Rohrmann's (1999) study involved a sample of 110 Fireguard group members active for one to two years, 21 members from one newly formed group and three comparison samples of non-members. A group of 20 CFA staff members also participated in the study. Data were gathered by face-to-face structured interviews.

The evaluation was informed by a conceptual model derived from social-psychological risk communication theory. The model suggests that the final desired change (outcome variable) of 'risk-reducing behaviour' results from a cognitive process involving risk (re)appraisal and decision making in relation to preventive actions that follow a risk communication activity. This might be thought of as the primary causal pathway in the model. However, the model also recognises, importantly, that a complex evaluation process is activated in those who are exposed to the risk communication that is influenced by both personal characteristics of the recipient (eg prior hazard exposure, risk-specific beliefs) and various contextual factors including characteristics of the information source and the recipient's social environment (family, friends, community).

Program context

Fireguard groups are active across most rural and urban interface regions in Victoria but appear to be particularly prevalent in peri-urban and rural localities on the outskirts of Melbourne. Municipal websites, for example, report that in September 2008 there were 153 Fireguard groups in the Shire of

Yarra Ranges to the east of Melbourne and 60 in the Macedon Ranges to the west.

Individual/householder-level outcomes and causal processes

The evaluation **reported** that Fireguard participants:

- were more likely to accept responsibility for bushfire preparedness and safety rather than seeing this as predominantly a fire agency task[14]
- rated their overall bushfire preparedness higher[15] and
- undertook more preparedness actions.[16]

A similar comparison of the newly formed Fireguard group against the group of non-participating residents from the same area showed that the view that the fire agency was responsible for fire safety decreased in the Fireguard group over an initial six-month period of membership more than it did in the comparison group. Additionally, the number of preparedness actions taken by the new Fireguard members increased significantly. More specifically, the greatest change was observed for 'joint planning with neighbours' and 'writing down planning for bushfire events' (Rohrmann 1999). Further, it is reported elsewhere that the evaluation found that:

> Community Fireguard members rate significantly higher for more sophisticated strategies; in terms of planning (including family, clothing, animals), discussion of plans with family, joint planning with neighbours, taking care of the vulnerable in their community, setting up warning systems within the community, and deciding on evacuation (Boura 1998b, p 11).

Community-level/organisational outcomes and causal processes

---

[14] As calculated from the reported results, the relevant effect sizes (ES) of the comparison between the Fireguard group (N = 110) and residents in similar fire prone areas (N = 126) 0.37 and 0.43 respectively. These figures indicate small differences between the comparison groups (conventionally an ES >0.2 is regarded as small, an ES >0.5 as medium and an ES >0.8 as large).

[15] ES 0.64, ie a medium-sized difference.

[16]16 ES 1.6, ie a large difference. Note, however, that the author regarded all reported differences as 'not very large'.

As the focus of the primary evaluation report is on attitude and behaviour change among individual Fireguard participants, little information is available on processes or outcomes at the group or community level. It is interesting, however, to note again that a strong change in the newly formed groups appeared to have occurred in joint planning for bushfire with neighbours. As Fireguard groups are desirably formed from householders within an immediate neighbourhood, this finding is an initial indication that strengthening local ties is a feature of early participation in the groups.

Boura (1998b, p 6) noted that 'The vast majority of ... groups are self initiated', often by one or two residents concerned about their bushfire safety or in response to a local issue. Other groups are formed following agency activity or develop from other community groups (eg Landcare). It is also claimed that Fireguard activities are built on principles of adult education, including the recognition of local knowledge and, importantly, empowerment principles.

> Empowerment requires people to realise that they are responsible for their own safety, and accept that they themselves can do what is necessary to successfully manage the threat of fire. They need to overcome the learned helplessness promoted by inaccurate and sensationalised media reporting of wildfires. They also need to have the knowledge and skills to develop their own strategies, and they need the technical and resource support to enable them to implement those strategies (Boura 1998b, p 8).

Additionally, it is argued that Fireguard is designed to facilitate a partnership between the fire agency and the community. Fireguard is viewed not just as an education program. Rather, it provides a framework for emergency services to interact with high-risk communities throughout the emergency management process—prevention, preparation, response and recovery. In this way, Fireguard is viewed as 'fundamentally different from other "education" programs', which are seen as limited to provision of prevention or preparedness messages (Boura 1998b, p 10).

Finally, it is argued that this evolving partnership placed members of Fireguard groups in a unique relationship with fire agencies during an event and results in increased trust of agency decisions and activities.

> Community Fireguard groups are in a unique position to interact with emergency managers during a wildfire. Not only does the education phase give them the knowledge necessary to appreciate the issues of emergency management, but their history of working with local CFA brigades and staff, and personnel from local government and public authorities to solve fire safety issues has built up confidence and trust (Boura 1998, p 10).

These expectations of the Fireguard program at the group and community level have, however, not been explicitly validated by research findings. There is, for example, no specific evidence that empowerment is a critical causal factor in group success (eg that those groups formed on the basis of local initiatives and managed by community members are more successful compared with those initiated and possibly directed by agency personnel) and, similarly, no information about the specific nature of the hypothesised agency/community partnership arrangements and how this partnership leads to the increased trust in the fire and other agency staff and activities.

A theory model for the Community Fireguard program

A tentative program theory model for the Community Fireguard program that incorporates the more salient of the causal links proposed in the evaluation is presented in Figure 6:4.

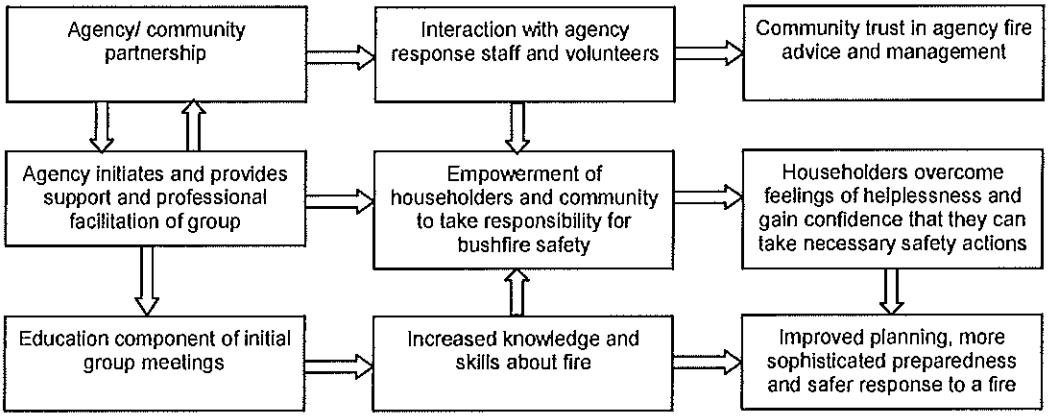


Figure 0:4 A tentative program theory model for Community Fireguard

Community Fire Units

Community Fire Units (CFUs) are volunteer teams of local residents organised and trained under the aegis of the New South Wales Fire Brigades (NSWFB) and, more recently, the Australian Capital Territory Fire Brigade. CFUs have both a preparedness and first-response role in relation to bushfire and they have been classified as 'localised community engagement and education activities and programs'. A case study that, *inter alia*, focused on the context, causal processes, outcomes and unintended consequences of CFUs for individual members and communities is reported by Lowe, Haynes and Byrne (2008). Some additional information for this summary was drawn from the NSWFB (2008) Community Fire Units brochure.

Program background and rationale

NSWFB is an urban fire and rescue service with responsibility for fire emergencies in the major cities and towns of the State. The service is responsible for fires in urban interface localities in these major cities and towns, and thus has a significant bushfire fighting capability. Aside from CFU members, it is a fully professional service with no volunteer fire brigades. The CFU program is a unique approach in Australia in that it is designed to combine household preparedness and first-response/mopping-up activities and might be best described as a 'hybrid volunteer system' (Lowe, Haynes and Byrne 2008, p 23).

Members of CFUs are local volunteers and have the task of protecting their properties in their specific designated localities (eg a street section or cul-de-sac) from an initial bushfire attack (ember attack) and spot fires prior to the arrival of a NSWFB response team. CFUs also assist with mopping-up operations after the fire front has passed. Members are fully insured and provided with protective clothing and 20 hours of training from the NSWFB. The training covers bushfire knowledge, safe house care and gardening practices, household planning and preparation, operating basic firefighting equipment and mopping up operations. A typical CFU team is made up of six to 12 members and, when trained, is provided with a trailer or fixed cabinet of basic firefighting equipment and protective clothing. Local NSWFB stations provide ongoing training of units.

The CFU program commenced in New South Wales in 1994. Membership and the number of units has grown quite rapidly and steadily from that time. As of May 2007 there were 330 units with approximately 6000 members throughout the State.

Evaluation methods

A multi-method approach was used (Lowe, Haynes and Byrne 2008, p 21), including interviews with agency personnel, a questionnaire survey of 670 CFU members, a questionnaire survey of the general public and four focus groups with CFU members. The published report relies largely on the CFU member survey and focus groups.

Context

CFUs were developed specifically for the urban interface context of New South Wales cities and larger towns where it was believed that there was a less well-developed 'sense of community responsibility' than in rural areas and a 'greater reliance on agency or government support in times of crisis' (Lowe, Haynes and Byrne 2008, p 23). Additionally, the socioeconomic characteristics of many urban interface localities meant that potential volunteers were not able to make a large time commitment to an organisation, such as that required for membership of a volunteer fire brigade. The CFU model was thus designed to provide urban interface communities with 'a level of self-reliance

with a minimum of commitment' (Lowe, Haynes and Byrne 2008, p 23). Urban interface regions are expanding rapidly into rural areas in New South Wales and are subject to quickly developing fires with the potential to over-run available firefighting resources (Lowe, Haynes and Byrne 2008, p 23). Localities that were targeted by the NSWFB for development of CFUs included streets that had a particular risk due to poor access and a topography of proximity to high fuel loads (Lowe, Haynes and Byrne 2008, p 29).

It was also reported that localities with CFUs were 'likely to exhibit other forms of community action ... such as neighbourhood watch or bushcare groups, suggesting an existing spirit of community action and co-operation' (Lowe, Haynes and Byrne 2008, p 29). This increased social cohesion might be associated with the homogeneity of households in the locality (similarities in age, family development, background, community stability, shared bushfire experience) and the particular nature of the high-risk locality (suburban cul-de-sacs on the urban fringe).

Individual/householder-level causal processes and outcomes

Lowe, Haynes and Byrne (2008, p 29) reported that individuals involved in CFUs:

- ecognised the high bushfire risk in their local areas
- may have 'felt that a declining number of fuel reduction burns in recent years had increased their risk'
- were likely to have been involved with bushfires in the past and to have defended their homes using their own resources (often shared with neighbours)
- if previously involved with bushfire, some felt that the trauma had 'generated a heightened state of anxiety'
- if not previously involved with bushfire, were aware of the fire risk in their neighbourhood
- felt 'helpless and unsure' prior to their involvement with the CFU
- had a strong motivation to protect their homes and properties.

As a result of CFU membership, they reported:

- gaining confidence in their ability to organise themselves, plan, and to stay and defend their homes

- having enhanced local knowledge (knowing each other's resources, the best configuration of equipment for particular circumstances, status and whereabouts of other residents)
- as a specific result of the firefighting equipment provided, feeling more independent and self-reliant
- feeling a greater connection with their immediate neighbours
- learning to trust their neighbours
- feeling that 'looking after each other' would become increasingly important as they become older
- feeling that they had obtained great personal benefit from CFU membership with little sacrifice.

Community-level/organisational outcomes

Lowe, Haynes and Byrne (2008, pp 23–4) summed up the community-level 'theory' of the CFUs succinctly as follows:

> The CFU approach is intended to empower community members to be proactive in the defence of their own properties by utilising existing social capital and local knowledge ... as an important resource. This ... is enhanced by providing communities with equipment, further knowledge and improved social networks required to carry out a limited but important role. It is hoped that this fusion of expert and local skills, knowledge and networks will produce a more resilient urban interface.

The CFU approach was designed to combine the top-down 'command and control' management structure (which is typical of fire response agencies) with bottom-up community involvement. The aim is to 'balance strong leadership and strict hierarchy with the people management skills required to maintain volunteer preparedness ...' (Lowe, Haynes and Byrne 2008, p 23).

Lowe, Haynes and Byrne (2008, pp 29–30) suggest that the evidence from their survey and focus groups confirms that the formation of a CFU has led to increased community resilience and cohesion in a locality (connections expanding from an initial core group to a wider range of residents). CFUs that had been actively involved in an incident 'worked well together' and benefited from 'understanding fire brigade operations and procedures', and successful defence of homes and property resulted from 'a more detailed knowledge of pre-fire preparations, fire behaviour, likely ignition points and each other's strengths and assets' (Lowe, Haynes and Byrne 2008, p 30).

Unintended (negative) outcomes

The report by Lowe, Haynes and Byrne (2008) is noteworthy for its clear and explicit discussion of a number of unintended and possibly negative outcomes of the CFU program. These include, particularly:

- a focus within the CFU on equipment operation and bushfire response to the possible detriment of household planning and immediate pre-event preparation (many survey respondents, for example, were reported to have a 'wait and see' policy in relation to evacuation, a position that is believed by fire agencies to be particularly disadvantageous to safety)
- that training had not prepared members for what to expect during a real event
- that, particularly in the period after a major event, CFU membership could decline to a small 'core' group that might, in time, be regarded by other community members as an 'impenetrable clique' (Lowe, Haynes and Byrne 2008, p 31)
- that the agency strategy of recruiting CFUs from neighbourhoods where there is existing social cohesion and community groupings excludes less proactive or articulate neighbourhoods where the need for support and resources may be greater
- that there may be conflict between CFU members and others in the locality about prioritising properties to be defended and/or that the presence of a CFU in a neighbourhood might result in a false sense of security.

A theory model for the Community Fire Unit program

The evaluative report on CFUs by Lowe, Haynes and Byrne (1008) is particularly rich in information relating to the context and causal processes potentially activated when a CFU is formed in a specific neighbourhood.

Figure 6:5 is an attempt by the present authors to summarise the more important aspects of the program in the form of a causal theory model.

Context:

- urban fire service with no volunteer fire brigades
- high fire-risk urban fringe localities (suburban streets, cul-de-sacs etc abutting bushland)
- localities with some existing community strength; individuals likely to have had prior fire experience and/or be aware of local risks and motivated to become more self-sufficient ('readiness' at both individual and community levels)
- individuals may have felt anxious, helpless and unsure about present circumstances.

Program strategy:

- potential locality identified by fire agency
- agency provides 20 hours of initial training at local fire station in household planning and protection and basic firefighting techniques
- on completion of training, agency provides CFU with a trailer or cabinet of basic firefighting equipment and personal protective clothing.

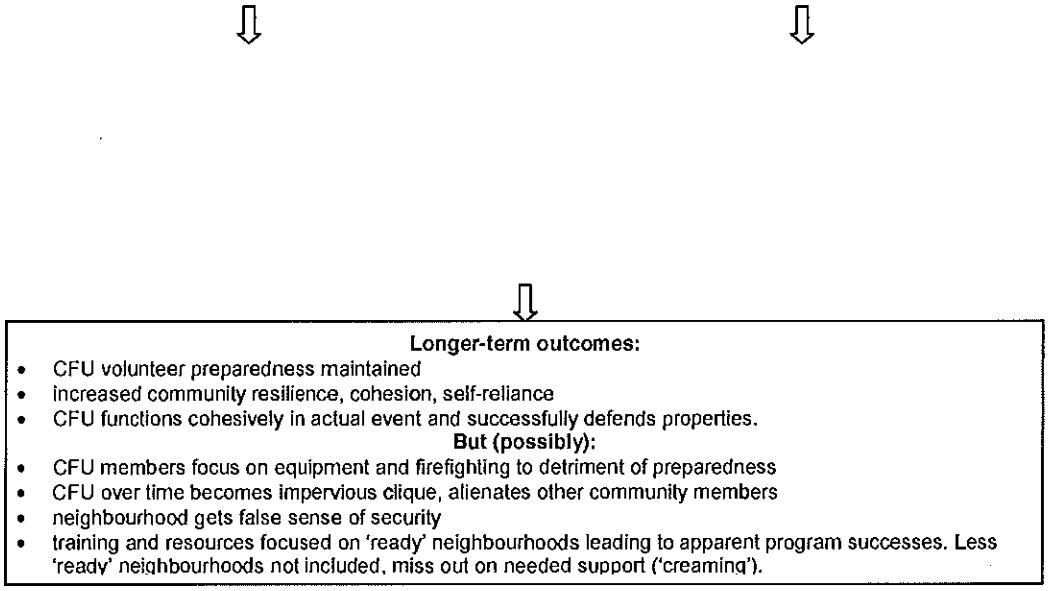


Figure 0:5 A reconstructed program theory model for Community Fire Units

CHAPTER 7

Community consultation, collaboration and development approaches

Ferny Creek Fire Alert Siren

Development of the Ferny Creek Fire Alert Siren was classified under 'community consultation, collaboration and development approaches'. While the result of the activity was a local warning system, accounts of the evaluation (Betts 2001, 2003; Free no date) clearly suggest that it was primarily a community consultation and collaboration process.

Program background, rationale and consultation strategies

A lobbying campaign by a small group of local residents followed a fire in Ferny Creek that was believed to have been deliberately lit and in which three lives and 33 dwellings were lost. A coronial investigation that followed the fire identified the importance of 'early warning to residents in areas of particularly high fire risk'. A working group established by the municipality developed a number of options for a fire alert system and a preferred strategy that corresponded with the resident lobby group proposal—installation of a fire brigade-type 'warning' siren. One of the central aims of the

working group was to 'Maintain a consultative communication link with the Ferny Creek community on the progress of the project' (Betts 2001, p 4). The consultation and communication strategy involved four main strategies:

- a questionnaire to landowners in the trial area
- a residents' meeting
- a door-knock campaign to disseminate information about the alert siren and other bushfire safety issues, and
- a community education campaign using a community newsletter *(On the alert).*

Additionally, information on the progress of the trial was circulated to local newspapers and radio stations, a forum for residents was held prior to the next fire season and a Community Safety Fair was held.

Evaluation methods

Results of a study of the community-related aspects of the Ferny Creek siren development have been reported by the evaluator (Betts 2001, 2003, OESC Research Projects 2002) and a stakeholder (Free no date). While information on the evaluation strategy is somewhat sketchy, it apparently involved interviews with all members of the working group for the project, a questionnaire distributed to residents mid-way though the consultation phase (46 respondents), and a follow-up residents' questionnaire after the subsequent fire season (54 respondents).

Context

Ferny Creek is a township on the north-western side of the Dandenong Ranges, approximately 35 kilometres east of the Melbourne CBD. There were reported to be a total of 680 households in the locality in the 1996 national census. Ferny Creek is a high fire-risk peri-urban setting. The residential subdivision is adjacent to the Dandenong Ranges National Park, which includes spectacular Mountain Ash forest and tree fern gullies. Additionally, the residential locality faces in a direction that is vulnerable to hot, dry summer winds and contains a topographic feature, referred to by locals as the Devils Chimney, which can funnel and concentrate these potentially damaging winds (Free no date).

Individual/householder-level outcomes

A follow-up survey of residents (OESC Research Projects, 2002) indicated that the majority (72%) had a 'thorough knowledge of the fire alert siren and that they had sufficient opportunities to

comment on its introduction' (Betts 2001, p 6). The local municipality newsletter was identified by 77% of respondents as the means by which they kept themselves informed about the project; informal communication was also identified as significant. Approximately 43% of respondents to the survey rated the siren of 'high importance' to them, and 39% rated it of 'medium importance'. In contrast, 68% of respondents believed that the siren would be 'extremely valuable' or 'very valuable' to the community, while 38% believed it would be of high value to the community but of little influence to their own bushfire response. It was reported that the combination of the alert siren and community education information supported the development of individual/householder bushfire survival plans.

Data also suggested a trend towards safer behaviour during a bushfire. Seventy-nine percent of respondents indicated that they would put their bushfire survival plans in place after hearing the alert siren (an increase from 28%). There was also a reduction of 50% in those indicating that they would leave their homes on hearing the siren (Free no date). Taken together, these findings suggest a quite substantial increase in the number of householders reporting that they would follow the 'stay' option of the 'stay–go' policy (stay and defend a prepared property).

Community-level/organisational outcomes

Very little explicit data are reported for outcomes at the community and/or organisational levels. It is reported that the results of one follow-up survey 'identified the significant role of informal communication (social networks of friends and neighbours)' but there is no indication that this important facet of community resilience was changed by the community consultation intervention (Betts 2001, p 6). There is also discussion of the role of community engagement in social trust and building partnerships. It is indicated that 'the evaluation findings confirmed the complexity of this process' but, again, not that the consultation process may have improved aspects of social trust and partnerships in the community.

Causal processes

The evaluation identified that the critical leadership role of the mayor and the commitment of working group members throughout the process were positive contributions to progress. Recognition by the working group of community demand was reported to have resulted in a shift in working group attitudes from 'antagonism to acceptance' of the concept of a warning siren. Thus the project 'provided a clear example of community engagement whereby residents confirmed that their voice was heard' (Betts 2001, p 8). Further, the effectiveness of 'a cooperative partnering process between multiple agencies and the community' was highlighted, particularly in achieving an appropriate balance between expressed community need and agency policies. The positive role of community education in improving the nature of the potential household response to a bushfire alert (to stay and

defend a prepared property) was also highlighted, while the potential unintended outcome of late evacuation was recognised.

In summary, while proposing that 'A successful integrated alert system requires the development of shared meaning and expectations between stakeholders including the community', the evaluation report observed that 'Currently there is a wide range of meanings and expectations of the Ferny Creek fire alert system' (Betts 2001, p 7). This 'wide range of meanings and expectations' might be seen as a potential constraint on successful implementation of the siren as an effective early alert system. No intra-community interactions with these causal processes were reported.

A theory model for the Ferny Creek Fire Alert Siren

Based on the studies reviewed, an initial model of the main causal processes and outcomes identified is presented in Figure 7:1.

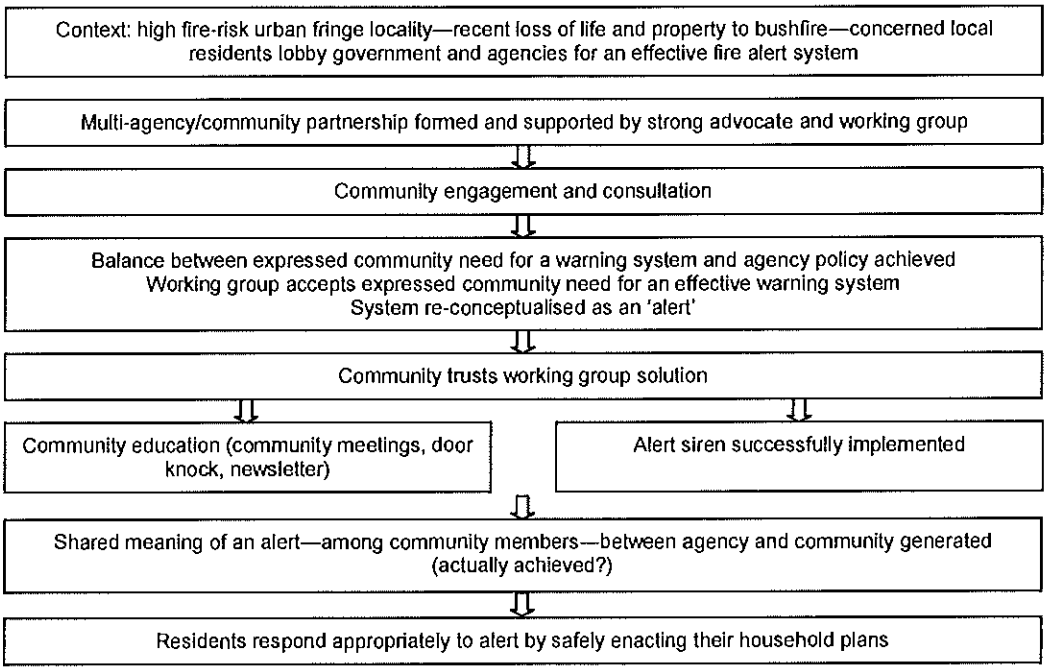


Figure 0:1 **A reconstructed program theory model for the Ferny Creek Fire Alert Siren community consultation**

East Gippsland floodplain management strategy

A paper titled 'Refining evaluation criteria for public participation using stakeholder perspectives of process and outcomes' contains two quite separate perspectives on the issue of public participation in floodplain management (Grant & Curtis 2004). Initially, the aim of the research project reported in the paper is stated as follows: 'Our aim was to refine a set of evaluation criteria with an approach that could be used by practitioners to evaluate public participation in different contexts of natural resource management' (Grant & Curtis 2004, p 143). This aim was to be addressed in the context of the East Gippsland floodplain management strategy. The second half of this paper, however, provided a very useful evaluation of community consultation from the perspective of 16 stakeholders who were involved in the consultative committee for the management strategy. This evaluation is of most interest to this review and will be the focus for the remainder of this summary.

Program background and rationale

As the paper appeared to be designed to serve dual purposes, it contains little detail on the background and rationale for the East Gippsland floodplain management strategy. However, sourced from the article, it is known that as part of a State Government initiative, East Gippsland, along with eight

other Victorian regions, developed a floodplain and rural drainage strategy. Community and stakeholder participation was emphasised as a critical aspect of the strategy development. Public awareness of floodplain management was increased after extensive flooding in the East Gippsland area in June 1998. The paper does not specify the commencement date of the project; however, it is reported that East Gippsland Catchment Management Authorities appointed consultants from an engineering and environmental firm to conduct the participation process and complete the floodplain management strategy document by early 2000. The project was to undergo a three-phase process that included preliminary investigations, stakeholder review and public review.

Evaluation methods

Grant and Curtis (2004) evaluated the East Gippsland floodplain management strategy from a stakeholder participant perspective by conducting 16 face-to-face interviews with key stakeholders. Interviewees were encouraged to express their own ideas and observations about the purpose, process and outcomes of participation, thus providing data that were 'grounded within the context and experience of participants' (Grant & Curtis 2004, p 148). A review was undertaken of 37 documents and the researchers also participated in planning activities in the development of the East Gippsland floodplain management strategy (Grant & Curtis 2004, p 143). Researchers analysed and coded data generated from their interviews using a grounded theory approach. Identifying themes and categories within the interview data allowed the researchers to analyse these themes and categories against information generated from the document review and participant observation to ascertain if data from the interviews accorded with already existing information. The three themes investigated were the participation process, participants' expectations and stakeholder needs (Grant & Curtis 2004, p 148). Much of the evaluative content of the report consists of verbatim quotations drawn from the stakeholder interviews.

Program context

East Gippsland is located in south-east Victoria and covers approximately 20,931 square kilometres, making the region the second largest area in Victoria. The estimated population in 2007 was 43,790. Bairnsdale, the commercial centre, is located approximately 300 kilometres from the Melbourne CBD. The East Gippsland Shire is an amalgamation of four previous shires and one city (Shires of Bairnsdale, Omeo, Orbost and Tambo, City of Bairnsdale.) With extensive coastline, major lakes and river system, rugged high country, extensive national parks and State forests, 75% of East Gippsland is public land (Local Government Victoria 2009).

East Gippsland has been affected by drought, bushfire and flood. Extensive periods of drought resulting in large-scale bushfires are often broken by flooding; the Mitchell River floods of 1990,

1998 and 2007, and the Snowy, Cann and Genoa river floods of 1971 are good examples (East Gippsland Catchment Management Authority 2007).

Individual/householder-level outcomes

Reports from interviewees highlighted several issues that arose from the stakeholder participation process. Many stakeholders reported that they wanted a higher level of engagement in planning for floodplain management. The level that was offered was not considered adequate or desirable. Stakeholders suggested that not enough information was provided about the process or purpose of participation and they were also not provided with an appropriate level of information to be able to adequately contribute to the strategy. Further, it was felt that key stakeholders were not adequately represented and critical local knowledge was excluded or ignored (Grant & Curtis 2004, p 157).

Community-level/organisational outcomes

Reports from stakeholders do not reflect trust and building of partnerships through this consultative process. Poorly managed collaborative processes were reported to undervalue stakeholder participation. The reluctance of consultants and the 'experts', such as the technicians and engineers in the field, to share power and responsibility limited the opportunity for community perspectives to be heard, understood or valued. Community stakeholders held:

> little faith that institutional arrangements would allow for locals to shape decisions on the big issues such as infrastructure development on floodplains or the closure of estuaries at river mouths (Grant & Curtis 2004, p 153).

A possible reason for this reluctance to share power was the perception that community stakeholders were unskilled in technical matters, thus making them unwilling to participate in a subject they are unfamiliar with. (See the idea of 'technical alienation' discussed in the review of the Coffs Harbour floodplain management community consultation below.) There are reports, however, that consultants did respond to stakeholder input by demonstrating some flexibility in making changes to flood-mapping and responding to concerns. An example of this is that an additional meeting was held for a preview of the draft strategy (Grant & Curtis 2004, p 157).

Causal processes

Reports by stakeholders relating to the participation process identified that they were inadequately represented. Stakeholders were unable to source sufficient information about the purpose or detail of the project, which consequently created a barrier to their ability to make useful contributions.

This lack of collaborative work, possibly due to unskilled consultants, resulted in stakeholders perceiving their involvement as tokenistic.

> In this study, both the consultants and proponents had limited experience with collaborative planning processes and appeared to have very low expectations of stakeholder interest in contributing to the planning process beyond learning about some of the technical aspects of flood mapping and flood warning. Our investigations suggested that stakeholders were interested in a range of issues and wanted to be engaged at various stages of the planning process (Grant & Curtis 2004, p 157).

Some stakeholders did remain optimistic that their involvement would be valued as a reliable resource in the future; however, many were sceptical that their involvement would have any influence over decisions made by those in official positions: 'The failure to articulate and mediate these value differences contradicted one of the fundamental factors for effective participation processes' (Grant & Curtis 2004, p 157).

In summary, this report does not provide a detailed evaluation of the community consultation process. It is therefore difficult to ascertain 'what worked', as the focus on verbatim reports from stakeholders has limited the detail provided about the progress of the strategy. However, the information provided clearly suggests that this particular consultation process did not result in community stakeholders being able to make a substantial or meaningful contribution to the final floodplain management strategy. This is supported in the evidence that stakeholders were not privy to the final report and many felt that their contribution lacked authority and substance.

A theory model for the East Gippsland community consultation

The summary theory model for the East Gippsland floodplain management consultancy (Figure 7:2) highlights the barriers that a poorly designed and/or implemented community consultation process can erect against effective community involvement and collaboration in planning.

Barriers	Strategies	Outcomes

Poor community engagement process through unskilled consultants. Stakeholders felt that level of community consultation was inadequate and not desirable.	Consultants held an additional meeting for a preview of draft strategy.	Stakeholders reported that they wouldn't expect any changes to be made at this late stage.
Key stakeholders were felt to have been excluded and important local knowledge ignored.	Consultants demonstrated some flexibility in changing flood mapping and responding to concerns.	Stakeholders were sceptical that their input would be valued as reliable or authoritative.
Lack of information sharing between groups by not providing stakeholders with adequate information to contribute to discussion. Consultants had low expectations of stakeholders' interest.	No strategy recorded.	Suggested to stakeholders that their input was tokenistic.

Figure 0:2 A theoretical summary of the perceived barriers to a community consultation

Coffs Harbour floodplain management community consultation

The Centre for Ecological Economics and Water Policy Research (CEEWPR)[17] at the University of New England conducted an action research study of community engagement processes in conjunction with a Floodplain Management Study following severe flooding in the Coffs Harbour region of New South Wales in 1996. The author of the report had previously observed conflict, alienation and distrust between consultative committees and community members during implementation of the procedures recommended in the New South Wales *Floodplain Management Manual* current at that time.[18] The need for improved community engagement practices was believed to be imperative for the success of Floodplain Management Studies (as distinct from the more technical Flood Studies that

[17] We use the current name of the Centre—when the report reviewed was written, the Centre was named the Centre for Water Policy Research.

[18] Description of the process is now a component of the NSW Floodplain Development Manual (http://www.naturalresources.nsw.gov.au/floodplains/pdf/3_flood_manual.pdf).

preceded the management studies) and steps were undertaken to encourage more effective facilitation and collaborative work within the present consultative committee. Results of the study were presented at the Annual Conference of the Floodplain Management Authorities of New South Wales (CEEWPR 2004).[19]

Program background and rationale

A Flood Study and Floodplain Management Study were initiated by Coffs Harbour City Council and the Department of Land and Water Conservation following a severe storm in Coffs Harbour that caused in excess of $30 million of damage. Flooding from Coffs Creek inundated more than 300 homes and businesses with up to a metre of water and swept one woman to her death. During the initial phases of this project, CEEWPR received funding from the Australian Research Council and Coffs Harbour City Council to 'explore improved process for community involvement in floodplain management planning' (CEEWPR 2004, p 1). A central principle of the research team's approach to floodplain management planning was to engage in effective collaborative work with various community stakeholders as a means of enhancing community acceptance of the resulting management plan. Members of CEEWPR recognised that a key problem with community consultation in relation to water management is the necessary involvement of hydraulic and hydrologic considerations. Such considerations rely on technical language and detail that non-technicians typically have little understanding of, which creates a knowledge or power imbalance between groups. Due to an unwillingness to appear ignorant, people may refrain from asking the 'silly questions', which subsequently results in alienation. This alienation can manifest as mistrust and stakeholders often form the view that they are being 'blinded by science so that they can't bring their concerns to attention' (CEEWPR 2004, p 2). Mistrust and conflict between groups can also manifest when one interested party (eg the municipality) is perceived as having a preconceived agenda that may not appear to have the community's best interests in mind. CEEWPR (2004, p 2) named these two prevalent issues as

- technical alienation, and
- perceived-agenda alienation.

The New South Wales principles that inform the development of the consultative committee for a Floodplain Management Study are identified as a potential source of mistrust: 'The principles suggest that a certain mix of people will form the committee and once established will be closed for further

---

[19] Some additional detail is available (March 26 2010) at <http://www.bewsher.com.au/pdf/CNF42-1%20Coffs%20JM&JR.pdf>.

membership', and this approach can 'generate perceptions that secret business is being transacted' (CEEWPR 2004, p 3). Therefore it was a central aim in the development of an improved model for community consultation to facilitate a more constructive relationship between council members, technicians and stakeholders. The CEEWPR implemented several strategies to facilitate this relationship. It:

- took overall responsibility for the community engagement process, working closely with the technical consultants and the management committee to develop and implement the engagement program
- involved the wider community by issuing a direct invitation to the public through the media to establish a technical working group through self-selection with open membership
- acted as an independent facilitator of the technical working group and public meetings and continued as an independent third-party consultant and facilitator when the technical consultants for the project were appointed
- played a 'devil's advocate' role (our phrase) on behalf of the community members during technical working group meetings
- continued the community engagement process for the remainder of the project
- ensured that the technical consultant was willing to work with facilitators
- engaged the wider community in two-way dialogue
- validated the role of the community by ensuring that its input was taken seriously by other members of the consultative committee.

Evaluation methods

Little information is provided in the available paper on the evaluation method used for this project. Results of the effectiveness of this study are recorded from the perspective of the author of the paper (a member of the independent facilitation team) and based on feedback from 'various participants of the consulting team' (CEEWPR 2004, p 6).

Program context

Coffs Harbour, with a population of 68,000 in the Coffs Harbour local government area, is located on the east coast of New South Wales, approximately half-way between the cities of Sydney and

Brisbane. Surrounded by subtropical rainforests and coastal beaches, Coffs Harbour is fitted with big city infrastructure but maintains a small town feel (Coffs Harbour City Council 2009). The region is prone to flooding due to the closely located Coffs Creek. The mouth of Coffs Creek is located just to the north of Coffs Harbour, within close proximity to the town's main centre. Approximately 60% of the Coffs Creek catchment is either urban or zoned urban. This development is mainly located in the 'middle to lower part of the catchment' while the upper slopes are 'very steep and largely occupied by banana plantations'. There is on-going pressure for new development in the catchment. [20]

Individual/householder-level outcomes and causal processes

Possible outcomes of the facilitated consultation at the individual or household level are not detailed in this report. As previously mentioned, the report is written from the authors' perspective, with feedback from the various participants and the technical consultants. It is not explicitly indicated if the community stakeholders supported these findings.

It was reported that following the invitation to the wider community to become involved with the floodplain management study, 28 members of the public attended the committee meeting. The meeting covered a wide variety of issues including discussion of the proposed floodplain management strategy and economic and social factors. A 'mud map'[21] was undertaken of these various issues, and a technical working group was developed with 'open membership'. It was reported that effective and respectful facilitation resulted in a productive two-way dialogue between all parties and community members were able to discuss intricate and relevant issues.

Community-level/organisational outcomes

It is argued that a key component to the overall success of this project was the perceived independent status of CEEWPR as a third-party facilitator. Establishing the independent status was critical for the community engagement phase, as trust needed to be developed for the community to feel that its opinions were important and recognised. To facilitate this process, CEEWPR advocated for the community by attempting to bridge the knowledge gap. This was undertaken in the following ways:

---

20 <http://www.bewsher.com.au/pdf/CNF42-1%20Coffs%20JM&JR.pdf> pp 2-4.

21 A 'mud map' is a form of cognitive map devised by the author and colleagues (see Gill & Wolfenden 1998) resulting from a facilitated dialogue approach; participants are invited to contribute to developing a shared understanding of the issues and how they inter-relate.

- CEEWPR asked the 'silly questions' about the technical issues to assist in community members' understanding
- if community members questioned whether there was a 'hidden or otherwise preset agenda' and were disregarded by council members, facilitators would follow this up for a satisfactory outcome
- CEEWPR advocated for community stakeholders to be understood and heard and purposely 'took the side' of non-specialist members, advocating on their behalf for clearer information.

Evaluative outcomes of this report indicate that due to effective technical communication processes and advocacy for the community, a better understanding of the technical information was achieved, which encouraged participation from the community stakeholders.

Causal processes

This evaluation identified the significant potential of skilled facilitation to mediate conflict between groups, particularly when technical issues are central to planning. The ability to mediate this conflict is most likely due to the intervention of CEEWPR, as the perceived independent nature of its role provided advocacy for all members of the consultative group without a preconceived agenda. The importance of the independent facilitator was highlighted by the fact that 'The Technical Working Group—through time, came together to address substantive issues rather than just wanting to argue' (CEEWPR 2004, p 6).

One source of mistrust in community participation on working groups that have a technical focus was credited to 'technical alienation'. It was noted in the report that the technical consultants appeared to make a concerted effort to communicate this information in a way that was readily understood. Additionally, as noted above, the facilitators actively encouraged disclosure and simple explanation of technical detail. These communication practices addressed the issue of 'technical alienation'; however, CEEWPR was sceptical that this was the whole story, as a fair amount of work was also done to develop trust within the community to accept that the technical specialists were not trying to 'pull the wool over their eyes'. Further to this, it was argued that extending an open invitation to the wider community created a transparency of intentions, which can promote trust that nothing untoward is occurring.

Importance was also placed on establishing effective two-way dialogue and information flow. CEEWPR suggests that this improved communication was due to a flow-on effect from its intervention, as it claims that 'in theory—dealing with stakeholder alienation ought to improve communication flows' (CEEWPR 2004, p 6).

In summary, the proposition that independent consultation and wider inclusion of community members on consultative committees results in 'an improved model for community consultation' is supported by the report. The report argues that it was due to extensive effort to develop trust, facilitation and advocacy by CEEWPR that improved community consultation and 'two-way dialogue' were successfully established. Without the intervention of independent facilitation, 'technical' and 'perceived agenda' forms of community alienation may operate as significant constraints on making these outcomes readily achievable.

A theoretical summary of the Coffs Harbour community consultation

As noted above, a central focus of the CEEWPR activities as an independent facilitator in the development of a floodplain management plan was to address the twin barriers of technical alienation and perceived-agenda alienation as sources of community mistrust in the planning process. The matrix representation in Figure 7:3 summarises the manner in which the intervention appeared to overcome these barriers and generate a successful planning outcome.

Barriers	Strategies	Outcomes
Distrust and non-collaborative practices developed prior to intervention due to poor community engagement process.	Introduction of independent facilitator.	Effective two-way dialogue that did not result in an argument.
Technical information is necessary for floodplain management planning, which can create knowledge gaps and power imbalances. Causes alienation for community stakeholders to participate in constructive conversations.	Independent facilitator advocates for the community stakeholders by asking the 'silly questions', ensuring that everybody understands the information.	Knowledge gap is reduced and technical language is used carefully, with consideration to all attendees at the meeting.
The presence of council employees on technical and consultative committees can result in community members feeling that there are hidden or otherwise pre-set agendas to be pushed through.	Independent facilitator pursues questions on behalf of community members if it is felt that these questions are being 'fobbed off' by council staff during meetings.	Perceptions of hidden or pre-set agendas are reduced. Such agendas, if in fact present, may have to be abandoned.

The NSW *Floodplain Management Manual* (NSW Government 2005) provides guidance on the constitution of a Floodplain Risk Management Committee. These principles suggest a certain mix of people should be selected and, once established, would be closed to new membership. The formation of a 'selected' group can create a sense of secrecy and mistrust.	Extend an open invitation to all community members to participate in the consultative committee meeting.	Twenty-eight community members attended the consultative committee meeting and representatives formed part of the technical working group.

Figure 0:3 **A theoretical summary of a facilitated community consultative and planning process with a technical focus**

Section C Case studies of community education, awareness and engagement for natural hazards

CHAPTER 8

The case study approach

The case studies

The purpose of the six case studies presented in this section was to provide researchers and practitioners with practical examples of what is being done in different fields and jurisdictions in Australia to engage, educate and make individuals and communities aware of the risks that natural hazards pose for their wellbeing and safety. To this end, the research team selected examples of programs already in place that illustrate:

- the central role that local government and emergency agencies have to play in educating and engaging the public
- the importance of collaborative enterprises between them
- the vital lessons to be learned from the recovery period following any natural hazard event (most powerfully shown in the aftermath of bushfires in this country), and
- the need for governments at all levels and emergency agencies to be aware of the complexity and diversity of communities, both rural and urban, in contemporary Australia.

The six studies in this collection represent a range of community education, awareness and engagement practices and activities. They comprise:

- a funding program to increase local governments' commitment to emergency risk management in Western Australia (Chapter 9)
- educational programs provided by the Australian Bureau of Meteorology on natural hazards (Chapter 10)
- consideration of the level of interaction between emergency services and immigrant groups (Chapter 11)
- strategies to improve individuals' knowledge and awareness of cyclone risk in tropical Australia (Chapter 12)
- flood risk in South Australia (Chapter 13), and

- a survey of how governments in the eastern States have understood and undertaken recovery in the aftermath of bushfires since 2002 (Chapter 14).

The studies also include consideration of three prominent natural hazard types in Australia: cyclones, floods and bushfires. The following briefly outlines each case study and the research method used for each.

Based in Western Australia, the program known as 'All West Australians Reducing Emergencies', or AWARE, provides local governments with funds to set up and develop emergency management processes. Coordinated by the Fire and Emergency Services Authority (FESA), Western Australia, AWARE trains local government staff in emergency risk and recovery management, and provides funds so that local governments can undertake the emergency risk management (ERM) process. Our case study focuses on how two local councils, the City of Bunbury and the Shire of Kalamunda, implemented ERM programs funded by AWARE. Discussion of the AWARE program examined various approaches to engage communities in hazard approach and develop emergency management plans that include their views, interests and concerns.

Our review of the educational programs offered by the Australian Bureau of Meteorology (the bureau) had a two-fold focus. First, it discussed the warnings the bureau issues and the programs it has developed to educate the public about what these warnings mean and how to respond to them. Second, it discussed the programs the bureau runs to educate the public about natural hazards and severe weather events such as cyclones, gales or extended heavy periods of rain or snow. The study showed how the bureau was both expert in the science and technology of weather and official promoter and manager of warnings for meteorological hazards in Australia. The bureau often forms partnerships with other agencies to deliver public education—at a policy level this is often with EMA, while at a local level it is with State-based agencies, local governments and other parties. For some hazards, the bureau is primarily responsible for the warning information and education, while for other hazards it is a support agency to others.

The purpose of our study of CALD communities was to examine the extent to which emergency services engage with immigrant groups. Its main finding is that while emergency services and governments have put in place strategies emphasising the importance of engaging with immigrant communities, at least one group of newly arrived immigrants, from the Horn of Africa, has not experienced any real engagement with them. Our conclusion is that emergency services need to do more to practice the principles that are meant to guide their liaison and engagement with CALD communities in Australia. The case study suggested that while there have been a number of achievements to date that point to the development of better relations with immigrant groups in Australia, more was needed. It suggested that workers and managers in the emergency services need

to demonstrate a greater preparedness to engage genuinely with immigrant groups and provide them with the same level of knowledge on natural hazards that a reasonable person might expect all citizens to have.

During certain times of the year, cyclones are a major natural hazard in tropical Australia. Our chief concern in the case study on cyclone preparation was to investigate how cyclone warnings are passed on to two groups of itinerant people in tropical Australia. The first group comprised the users of low-cost accommodation in Cairns: backpackers and the so-called 'grey nomads'. The second group comprised management and miners at Cape Flattery, a coastal silica sand mine near Cooktown in far-north Queensland. Our study showed that information is made available to independent tourists at the discretion of accommodation providers and typically 'borrowed' from what the local council and newspaper provide the local population.

The primary aim of a flood awareness program undertaken in South Australia in the mid-2000s was to provide detailed information about flood risk and appropriate response to individual households in high-risk localities. The case study also explores how the initiative developed better links and promoted better cooperation between local government and emergency services. In 2004 representatives of the South Australian SES, the Bureau of Meteorology and the councils of the cities of Unley and Mitcham collaborated to improve information about flood risk that was provided to residents of the two municipalities. Serious flooding in November 2005 underscored the timeliness and usefulness of this collaboration and accelerated attempts to develop a sense of shared responsibility for flood awareness between agencies and residents, especially those who lived in high-risk areas. In contrast to the somewhat *laissez faire* approach to cyclone safety in low-cost accommodation in north Queensland, this study of flood-risk education in South Australia noted how important it was to provide people with systematic and locally relevant information prior to and during an event. In addition, the study raised the important question of the continuity of funding for programs of this kind and showed that local citizens favoured a subscriber-based warning service with SMS and telephone messages as delivery methods.

The purpose of the bushfire recovery study was to summarise the community engagement and education activities that were initiated in the aftermath of bushfires in the eastern States of Australia in the period 2002–06. Our study includes discussion of recovery in a general sense as it applies to all types of natural disasters. In particular, it looks at a community development recovery program the Victorian Government instigated after bushfires in 2006. It also draws on written evaluations of the recovery processes and activities that were instigated following fires in Victoria in 2002/03 and in the Australian Capital Territory in 2003. And, finally, our discussion of the usefulness of knowledge gained in recovery suggested that while more work was needed to make better use of recovery

knowledge, the principle of doing so could be transferred to other areas of natural hazard response. And that, in other words, emergency services responsible for preparing for and responding to cyclones and floods, for example, might benefit from recognising the relationship between recovery activities and subsequent planning and preparedness and testing its usefulness in their areas of practice.

The research method

As mentioned, the purpose of this selection of case studies is to provide examples of what is being done in different fields and jurisdictions in Australia to inform individuals and communities about the risks that natural hazards pose to them. Each case study is based on a review of literature, as well as qualitative analysis. All the six case studies made use of face-to-face interviews; one included a survey, and two used both group interviews and individual interviews. The purpose of the interviews, which were generally held with practitioners, was to draw on expert knowledge in the field.

Individual interviews were used for the case studies of Bureau of Meteorology, CALD communities and bushfire recovery programs. Group and individual interviews were used for AWARE and the flood-awareness programs in South Australia. Individual interviews and a survey of low-cost accommodation providers were used to investigate how itinerant groups in Queensland are made aware of cyclone risks.

We followed a semi-structured approach in all the interviews. Interview schedules were used but not rigidly adhered to so as to make possible open discussions, while still covering key questions of interest. Interviews ran from one to two hours, were recorded, transcribed, and, in some cases, coded with the NVivo software program. As mentioned, we complemented our analysis of the interview data with literature reviews and the analysis of documents related to the programs.

The methodology we used for our study of AWARE programs in Western Australia involved a mixture of group and individual interviews. We interviewed AWARE coordinators in Bunbury and Kalamunda, as well as representatives of the local Emergency Risk Management Committees (ERMCs). We held interviews with training and development staff from FESA and a representative from the West Australian Local Government Association. FESA put the researchers in touch with the two coordinators in Bunbury and Kalamunda.

For our investigation of the educational programs offered by the Bureau of Meteorology, we interviewed staff working in education and development of the bureau's warnings. Our researchers examined the Australian Tsunami Warning System and collaborative approaches to developing local flood response guidelines in Traralgon, Victoria. The focus of the latter was on how community education and awareness are being encouraged more generally in Australia through initiatives of this

sort.

Like many disadvantaged people, individuals from CALD sub-cultures can have difficulties relating to members of the emergency services, especially when the latter's workforces are largely drawn from the dominant culture, which, in Australia's case, means white, Anglo-Saxon or Anglo-Celtic and male. As mentioned, the purpose of this case study was to investigate what if any impediments exist to the development of good relations between CALD communities in Australia and the emergency services. To achieve this, we interviewed officers employed in local government and an emergency service, as well as a representative of newly arrived immigrants in Melbourne.

Of all the case studies we undertook, the one that looked at cyclone preparation in Queensland involved the most diverse research methods. First, our researchers planned interviews with two separate itinerant groups: independent travellers and mine workers. Second, their approach to prepare interviews with the providers of accommodation that independent travellers most frequently use and with mine workers involved the following:

- an online survey and telephone follow-up of accommodation providers
- face-to-face interviews with accommodation providers, and
- after a great deal of work trying to arrange onsite interviews at the mine location at Cape Flattery, a separate interview was finally arranged with the Workplace Health and Safety Manager in Cairns.

The online survey (16 questions) of accommodation providers was developed using SurveyMonkey. In consultation with the Cairns Regional Council, a list of approximately 90 backpacker hostels, low-cost resorts and caravan parks was identified. Access information for the survey was emailed to the manager of each of the accommodation businesses with a covering letter that explained the purpose of the survey and provided necessary ethics guidelines. As the initial response rate was low, a reminder email was sent out. This generated some more responses, although the response rate was still quite low. After further telephone follow-up and mail-out of 'hard-copy' surveys when requested, a total of 18 surveys were returned, mainly via the online survey. A number of reasons might explain the low uptake. First, the survey was outside the cyclone season, which may have meant people were not interested in taking part. Second, the survey coincided with the peak tourism season and several managers said they were simply too busy to take part. Given these limiting factors and the extensive attempts to generate more interest, the response is a reasonable sample of accommodation providers in the Cairns region.

Survey respondents were asked if they would be willing to participate in a follow-up interview, which

took place in Cairns over a four-day period. Several survey respondents expressed interest in doing so. In total, we held six interviews. Two were with backpacker hostels, three were with caravan parks[22] and one was with a representative of the Cairns Regional Council.

The flood-risk case study in South Australia involved a mixture of group and individual interviews with key stakeholders involved with the pilot program in Unley and Mitcham, as well as the SES and Bureau of Meteorology. An initial meeting took place with the program facilitator to seek approval from the councils to undertake the study and arrange a timeframe for the interviews. We then used semi-structured interviews and transcribed them for data analysis. The data were complemented by a range of resources supplied by the project team related to the pilot, which included presentations, maps and survey findings.

Our final case study was primarily concerned with providing a historical overview of how governments in Australia have understood and acted during the recovery periods that follow bushfires. Interviews were also held with bureaucrats involved in administration of the community development component of bushfire recovery activities in the Victorian Department of Human Services.

---

[22] One of the caravan parks was in the neighbouring council area of the (then) Shire of Johnstone, which had been extensively damaged in cyclone Larry.

CHAPTER 9

The AWARE program, Western Australia

Program background and rationale

The AWARE program in Western Australia is coordinated by the Fire and Emergency Services Authority (FESA) and was developed in conjunction with local government. The program is designed to enhance emergency management capacity at a local government level. The multi-faceted program incorporates a training component that focuses on equipping local government employees with an understanding of emergency risk and recovery management, as well as introducing them to the emergency risk management (ERM) process. It also provides a funding mechanism through a grant scheme to which local governments can apply to undertake an ERM planning process. ERM is a systematic process of identifying, analysing and evaluating risks in the municipality and developing treatment options to mitigate them. Embedded in the process is communication and consultation with a wide range of stakeholders, including the local residents and businesses.

Our case study of AWARE focused on two municipalities where the program was in different stages of development (Bunbury and Kalamunda) and on interviews with stakeholders from the municipalities and the FESA Community Safety Directorate. The ERM model is based on the Australian/New Zealand standard for risk management.[23] This model (Figure 9:1) has a number of progressive stages leading from identifying the risks through to treatment of the risks, with a process for monitoring, review, communication and consultation at each stage.

AWARE funding for a local municipality to go through the ERM process is usually provided in three stages based on a breakdown of this model.

- Stage 1: establish the context and identify risks. Setting up of an AWARE project committee to drive the process with an AWARE coordinator. An ERM study is undertaken, including a community survey to identify key risks and other forms of community consultation including workshops and general awareness-raising activities.

- Stage 2: analysing and evaluating risks. The AWARE project committee goes through a consultation process with community experts to apportion relative levels and magnitudes of risk for those identified in the first stage.

---

[23] AS/NZS 4360: 2004 (Standards Australia & Standards New Zealand 2004).

- Stage 3: treat risks. Treatment options are identified for each of the identified risks and priority assigned according to the outcomes of the risk analysis in Stage 2. A lead Hazard Management Agency (HMA) is assigned for each of the treatment options.

The next step is implementing the treatment options, and responsibility for this rests with the HMA. In some cases the HMA is the AWARE project committee, in which case it undertakes the relevant treatments. Relatively few municipalities are involved at present. Funding is sought from other sources for the implementation of the majority of treatment options.

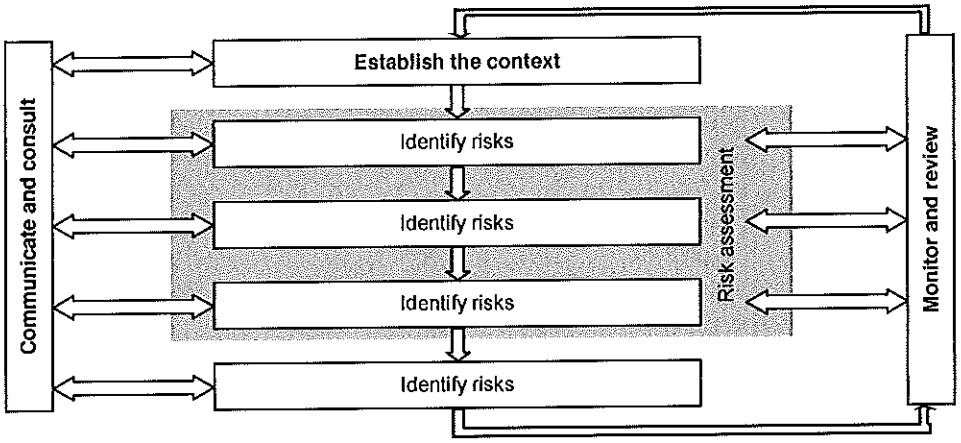


Figure 0:1 **Risk management process—overview (Standards Australia & Standards New Zealand 2004, p 9)**

Emergency Management Act 2005

The *Emergency Management Act 2005* came into operation in Western Australia in December 2005. It formalised Western Australia's emergency management arrangements and required local governments to establish a Local Emergency Management Committee (LEMC) in order to develop local emergency management arrangements (FESA WA 2005).

Funding from AWARE typically subsidises the local government for the salary and associated costs to replace an existing staff member who temporarily becomes the AWARE project coordinator. This allows someone with an interest and knowledge of emergency management to work on AWARE full-time while the municipality goes through the ERM process. The funding can also be used by the local government to commission consultants to undertake a research study.

AWARE is overseen by a Community Development Officer at FESA. In this capacity the officer coordinates the AWARE program and runs training. The responsibilities include (a) sitting on the panel that approves local government applications for AWARE funding; (b) ensuring local governments complete the ERM process; (c) running training in ERM for AWARE coordinators; and

(d) organising various networking and information sharing initiatives such as annual workshops for AWARE coordinators and an AWARE newsletter.

Focus

The foci of this report are the City of Bunbury, which completed the ERM process through the use of AWARE grants and training, and the Shire of Kalamunda, which is currently working through Stages 2 and 3 of the ERM process, having completed Stage 1 in 2006/07. These specific case studies are not intended to constitute a full review of the AWARE program; rather, they explore particular aspects of the program in the context of what works, for whom and in what context. Of particular interest to this research is the community consultation and engagement that takes place in the ERM process, both in terms of who is being consulted and how, and the benefits of community involvement in all stages of the ERM process. Also of interest is identifying the principle facilitators and barriers to the process in these two examples; in particular, some of the contextual factors that either enhance or inhibit the process were explored.

The City of Bunbury is located about 175 kilometres south of Perth; it has a population of approximately 31,000.[24] Bunbury is the principal regional commercial, industrial, transport and service hub for south-west Western Australia. It has a sizeable central business district and dormitory suburbs in the Greater Bunbury area. The City of Bunbury initially took part in an AWARE project in 2003 with five other local governments (the Shires of Capel, Collie, Dardanup, Donnybrook/Balingup and Harvey; collectively, the Bunbury Wellington sub-region). This was prior to the legislative requirement for local governments to have ERM arrangements. The joint project with the five neighbouring shires involved a broad community-level survey to identify risks. The City of Bunbury decided to conduct another ERM report specific to the municipality and sought funding to go through the process again in 2004.

The Shire of Kalamunda is located about 24 kilometres east of Perth, and has a population of approximately 50,000.[25] It has three distinct areas: the foothills, the escarpment and the eastern rural district. The foothills encompass growing urban areas and are an expanding industrial and residential hub close to Perth Airport. Kalamunda received an initial round of funding in 2006. It received a second round of funding in 2007, but receipt of a local grant for another project meant that the second

---

[24] 2006 Census (ABS).

[25] 2006 Census (ABS).

stage of the ERM project did not commence until 2008. Funding has also been approved through AWARE for the third stage, which will commence at the finalisation of Stage 2. Stage 2 will involve analysing and evaluating risks identified in Stage 1, before moving on to the treatment options in Stage 3.

AWARE in Kalamunda

Background

The Shire of Kalamunda applied for AWARE funding in 2006. The application was successful, and Stage 1 of the ERM process (defining the context and identifying risks) commenced in July of that year with a coordinator seconded from Ranger Services. One of the first tasks was to establish an AWARE project committee made up of representatives from a range of agencies in the shire. Some of these were existing members of the LEMC. The committee is clearly seen as an important entity for driving AWARE in terms of making decisions and also because:

> it's a group of people identifying with the community who have got influence, who've got networks, who've got a broad range of experience making decisions which they think are beneficial to the community (AWARE coordinator).

Through the AWARE training component, the coordinator was able to attend a range of courses that have enhanced his knowledge and ability to develop the project. This included a focus on community engagement that has made him aware of the importance of 'community empowerment, community empowerment, community empowerment, you know? Over and over and over. And that's what it's all about' (AWARE coordinator). Other members of the AWARE project committee also attended training courses at various stages during Stage 1 of the project. One of the approaches taken was the development of a skills register that helped identify areas where training would be of benefit for various members of the committee.

Community consultation strategies

A number of strategies were adopted by the committee to raise awareness of the project in the shire. One of the first was the development of a page on the shire's website. This was to help ensure that stakeholders were kept up to date with the project and the community could access information. The site offered links to the FESA website and media releases. It also hosted an AWARE newsletter, which was put together every few months to update progress with the ERM process. The website also was used for an online version of the community survey. Direct communication with the coordinator

was possible through an email address link on the site. Information was also made available in print media, with advertising and articles in the local newspaper. Therefore a range of methods was used to raise a level of awareness in the community and to explain what AWARE was about, where more information could be found on issues, progress and outcomes, and how the community could contribute through the community survey.

An official launch of the AWARE project took place in late August 2006 with representatives from local schools and other community groups. The project team also targeted two community events to promote it further, both in terms of encouraging people to participate in the survey and also to draw attention to the need for members of the community to think about where they live and the risks they are exposed to. These events were Senior's Week and the Zig Zag Festival (an annual community arts event held in late October); at each, the project coordinator had a display that provided information about preparedness for a range of risks such as bushfire and storm. The focus of the display at the Zig Zag Festival was predominantly on bushfire information, as it coincided with the bushfire season. However, an emphasis was also placed on ERM.

Schools were also a particular aspect of the community that were targeted, with presentations about the AWARE project given to principals or delegates at 14 of the 26 schools in the shire. Presentations were also held with a number of ratepayer associations and resident groups, and information was also passed on to Neighbourhood Watch groups via the police. The coordinator saw this as 'not necessarily consultation, even though I gave out some surveys, it was more just to communicate and marketing sort of tool, if you want'. Thus various strategies for contacting community members were used to draw attention to the project and to generate interest in completing the survey both before it was distributed and during the period when responses were being collected.

Community surveys

The rationale behind the survey was based on an assessment of the merits of this approach compared to public forums. The committee came to the following conclusion:

> We sort of settled on running a survey 'cause we felt that that was the best way we'd be able to get some input from the community. One of the other ones was having a workshop, but you know, meetings, public meetings and that ... But they're notorious for becoming driven by one or two people that have an agenda. It turns into a bit of a shouting match or whatever and becomes unorganised and that sort of thing. So it was really, it was a better way of structure, getting people's structured answers and that sort of thing as well so we can get some good information I suppose (AWARE coordinator).

Kalamunda used a standard survey approach, randomly distributing 1036 copies of the questionnaire in the community. The questionnaire sought views from residents on sources of risk, consequences of risk, assets at risk and value of loss, targeting both residences and businesses. The questions listed a range of types of emergency and asked respondents to rank the risk from low to high on a numerical scale in terms of likelihood and consequence. It then asked them to rank asset types in terms of risk of loss and value, again on a numerical scale of low to high. In total, Kalamunda received 262 responses, about a 25% response rate. The survey identified bushfire, severe storm and air transport emergency as the sources of risk with the highest perceived consequences.

Ongoing community engagement

Issues of limited time and resources affected the community engagement process that followed the survey. The coordinator was busy analysing the survey results, which limited the time he could spend on engaging with the public after October. Therefore the committee relied on providing the results in a number of media outlets, including the website and the local newspaper. Some individuals and community groups took a great deal of interest in the findings and distributed the results through their communication channels:

> There's been some spin-offs from that, even though it wasn't contributing to the emergency risk management of the community, there's been some spin-offs in [that] people have taken it on board, you know, to look at these things as well in their own sub-committees, I suppose, or you know, schools or whatever (AWARE committee member).

Stages 2 and 3

The project committee applied for additional AWARE funding to complete Stages 2 (analyse and evaluate risk) and 3 (treatment options) of the ERM process, as six months had been insufficient time to complete all stages of the process. There had been a delay in the start of Stage 2 while the municipality waited for final approval of a grant from EMA to undertake an unrelated project. This meant that the AWARE coordinator was occupied elsewhere and was not replaced. As a consequence, there was a year-and-a-half gap between completing Stage 1 and commencing Stage 2. The time delay had implications for the AWARE project:

> The break ... was a bit unfortunate because we lost a good member of AWARE being our local police coordinator ... that gap did cause a few issues, particularly with momentum in the community, as well [as] advertising, newsletters, it all just died 'cause I had to go back to what I was

> doing and other stuff 'cause we didn't have the money (AWARE coordinator).

When funding came through for Stage 2, the Stage 3 grant was also secured, which will mean more continuity for the remainder of the project. The committee will be able to plan to move straight into developing treatment options.

The focus of community engagement in Stage 2 will be through workshops with industry representatives and community members to analyse and evaluate the risks identified in Stage 1. Stakeholders were being identified by the project committee, and advertising in newspapers and newsletters and the website was being used to attract community representation. The project committee emphasised the importance of experts, who 'set our criteria that need to be met by the community and even stakeholders to make sure that we get the correct experts coming in' (AWARE committee member).

The aim of this phase is to apportion levels of risk to identified hazards with a view to developing treatment options. The committee was then keen to keep the same subject matter experts involved for the remainder of the AWARE project, as they anticipate that the shire will not be the HMA for many of the treatment options:

> We need to keep these people in the loop once we start, all the way through because if we lose them, then when we get to treatment option, well, we can't really send them a letter saying, 'oh, these are the treatment options', you know, need to do something about it (AWARE committee member).

It seems clear that the committee is devoted to achieving the longer-term aims of the project associated with relationship building with a range of stakeholders and sharing responsibility. Another motivation is that by going through the risk management process, it may open up further avenues for funding of mitigation strategies: 'we've undertaken the work and we can prove that we've got some solid information behind it to prove this is a viable treatment option' (AWARE committee member). Development of an evidence base is seen as an important outcome for supporting the LEMC to pursue additional projects to enhance community safety in Kalamunda.

AWARE in Bunbury

Background

As mentioned, the City of Bunbury has been through the ERM process with AWARE funding twice. On the first occasion in 2003 it was in collaboration with other municipalities in the Bunbury

Wellington sub-region. The second occasion was in 2004 when the project focused exclusively on the City of Bunbury.

While going through the initial project provided an introduction to AWARE, the project team did not feel 'it was gutsy enough, it didn't hold enough to the city of Bunbury' (ERMC member). Consequently, the project coordinator and a couple of ERMC representatives from FESA worked closely to develop an AWARE project plan for Bunbury that would more adequately address the needs of the community. There was an acceptance of the approach and a motivation to use the process to enhance existing arrangements. However, without the AWARE funding it would not have been as likely to take place, especially prior to the legislative requirement.

The AWARE project was a driver in the emergence of the LEMC in Bunbury. Prior to the project it was felt that a District Emergency Management Committee was sufficient. But the growing realisation that Bunbury needed to go through the ERM process itself crystallised the need for a more localised committee. During the project and while developing the emergency management arrangements, the committee met regularly; since then, it has met less frequently. Core members of the LEMC still engage regularly, however.

Community surveys

Bunbury used the standard survey approach (similar to that described for Kalamunda) in the earlier AWARE project with surrounding municipalities. However, the project team thought it did not adequately represent experts in the community or the all-hazards approach, and the team was not getting adequate data: 'it wasn't specific enough to be of any value to any one community *per se*' (AWARE committee member). Consequently, in developing the survey for the Bunbury AWARE project, the project coordinator did things rather differently. First, the coordinator decided to target specific stakeholders in the community rather than a random sample from the population. Second, the questionnaire was more open-ended to allow for more diverse responses to the risks in Bunbury. It also provided qualitative assessments to allow for clearer answers. In total, 43 organisations and groups were targeted and 32 responses were received.

A second questionnaire was then designed and distributed to cross the spectrum of environmental, financial, social, health and infrastructure community groups. Participants were encouraged to discuss the survey with colleagues and fellow community members and to reflect this in their responses. In total, the two surveys achieved an 80% return rate, totalling 284 responses. From the surveys, fire, flood and storms emerged as the three top-rated risks. The project team wanted firm data for its decision making. It felt that consulting with actively engaged members of the community was important to achieve this, as was a high response rate. This approach also had the effect of developing

a network of interested parties and a level of communication that was previously absent.

Ongoing community engagement

Since the completion of the Bunbury ERM report in 2004, members of the AWARE project committee continue to meet and the role of the coordinator has become an ongoing council position with responsibility for implementing a range of treatment options generated from the subsequent risk evaluation phase. One of the benefits of undertaking the ERM process was seen to be that it allowed a greater understanding of community values:

> one of the important issues that we identified very early in the piece is that the community survey would assist in identifying first of all what hazards were, but then also applying ... the community value in the evaluation criteria when it came to prioritising those risks (ERMC member).

This had an impact on the recovery process, where the values identified in the community were used to make decisions on where funding should go following a recent tornado. It has also helped when emergency management agencies have responded to incidents in areas with which they might not be familiar. The community values identified in the ERM process are now articulated in the emergency management arrangements and the agencies are more aware of which assets need to be prioritised and what consultation and engagement is needed in the community.

The AWARE report provided an emergency management plan for Bunbury, the focus of which was on developing community resilience. Some risk treatments focused more on structural mitigation but also emphasised developing links between and within communities at all levels, including getting people to work together at local government level, on the LEMC and in emergency services agencies. A community communications plan is being developed and funds have been allocated to develop a plan that encompasses community consultation across three phases: pre-, during and post-disaster. It will include raising awareness prior to an event and establishing how and in what form the community wants to receive information and how communities want to be engaged and communicated with during and after an event. This is being considered in an all-hazards context:

> We saw this in our risk management as very important, as being able to communicate with our community, build awareness for this, that and the other. We can talk flood and fire but it's still about the community knowing what to do (AWARE coordinator).

Bunbury helped to pioneer a model that has been utilised by other local governments in Western Australia. The Australian/New Zealand Standard 4360 provided a structure but the ERMC needed to

make it work for Bunbury in terms of community engagement. This is well summarised in the following extract from an interview with an ERMC member.

> The ERM 4360 model is a great framework to operate by and it just says identify your communication strategies, identify your community engagement strategies, but there's a whole suite of different skills and expertise that ... hangs off that that you need to use. That requires funding, that requires knowledge of where they actually exist, how you engage them, how do you brief them? How is that going to tie ... back in? And that's what we actually sort of struggled with ... we had some of the skill sets within some staff, but it was ... if we're going to engage community people, do they really understand what we're after? Are we going to get value from asking them ... their thoughts, or do we have to go down that tick and flick box, because they may not speak the same language that we do. So it was an interesting one.

An Emergency Management Conference, initiated in Bunbury, has been held for the past couple of years and was used as an opportunity for discussions and networking of people in the ERM field. The Bunbury coordinator also disseminates information about the municipality's experience of ERM at various forums and training courses on ERM. The development of networks has also resulted in the founding of a South West Regional Alliance, comprising the LEMCs from 12 local governments in the region. This has been an opportunity for Bunbury's project team to share their experiences with others involved in ERM planning in similar environmental and socio-demographic contexts. There appear to be a range of benefits from the development of networks:

> information becomes free to air and available for other people to share that experience and ... at the end of the day that has two benefits, one is it makes it easier for other people who are following because they get [the] benefit of that, but the second ... I suppose [there are] three [benefits] ... it develops relationships across borders and the third thing is that should the incident be bigger than any one local government there's also that shared opportunity that exists with local governments having similar or like arrangements or processes (ERMC member).

The Bunbury ERMC saw that networking had the potential to enhance the effectiveness of the AWARE program offered and took the initiative in actively developing local and regional networks.

Discussion and conclusion

The use of community surveys as the method of 'community consultation' during a community planning process is a one-way approach that does not offer community members a share in the decision-making process (Pretty & Hine 1999). The potential limitations of this approach appear to have been recognised in Bunbury, where a second round of community surveys was undertaken with a group of more engaged community representatives. The second questionnaire contained more opportunity for open, extended responses compared with the previous one and the one used in Kalamunda. There was also an explicit attempt to ascertain diverse community values. Groups involved in these surveys were, however, selected by the program coordinator, a process that may have omitted others in the community.

There is evidence that the Bunbury survey approach opened the way to a more consultative process with some engaged community members. It might be argued, however, that 'consultation by questionnaire', even if followed up by more interactive discussion with a select group, is limiting, giving citizens the opportunity to 'hear' and 'be heard' but not necessarily to be 'heeded' by those with the planning authority (Arnstein 1969, p 217). This form of consultation can be 'a legitimate step towards ... full participation' (Arnstein 1969, p 219); however, it needs to be followed up by activities that enable participation to achieve a working partnership between citizens and their local representatives and professional staff. The argued benefits of full community participation in planning for emergency management must, however, be assessed against the costs of the process and considered within the framework of the legal responsibilities of local government. But ongoing dialogue between increasingly ERM-aware citizens and an increasingly community-conscious planning committee clearly has the potential to lead to improved ERM arrangements and ensure that ERM is a dynamic and ongoing process.

The ERM experiences of Bunbury and Kalamunda help illustrate how to engage communities in this hazard mitigation approach and develop emergency management plans that include their views, interests and concerns. Outcomes from the AWARE program at an individual or household level were not directly explored in the case study. An increased level of awareness about emergency management and the need to consider a range of hazards in the community may, however, have resulted from the surveys and efforts to promote them. In addition, getting the views and opinions of individuals in the community and using their collective knowledge to inform the development of emergency management arrangements and the implementation of treatment options is potentially more inclusive than the typical 'top-down' emergency planning approach. The AWARE program strategies are not directly aimed at achieving changes in individuals and households, but rather are aimed at the local government level. However, the logic of the program suggests that individual, household and community change will be longer-term outcomes. It is also likely that changes that occur in levels of householder and community awareness will result from the activities of the HMAs in response to the

AWARE project.

In Kalamunda the results of the community survey helped to validate information that already existed and so suggested that local government was communicating effectively. Conducting the survey also suggested that the council was prepared to be more open in the planning process. It was apparent in Bunbury that understanding particular groups in the community was a precursor to developing effective emergency management arrangements. In Bunbury the development of the AWARE project committee transcended the life of the project and it continues to meet and discuss emergency management issues. It certainly prepared relevant agencies to deal with a disaster (tornado); because of the networks developed, the lines of communication were clear and there was a deeper understanding of what communities needed.

More apparent were broader community and organisation level outcomes from AWARE in the two localities. The program helped to clarify the role of the LEMC and facilitated adherence to the *Emergency Management Act 2005*. It proved to be valuable for relationship building between agencies and community groups. Building trust with the community appears to be of major importance in successfully going through the ERM process and coming out of it with tangible treatment options with a sound rationale.

CHAPTER 10

The Bureau of Meteorology's programs about warnings

Introduction

The Australian Bureau of Meteorology (hereafter, the bureau) provides a wide range of products and services to the public related to weather, severe weather events and natural hazards. The bureau works collaboratively with emergency services organisations in delivering warning information and community education before, during and after weather events. Two major components of the bureau's work are particularly relevant to community education. First, the bureau provides warning services and products. These include actual warning information about imminent meteorological or hydrological hazards and educational material about what warnings mean; they also teach people how to use the information that the bureau provides. Second, the bureau offers public education on natural hazards and severe weather events. These include publications, brochures and posters distributed from the bureau's head office and through State and regional offices. There are severe weather sections at each forecasting office, with media/public liaison officers attached and a Corporate Communications

Unit at the central office.

Public education at the bureau focuses on delivery at regional level. Bureau booths at field days and open days are a common way of distributing information, as are presentations to the public about severe weather phenomena. Much of this work is done in collaboration and partnership with State and Territory agencies and authorities, as well as with EMA.

The bureau website is a central focus of community education. It is a vast online resource with a large amount of materials. The 'Learn about meteorology' section provides links to publications, descriptions of natural hazards and a glossary. The website also includes disaster and disaster mitigation information, awareness material and a feedback service. The website attracts large numbers of users, particularly at times of major natural disasters, and the content of the site is continually growing.

The focus of this case study is the bureau's community education about warnings, with particular emphasis on the website as a means of raising awareness. Aspects explored include:

- the role of the bureau in community education about natural hazards
- strategies the bureau uses to educate the community, in particular its website
- the sorts of collaborative approaches that the bureau is involved with to this end, and
- the challenges in educating communities about warnings and actual events.

Specific educational examples covered include the Australian Tsunami Warning System and a flood warning system in Traralgon, Victoria.

Role of the bureau

The bureau has a responsibility to ensure that weather warnings are issued to the public in an 'end-to-end' context. From the bureau's perspective, this responsibility begins with 'understanding the meteorological event and being able to provide forecasts, right through to the community being able to take good effective actions and make good decisions, so it's that whole continuum' (bureau employee).

The bureau's natural hazards role is pivotal because it is in possession of the 'top end' of science and technology. With this knowledge and power it has a responsibility to ensure that the public not only receives these warning messages but also understands them because, in the view of one bureau employee, the 'message is useless if it's not used efficiently by the community'. The bureau works

collaboratively with other agencies to make sure that public education complements its technology and warnings. For example, community awareness campaigns and brochures on tsunamis are the responsibility of EMA, while the bureau plays a support role in their delivery. The two organisations work closely to ensure that the community understands the terminology used and what warnings mean.

The bureau's educational role varies from hazard to hazard. Two contrasting examples mentioned were cyclones and bushfires. For cyclones, the bureau takes a lead role in the issuing of warnings and public awareness information, whereas, in the case of bushfires, it is a support agency providing assistance to fire agencies at a State/Territory level. Therefore, while the bureau issues fire weather warnings across Australia, it is the appropriate State bushfire agency that issues a total fire ban through media channels.

Strategies used for public education

Because past collaborative public education campaigns and public meetings, especially for cyclones, have been relatively unsuccessful, the bureau now provides information to agencies, which then disseminate it. 'We work with the industry', said a bureau employee, '... with the local disaster committees and the local emergency services ... and the media'. Cyclone information that the bureau now provides includes what is predicted to happen in a cyclone season and what people need to do to prepare. The information is consistent and supported by information provided on the website and in leaflets. One member of staff said that by providing a consistent message in different formats, the bureau is able to reach many members of the public:

> The information that we deliver, for what people need to do at a household level, is supported by information that's on the website, the leaflets that are given, by personal presentation to community groups or school groups ... Whoever needs it, so that's how you sort of drill down to that level.

The bureau also has field days to promote its website and often looks to join existing events where there is an opportunity to promote its services. It has a public education and awareness section that is responsible for producing educational publications. In its previous location in Melbourne, it had an interactive display designed for school children. However, this was not relocated to the new premises, despite its popularity. The website provides information on weather or hazard warnings and also on what the warnings mean. Action statements are provided with each type of warning and these give the public prompts on what to do prior to, during and after an event.

The media are critical in sending out warnings to the public because, in the words of one bureau

employee, 'people have got to be made aware that there is a warning ... for them to find out about the warning'. A lot of work goes on with media to ensure that the warnings are accurate and clearly expressed. The bureau provides a glossary of terms to help simplify the terminology. However, the concept of 'warnings' can be more difficult to communicate:

> Terminology can be a problem with things that are unfamiliar like tsunamis, storm surges and cyclones, the wording ... just the water is going to come up; people just don't understand the concept (bureau employee).

One difficulty the bureau faces in dealing with the media is its tendency to exaggerate meteorological events. In the view of some of the bureau employees interviewed, hyperbole—where thunderstorms are described as mini-cyclones—can cause people to become complacent because it distorts their perception of 'what a cyclone is'. A consequence of these distortions is that the bureau has to keep public knowledge of hazards in perspective. An issue under discussion was to distinguish between major and minor storms. Minor warnings would require people to take appropriate safety precautions, while major warnings would require people to take notice, be aware and act as advised or directed.

An example of this scale system is already in place for floods where warnings exist for minor floods, moderate floods and major floods. It was also noted that if the bureau makes a mistake the media are often quick to criticise. After the April 2007 tsunami warning in Cairns, for example, one headline read, 'Bureau bungles tsunami warning'. This could have given the impression that a tsunami had not occurred, when one had been recorded along the east coast. This type of publicity can cause the public to question the bureau's authority and could affect how people take notice in future events. It was pointed out that some work may need to be done on post-event education to help rectify such issues.

Collaborative approaches

The bureau works collaboratively with land and water management and bushfire consultative groups and partners across all levels of government, and with specific communities and interest groups, to develop brochures or pamphlets to support its warnings.

In the event of a warning, the bureau does not provide links to emergency services websites. Its website instead recommends members of the public contact their local emergency services. The reason for this is that the bureau is unwilling to take on the role of maintaining and keeping this information up to date.

> It's difficult to give people direct links or phone numbers because then we've got to make sure that they're maintained. But we are working toward doing

> that more often, because we do realise that people need to be able to do that (bureau employee).

As it is often the responsibility of the State emergency services to ensure the public's safety, the bureau works with the services to develop community education initiatives, as well as with EMA to provide national-level resources. Both the bureau and EMA provide aspects of the information that contributes to information about warnings at a national level. Then, depending on the type of information, either the bureau or EMA takes responsibility for publishing it. This necessitates a close working relationship between the two government departments.

The bureau recognises that there are different ways to communicate with different types of communities. As of 2008 it was working with remote Indigenous communities on warnings about cyclones in the Northern Territory. Due to the remote nature of the communities and language and sensitivity issues, the bureau identified that it would be important to work closely with radio operators through the Broadcasting for Remote Aboriginal Communities Scheme (BRACS), as well as with local remote Indigenous media associations. A training package is being developed for radio operators to enhance their understanding of the warning messages that they communicate. This is important because the radio operators are the ones with the direct relationship with the community. Bureau personnel also work with the local emergency services to deliver seasonal cyclone campaigns in remote areas, where they meet with decision makers in the community and provide them with information about the coming season and details of where to get more information. There are some special issues, such as the use of terminology, that do not translate clearly into Indigenous languages or that may cause offence.

The bureau sees the need for specific strategies to better inform CALD communities. The bureau has not yet engaged with CALD groups and this could be the next area on which it may work. Some brochures and pamphlets have been translated into non-English languages but this has been *ad hoc* and not systematic. Other areas identified as needing more work include special needs groups, including the blind. The lack of engagement with some of these communities is mainly a resources issue.

One difficulty the bureau faces when working with State services is that different States have different ideas about what should be included in action statements and warnings. For example, with the newly developed Australian Tsunami Warning System:

> State emergency services want to take leadership and ownership of the statements that go into those warnings, which is different across States (bureau employee).

This issue has slowed the process of getting the information into the public domain, which is a responsibility the bureau feels strongly about:

> When that part of the message, or that part of the warning is essentially ... under the control of other agencies, it can take a lot of work to get it right (bureau employee).

An example of a collaborative initiative at a local government level is the bureau cooperating with Latrobe City in Victoria and other stakeholders in the development of a flood warning system, including the development of a flood response guidelines brochure for the community (discussed in more detail, below). At the whole-of-government level the bureau co-chairs the National Forum on Early Warnings for the Community with EMA. Consequently, the bureau is involved with influencing policy about warnings for the community and at the grass-roots level in the implementation of community-based initiatives. A further activity is post-incident research after major weather events. This provides the bureau with information about the effectiveness of warnings and possible ways to improve them.

Post-event evaluations are undertaken often in collaboration with other organisations such as universities and the fire and emergency services. These are useful according to a bureau employee because 'Post-event assessments ... test the effectiveness and ... any gaps, any problems, anything that we need to ... address'.

Educating communities

> Success of the warnings is in the decisions that the community can make. You can't tell people what to do, you've got to give them information to be able to make the decision, so that's ... sort of where we're working towards ... empowering the community to make good decisions, because gone are the days when people would just take direction, or take orders (bureau employee).

As mentioned, the bureau believes its web-based services are an important means of communication. However, not all members of communities will have access to the Internet. In addition, people might be unaware of the website or how to understand and interpret the information it contains. Just as the bureau is aware that not all members of the public have access to the Internet or will understand their warnings equally well, so too is it aware of having to make special efforts to communicate with Indigenous citizens, as well as CALD individuals and communities. Different approaches are needed for educating and engaging different communities.

At a variety of levels the bureau connects with existing systems and events to promote its website and provide a range of public information. This includes field days, community events, and regional managers talking at schools and community groups. Bureau experience of public meetings has, however, not been positive and this is not a major strategy used anymore. The bureau has a 'shop front' meteorological office in Launceston, which has proved an interesting way of providing a public face to the range of weather services, including information about warnings. Information packs have been developed for specific hazard warnings such as cyclones and tsunamis. Some of these were developed in conjunction with EMA and other government departments such as Geoscience Australia. In the case of the Australian Tsunami Warning System, the bureau provides website information and brochures for the public, while EMA has the major responsibility for improving tsunami public awareness and preparedness.

Without some prior level of risk awareness, it is difficult for messages to be conveyed to communities: 'People will usually take on information better if they're seeking it, but they don't often know that they actually need the information' (bureau employee). Thus the bureau has the challenge of addressing different levels of community need for information. There are individuals who feel that they have enough information and experience and also those who have little awareness of the extent of the hazard (for example, those who are aware they live in cyclone-affected regions but who may not have experienced a cyclone). Attendance at local events organised or attended by the bureau tends to vary considerably. This often depends on the circumstances in which the event is held and the needs of the community.

Often a motivating factor is when a hazard is imminent:

> We post messages up on the local radio that says we're having a forum at this place, please come and talk to us, and we found that way, when people are seeking information it's well attended and very popular (bureau employee).

The interviewees provided an example of the bureau's involvement at regional events such as attendance at the Cyclone Season launch in Cairns, which was held in the car park of a hardware store. These types of annual events tend to draw a decent crowd and offer the chance to expose people to the bureau's information on warnings and often work better than a public meeting in a town hall.

There is also a range of other one-off initiatives that the bureau is involved with. One example is a computer game called Storm Watchers, which is targeted at school children. This was developed by a team at James Cook University and included collaboration with the bureau on the weather-related aspects. The shop-front bureau office in Launceston (mentioned above) is another example of an initiative designed to enhance the community's understanding of the services on offer. People can

come in off the street and get demonstrations and information. The interviewees reported that this had been quite a successful initiative, although there were no plans to roll it out more widely across Australia.

A cyclone event in Darwin provided an example that illustrates the need to be very precise with the wording of information that is disseminated with warnings and in related brochures.

> The brochures said go ... pick up your kids from school ... so everybody went out there and picked up the kids from school. So now there's a thing that says if authorities advise, go and pick up your kids (bureau employee).

The parents had clearly picked up the message from the brochure about collecting their children from school if there was a cyclone warning. The message the bureau wanted to get across, however, was that parents should wait to be advised by the relevant authorities to do so in case it was not safe. This internal logic was assumed by the bureau but not clearly articulated in the advice. Therefore a simple assumption by the people who put the brochure together had a major consequence in terms of the actions taken by people, which could have put more lives in danger. Such ambiguities in the wording of brochures can have significant implications for the behaviour of communities in a disaster, highlighting the need for planned consultative processes to be built in to the preparation of text messages.

Another challenge raised is the issue of the public receiving information from several different agencies. While the bureau supplies warning information and weather forecasts through official channels, there are a number of other websites and information sources where people can pick up messages. This includes the United States naval website, sites such as Yahoo and various private providers that source their information from a range of other sites. At times this can present conflicting information and add to confusion among people who are unsure what to do or who to believe. An example of this relates to tsunamis, where there was:

> a particular problem ... [of] people picking up messages from Hawaii and [the United States broadcaster] CNN and ... because the ... Pacific tsunami warning centre ... watches and warnings specifically can mention Australia ... So people could be picking that up on CNN and taking action based on that (bureau employee).

The solution to this problem was, according to one bureau employee, for the bureau to make itself the primary authority in Australia for tsunami warnings:

> And make sure that ... people think of us first. And check the bureau or listen

to the local community and see what the bureau has said about it.

The issue of terminology is also raised in the context of people misinterpreting what is meant and therefore not taking a risk seriously or not thinking it is relevant to them. Again in the context of tsunamis:

> We have problem with inundation, using the word inundation versus using [the word] flooding, using the word marine tsunami threat ... you might think it's only the water (bureau employee).

The interviewee went on to explain that there is also the potential for inland communities to be at risk from a tsunami if they are in low-lying areas, which is not easy for the public to grasp.

Therefore, consideration of these issues comes into the final development of public information provision. A further illustration is the development of a hotline telephone number for tsunamis. An initial idea was to use '1300 tsunami' but it emerged that people were unfamiliar with how to spell 'tsunami'. Thus an alternative number was decided upon. As cyclone warning is the most highly developed area of the bureau's warnings education approach, it was used as the basis for reconstruction of a preliminary theory model of these activities (Figure 10:1).

Australian Tsunami Warning System

Australia is at relatively 'low risk' from a tsunami. Because of the high number of low-lying coastal communities, however, there is the potential for a significant impact from such an event. A nationally coordinated effort between the bureau, EMA and Geoscience Australia has initiated a comprehensive tsunami warning system (known as the Australian Tsunami Warning System or ATWS), which is planned to be operational by June 2009. The Australian Government funded the project by committing $68.9 million in the 2005/06 federal budget over the subsequent four years (Commonwealth of Australia 2009).

EMA has the responsibility for improving public awareness and preparedness for tsunami in Australia. A tsunami awareness brochure has been produced in a collaboration between the three agencies as part of the education component of the ATWS. This pamphlet is an educative tool that provides information to communities on what a tsunami is, what the contributing factors are that cause a tsunami, and the environmental impacts of a tsunami. The pamphlet also outlines what communities should do in a tsunami event.

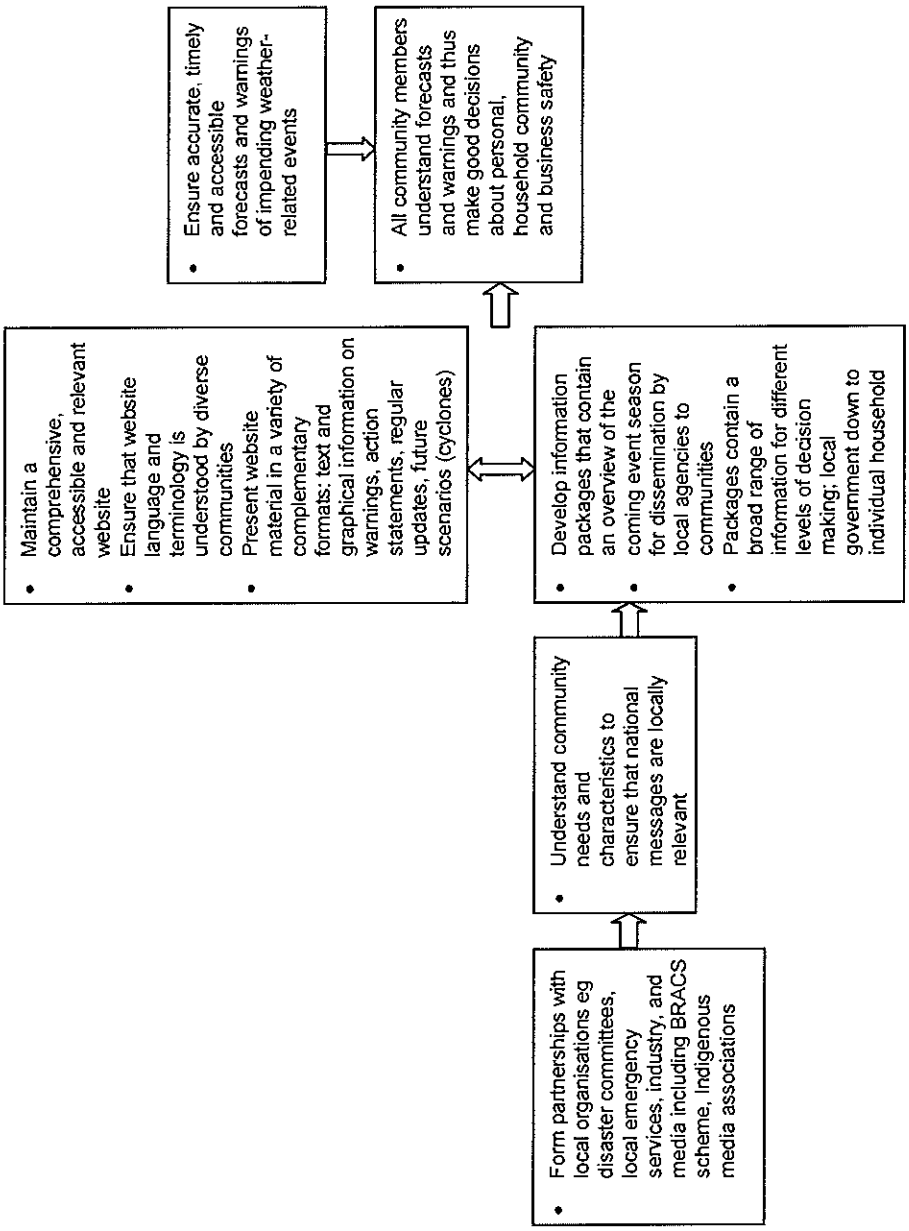


Figure 0:1 **A theoretical perspective on the bureau's EAE approach to cyclone warning**

The ATWS operates through a network of advanced technologies. Geoscience Australia regularly monitors seismic stations nationally and has access to data from international sources on the size, location and characteristics of a seismic event. As a matter of course or in the event of a tsunami, details of seismic activity will be relayed to the bureau and EMA. The bureau will then run a tsunami model to ascertain the potential impact of a tsunami on Australia's coast. This information will then be disseminated to State emergency services and to the public through its national office.

The following interview extract illustrates the importance of localising the warnings for tsunami in much the same way as the bureau has done for storm surge. It also highlights the challenge the bureau

faces in coordinating the messages in a systematic way and ensuring the integrity of warnings at the local level.

> For the tsunami warning system project, [a particular council] wanted ... some local education for the citizens. I think ... [that was] after the April 2007 tsunami warning .... And they used ... storm-surge modelling to draw an evacuation zone ... about where ... they wanted people to move to if they get ordered to evacuate. Strictly speaking ... storm surge and tsunami don't mean the same but I guess they took the approach that it's better than having nothing ... Other councils ... [may] have done similar things and haven't thought to come to us because it's a relatively new warning system ... I don't know whether our name is out there as ... being half of the warning system ... It's the same thing with storm surge. They've taken national messages or ... brief hazard messages and given them local meaning. They've put them in a local context and ... given the local community the maps and ... tools that have local relevance ... to draw on (bureau employee).

An insight is gained into the development of education around the ATWS from the observation of one bureau employee.

> We had some problems with the tsunami education ... being a rather new system there have been some uncertainties related to services and things, what their [local government] risk level is and us not being able to answer that question really definitively so they were choosing to [offer] less education rather than more. And also I guess with them trying to balance their resources between all the other hazards that they need to work on ... and the tsunami stuff as well.

In 2005 a study was undertaken by Bird and Dominey-Howes (2008) on community and professional perceptions of the tsunami risk in Sydney. The findings from this study indicated that the general community perception of tsunami was limited and often confused. The report recommended that more community education was needed about the threat, risk and consequences of tsunamis on low-lying coastal communities in Australia.

On 2 April 2007 tropical north Queensland was issued with a tsunami warning. It was reported that just after 9.30 am a tsunami was expected to hit the Australian coastline due to a strong earthquake off the coast of the Solomon Islands, around Gizo in the Western Province. A study undertaken by David King (2008) at James Cook University explored how people responded to this tsunami warning. It

highlighted that a tsunami warning system was highly effective, with more than 70% of residents from both Cairns and Townsville being made aware of the tsunami. However, King also found that there was a need for more public education and awareness of how to respond and prepare appropriately for a tsunami. His study reported that the first response from some residents from the affected and nearby regions was to evacuate, which left many residents stranded in low-lying coastal areas due to traffic congestion on evacuation routes.

Flood warning system in Traralgon, Victoria

Flooding in Australia can be fast acting and severe. Post-flooding studies in Traralgon in 1993 and 1995 recognised the need for a more comprehensive understanding by communities of the flood warning system and what it means to people at the community level. Extensive community education guidelines have been set out for the flood warning system in Traralgon in conjunction with several agencies including Latrobe City, the bureau and the Victorian SES. Several other volunteer agencies have also worked in collaborative partnerships to develop a community-focused warning system.

The warning system works as follows. The bureau uses real-time information on rainfall and creek flows in the area. It then issues flood warnings, which are disseminated by the SES and Latrobe City. However, this has been augmented with a set of guidelines published in a booklet entitled *Flood response guidelines for the community—Traralgon township and rural surrounds* (Latrobe City 2008). The booklet provides a detailed description of what a flood warning means for the local community: the severity, the predicted damage and the potential disaster. This includes providing a locality map of the potential flood-affected area. The guidelines also provide details on what to do after a flood and where to get further information. The details provided in this set of guidelines are much more comprehensive than those provided in the generic flood warning information. Once again, the importance of localising the information to the specific community in Traralgon has been an integral element of the approach.

An evaluation of flood warnings (*Are flood warnings futile? Risk communication in emergencies*) was undertaken by Handmer (2000), who suggests reasons why flood warnings may be ineffective. Some key issues of perceived inefficiencies of warning systems can be explained by the warnings serving administrative rather than practical needs. Handmer suggests that researchers' attention in this field is often directed at the content and detail of a warning system rather than who has legal obligations for dissemination. Another key issue identified for effective flood warning systems was the role of the community. In the face of floods and other natural hazards, some individuals may have 'perceived optimism' and do not heed the severity of warnings. They may refuse to take authoritative advice because they prefer to operate on visible environmental conditions. Handmer suggests that providing

accurate advice on how flood water will affect the people in the community is critical for overcoming inadequacies of official warnings. Another issue is the risk of ignoring those who have limited mobility or lack the capacity to respond to information and warning messages.

Handmer also argues that cooperation between organisations and the conceptualisation of these messages is an important factor in a flood warning system being effective. If communities do not understand messages, the warning system is flawed and could fail to prompt people to act. In 1999 the Australian guidelines for effective risk communication consisted of prediction, likely effects, dissemination, response of agencies and community, and review and improvements. Handmer suggests that to 'achieve this requires integration, cooperation, shared responsibility and broad thinking of the problem, involvement of communities at risk and the space for criticism and reflection' (Handmer 2000, p 3).

On the surface, the flood response guidelines for Traralgon appear to address many of the recommendations for effective communication of a warning system. They appear to encourage individuals within the community to act, highlight the responsibilities of agencies and individuals, and provide advice and information on the warning system, what it means, and the effect the flood water could have on individual households and communities. However, it is not clear whether the guidelines alone are sufficient for reaching vulnerable groups in the community. The rationale for this claim is supported by the guidelines not mentioning those who would fall into the 'vulnerable' category and the focus of information on those who would be deemed as mentally and physically able.

Discussion and conclusion

The Bureau of Meteorology is the official promoter and manager of warnings for meteorological hazards in Australia. The organisation operates at a range of levels: at the policy/whole-of-government level; at a State/local government level; and at a community/household/individual level. It deals with warnings in an 'end-to-end' approach, meaning that it deals with the technology and research that goes into understanding meteorological phenomena and forecasting, through to the community being able to take effective actions. It is expert in the science and technology of weather.

In terms of delivering public education, the bureau often forms partnerships with agencies. At a policy level this is often with EMA, whereas at a more local level partnerships are formed with State-based agencies, local governments and a range of other stakeholders. For some hazards the bureau is the lead agency responsible for developing and delivering the whole package of warning information and education (eg for tropical cyclones). For other hazards, the bureau acts as a support agency providing a level of assistance to others (eg for bushfire awareness).

Legislation varies between States and Territories, which impacts on the messages that the bureau can put out to the public and necessitates working closely with State emergency services. Issues surrounding this are particularly evident with the fledgling Australian Tsunami Warning System project. The bureau is presented with a range of challenges in terms of the delivery of accurate and timely warnings to the community and associated community education. There is a range of other providers of information about weather warnings in Australia and elsewhere that may offer contradictory or unofficial advice and information. The bureau is keen for people to be accessing information from its website, where warnings are accompanied with carefully worded action statements. Technological changes present both opportunities and challenges; it is a constant process of working to deliver warnings in ways that people want to access the information. In addition, advances in telecommunications such as mobile telephones make private subscription warning systems more prevalent, which again poses issues of accuracy and source of information. A further impact on the response of the community to warnings that the bureau disseminates is the role the media play in reporting events.

The bureau has a responsibility to issue warnings to communities about meteorological hazards based on the best available science. In essence, a warning is seen as a chain process and will not work properly if one or more links are not in place. In order for a warning to be effective, the forecast needs to be accurate and needs to reach people in a timely fashion and in a language that people understand and refer to. The community then has to understand what the warning means and respond accordingly, taking whatever action is required to ensure personal safety.

Past attempts to deliver public awareness campaigns and public meetings for cyclones at State and local government level have not proved successful for the bureau. Instead, information packs that are provided to the people who then deliver the messages, such as local disaster committees, local emergency services, industry and media, are believed to be more effective. The packages provide an overview of the coming season, what people can expect and what they should do at a range of levels. This might include at an infrastructure level for local government or at a personal/household level. These packs are then supported by a range of leaflets and presentations to community groups and schools, as well as by the website.

The website acts as a major portal to the wide range of information and services that the bureau has to offer. There is ongoing work on the website to maximise its utility and connectedness with other key sources of information. Presenting information in a variety of complementary ways appears to be an important factor, with text and graphical information on warnings accompanied by action statements, regular updates and future scenario estimates (in the case of cyclones). All this information is then augmented with help pages and glossaries providing an additional level of detail, as well as

explanations. Warnings, whether delivered via the website, the radio or other means, cannot tell people what to do. They need to empower people through providing accurate, timely and locally relevant information to enable individuals to make good decisions.

CHAPTER 11

Culturally and linguistically diverse communities

Introduction

This case study considers a range of programs designed to improve the understanding that culturally and linguistically diverse (CALD) communities have of, and their participation in, emergencies that arise as a result of natural hazards. The programs, which are discussed in more detail below, comprise those drawn up for the Country Fire Authority (CFA), Victoria, the Metropolitan Fire and Emergency Services Board (MFB), Melbourne, and for a variety of municipal and city councils and other emergency services in Victoria, Queensland, Western Australia and New South Wales.

The general principle addressed by these programs is that reducing the risk that all residents of Australia face from natural hazards means that community education and engagement programs should be extended to those citizens who belong to CALD communities.

Programs that are designed to address the needs of CALD communities seem to utilise one or more of three broad approaches. They translate existing information about hazards into the more common community languages, develop and provide information about how emergency services work and how to get in touch with them in the event of an emergency, and/or build the capacity of emergency services to engage with and respond to CALD communities.

Evidence exists that more needs to be done to improve relations between newly settled immigrant groups, such as those from Africa, and some emergency services in Australia. An African community representative who we interviewed for this case study argued that Australian governments and emergency agencies pay only 'lip service' to the notion of engaging with CALD communities and individuals. Asked if an African community had been involved in setting up a natural hazards' awareness program, the community representative replied:

> I am a community leader and community advocate. I have been highly involved with community issues for the last eleven years and I can hardly see any evidence of it. It's almost like there is nothing. And no African organisation is aware of all of it, has even been approached to be educated in natural hazards' awareness. And this is really very disturbing and will need to be represented [to government].

A recent occasion in Victoria was given as an example: in response to difficulties young Africans

were facing, the State government set up steering committees, on which no African was invited to sit. When funds were allocated to deal with the difficulties, they were simply distributed to local councils in the suburbs where the young African people lived. Our interviewee also pointed out that illiteracy was the biggest obstacle to full integration of African citizens in Australian society:

> We need to develop different strategies where the African communities can be involved. First of all, they should be aware of the Internet, what it is and what it is about so they can be involved and integrate with the wider community. As far as natural hazards are concerned, there is a list of strategies we can put but the main problem is whether we have the resources. What I mean is that these people don't speak English at all. Most of them, 90% of them, can't read, listen to the radio or TV and whatever media is available. The main thing is how can we engage them so that they can appreciate it and how we can make it culturally appropriate, so that they can respond to any natural hazards' issues?

It seems fairly clear, therefore, that effective cross-cultural communications lie at the heart of any improvement in relations between newly arrived (or newly settled) immigrant communities and the emergency services. For example, it is often assumed that differences exist between how emergency services operate in Australia in comparison with immigrant groups' countries of origin and that some immigrant groups do not trust emergency service personnel because they have memories of bad experiences with them in their countries of origin (see, for example, EMA 2007, p 18). Any difficulties emergency services have with immigrant groups relate to larger problems of settlement that all migrant groups face globally, for the migrant experience is a universal one and is not easily resolved.

> The balance of power that lies at the origin of immigration is retranslated into effects that are projected on to ... the immigrants' presence, on to the place they are assigned, on to the status that is conferred upon them, and on to the position ... they occupy in the society that counts them as its *de facto* (if not *de jure*) inhabitants (Sayad 2004, p 163).

CALD programs for natural hazards awareness exist in a variety of settings in most Australian States. They include those implemented by State and local governments and metropolitan and regional fire agencies. This case study draws on programs implemented by the Cairns Regional Council, Queensland, the City of Bunbury in Western Australia, the CFA in Victoria, and the New South Wales Fire Brigades. Three additional local government programs funded by the Local Grants program are also discussed. These programs were implemented in Kogarah, New South Wales, and in

Darebin and Maribyrnong in metropolitan Melbourne, Victoria.

Rationale behind a sample of programs

In addition to the changing demographic profile of modern Australia (EMA 2007, pp 8–9), three other inter-related factors may help to explain why in the past decade emergency services and local governments have begun to involve CALD communities in education and awareness programs that relate to emergencies arising from natural hazards. The three factors are the 'war on terror' that began after the terrorist attacks on New York and Washington in 2001, increased numbers of arrivals by boat of asylum seekers, and the Australian Government's policy responses to these events.

First, it is generally accepted that the terrorist attack on the World Trade Centre, New York, in September 2001 changed how Western countries, their governments and citizens viewed and continue to view citizens from the Middle East. Second, in Australia the electorate had already demonstrated a willingness to accept demonised representations of citizens from Arabic countries in the Middle East, as shown by the re-election of the Howard government after the so-called 'children overboard' controversy, which arose during the 1999 federal election, when the then Minister for Defence, Peter Reith, said refugees on a boat threw their children overboard when an Australian naval vessel approached. These claims, which were later shown to be unfounded, polarised public debate during the federal election.

Third, continuing the immigration practices that the Hawke government introduced in the early 1990s, the Howard government detained large numbers of what it called 'illegal immigrants' in camps that were situated in isolated locations such as Port Hedland, Western Australia, and Woomera, South Australia. On the whole, many people seeking asylum entered Australian territorial waters by boat via Indonesia. Their countries of origin included those in the Middle East such as Iran, Iraq, Pakistan and Afghanistan. It is likely that the Howard government retained significant public support for its policy of detaining so-called 'illegal immigrants' because of the conflation in the public mind of people from such countries and terrorists who, according to media analysis as well as government propaganda, were either waging war on the West or harbouring those doing so.

The federal government department that is primarily responsible for settlement of immigrants and refugees is the Department of Immigration and Citizenship (DIAC). During the Howard government's terms in office (1996–2007), it was known as the Department of Immigration, Multiculturalism and Indigenous Affairs (DIMIA) before its name change in 2007. In May 2003 DIMIA presented a *Report of the review of settlement services for migrants and humanitarian entrants* (DIMIA 2003). The report (hereafter, the settlement service report) emphasised 'settlement experience' and 'settlement indicators'. One overall purpose seemed to be to show that it was more costly to settle 'humanitarian'

entrants than 'skilled stream migrants' and those with English proficiency, and to thus build the argument for tightly 'targeted' assistance.

A number of principles were announced that would guide government services to newly arrived immigrants and humanitarian entrants. The first principle was to reject the notion of universal assistance to immigrants and to focus on the wisdom of 'targeted' assistance to those arrivals in greatest need. The second was to distinguish between well-established immigrant groups, such as Turkish and Italian people, and newly arrived groups, such as people from the Horn of Africa (Somalis, Ethiopians, Eritreans) and other African countries such as Burundi and the Democratic Republic of the Congo (DIMIA 2003, p 100). Distinguishing between immigrant categories would allow for the implementation of the third principle, which was to allow the government to allocate funds more effectively:

> It is not intended that DIMIA funding be used to support communities which are well developed and able to organise, plan and advocate for services to meet their own needs, or which have very few new arrivals in the settlement services target group (DIMIA 2003, p 95).

DIMIA's services would be provided according to what the report called 'migrant need' (DIMIA 2003, p 103). Categories of need were spelled out: some services were to be provided 'to specific categories of high needs arrivals' (possibly humanitarian entrants?); further, some would be provided free of charge (presumably on immigrants' capacity to pay?) but to others on 'a user-pays basis'. In other words, funding would be allocated according to the greatest need.

EMA, which is a branch of the federal Attorney General's Department, produced a manual in 2007 entitled *Guidelines for emergency management in culturally and linguistically diverse communities* (number 44 in the Australian Emergency Manual Series; EMA 2007). The origins of the manual lie in recommendations made by the COAG meeting in 2005. These recommendations included the need for (a) a coordinated response in the event of a national emergency and (b) stronger links with Australian communities and the promotion of 'tolerance and understanding' (EMA 2007, p v). The stated rationale for EMA producing the manual was to provide guidelines to assist emergency agencies to develop 'sound engagement opportunities with community leaders who represent the diversity within those communities' (EMA 2007, p 1). This is because national and international experience showed that agencies needed to work in partnership with CALD communities to deal with emergencies: 'Improved engagement with CALD communities leads to increased risk awareness and resilience. It also leads to inclusiveness, mutual respect, understanding and acceptance' (EMA 2007, p 1).

The manual gave three reasons why immigrant groups represented a 'particularly vulnerable part of Australian society'. First, immigrants' poor English proficiency could mean they would be less 'resilient' in an emergency. Second, as newly arrived people were in an unfamiliar environment, they could be 'susceptible to particular hazards or risks' and, third, 'cultural or linguistic differences may distort the meaning of messages' (EMA 2007, p 1).

Included among benefits for the emergency services was likely to be their contribution to the government's larger purpose of preventing immigrant groups in Australia from being marginalised. The manual acknowledged that communities were not homogeneous and advised that in order to develop meaningful connections with immigrant groups, emergency services should make contact with 'key stakeholders or representatives' (EMA 2007, p 17):

> gain the support of community leaders—be patient. If a leader is obstructive, speak to other leaders and key representatives within the community and involve them in putting forward the case (EMA 2007, p 19).

The EMA manual clearly enunciated benefits the emergency services would gain if they established real and meaningful connections with CALD communities. International evidence has suggested, especially in the case of the United Kingdom and France, that marginalised CALD communities could contribute to the growth and development of terrorist cells. While not directly stated, one perspective on the principles argued for in the manual is that engaging with CALD communities has benefits for both the immigrant communities and the emergency services in relation to the actual or perceived threat of terrorism. In a case study of a 'multi-faith initiative' undertaken for the manual, the observation was made that, among those interviewed:

> All of those who wore distinctive clothing expressed concern about how they would be greeted in a home visitation programme in the event of an emergency caused by—or even rumoured to be caused by—terrorist attack (EMA 2007, p 37).

Like DIMIA's settlement services report of 2003, the EMA manual for guiding relations with CALD communities emphasised distinctions between immigrant groups, drawing attention to immigrants arriving from the Horn of Africa and other African countries, as well as those from Arabic countries (EMA 2007, pp 9–14). The manual proposed a four-step process for engaging with CALD communities. The first step was 'Preparing for engagement'; the second was 'Making initial contacts: relationship foundations'; the third step was to establish 'CALD community engagement: creating pathways for involvement'; and the fourth was to maintain 'CALD community engagement' (EMA

2007, p 2).

The guidelines in the EMA manual offer basic advice for the fostering and improvement of cross-cultural cooperation. It is difficult to say to what extent they have borne fruit for emergency service agencies. As discussed in the next section, while emergency agencies have adopted in principle the need to engage with CALD communities, and while institutionally they are committed to the principles, on the ground their practice is often less engaged than it could be. The next section examines various programs enunciated and/or implemented by agencies to engage with CALD communities.

The programs

The sample of programs underlying this case study comprises those being prepared for or implemented by the CFA, the MFB, and a number of municipal councils and other emergency agencies in Queensland, Western Australia, New South Wales and Victoria. As mentioned, all programs designed to improve education of or engagement with immigrant groups in Australia have one or more of three common features: translating existing information about hazards into the most common community languages, developing and providing information about how emergency services work and how to get in touch with them in the event of an emergency, and building the capacity of emergency services to engage with and respond to CALD communities. The following discussion is organised into two sections: the first section concerns the strategies and activities of local government and emergency services and the second discusses processes and outcomes.

Strategies and activities

Country Fire Authority

The fire safety brochure 'Your home fire safety' is available in 20 languages from the CFA website. The CFA has also produced a multicultural media campaign. In 2006/07 this involved translating radio advertisements into 11 languages for broadcasting on SBS Radio and regional community radio stations. To support the advertisements, the CFA briefed CALD community spokespeople on key CFA safety messages.

Metropolitan Fire and Emergency Services Board, Melbourne

A manager from the MFB interviewed for this case study showed that the MFB was aware that the needs of different ethnic (immigrant) groups vary according to their length of settlement in Australia, stating that:

> Long-established communities tend to have more elderly who are most at risk and they are the ones we would target more. You've got the Italian, the Greek, the Chinese, Vietnamese communities, and some of those are long established. But in other areas there is a higher concentration of new and emerging communities and, again, it would be about developing programs to target those groups.

Distinguishing between immigrant groups on the basis of the length of time they have been settled in Australia conformed with observations from DIMIA's report: established communities are likely to have a higher proportion of elderly people and that the more newly arrived, such as those from various parts of Africa, are likely to be younger on the whole. Such distinctions are significant for the MFB because elderly people require a different type of response. For instance, more officers are often needed to move elderly people and need to do so less hastily than they would younger or more able people.

The MFB regularly uses Australian Bureau of Statistics (ABS) data to identify the types of CALD communities in each fire district and ensures that brigade officers are aware of their needs. The manager we spoke to emphasised that the MFB was aware of the importance of distinguishing between established CALD communities, such as Greek and Italian, and newly arrived communities, such as Horn of Africa immigrants. The manager also observed that the MFB was aware that some immigrant communities are actively involved in developing their own emergency programs and cited the Muslim community in Melbourne, which had begun to develop a school-based program and had:

> approached different emergency services and asked them to ... be part of that conversation. They are taking initiatives in building their own capacity to know more about emergency services and how to respond.

Municipal councils and other emergency agencies

The programs described below implemented strategies to either convey simple emergency messages in mediums or languages that are intelligible to ordinary members of immigrant communities or to assist local government officials or emergency service personnel to understand the complexities of cross-cultural communications.

- Cairns Regional Council, Queensland: a multi-language cyclone brochure provides information that is similar to council's emergency action guide, as well as instructions for contacting translation and interpreting services. Brochures are in six languages: Hmong, Arabic, Tagalog, Japanese and Chinese. (The following case study on cyclone awareness programs for independent

travellers and mine workers provides more information.)

- Darebin and Maribyrnong city councils, Victoria: in the north-eastern suburbs of Melbourne, Darebin City Council has provided training on emergency management and culturally sensitive practices in the cities of Darebin, Whittlesea, Banyule and Moreland (funded in 2006/07, $66,000). Maribyrnong City Council in the western suburbs of Melbourne also developed community awareness strategies targeted at people from CALD backgrounds (funded in 2005/06, $43,920).

- Fire and Emergency Services Authority (FESA) in Western Australia: 'StormSafe' messages translated into nine community languages based on ABS data of major non-English languages spoken in the Perth metropolitan area. They are being distributed throughout the community and can be downloaded from the FESA website.

- Kogarah City Council, in the southern suburbs of Sydney, produced fridge magnets with emergency contact numbers in community languages to be distributed through agencies working with immigrant communities and at a Migrant Information Day event. The project was informed by a consultation process with relevant agencies and aims to increase awareness of local emergency contacts and procedures (funded in 2006/06, $8635).

- Maribyrnong City Council, Victoria: Footscray, which is one of Melbourne's most culturally and ethnically diverse suburbs, sits at the centre of the Maribyrnong local government area. Council is actively involved in developing programs to ensure officials are aware of the emergency needs of their CALD citizens. Included in the strategies and activities it has undertaken are the following: 'Culturally and linguistically diverse policy and action plan 2006–2011' (May 2006); 'Emergency relief (evacuation) centre management guidelines' (September 2007); and 'Culturally and linguistically diverse (CALD) communities: Communication strategy 2008–2010'. An interview with a council manager drew attention to the fact that the risks residents face are mainly associated with the high concentration of heavy vehicle traffic and industry in the municipality. The manager also pointed out that the district was subject to occasional flooding from the Maribyrnong River. Other features of CALD education and engagement activities in Maribyrnong included regular meetings between SES and MFB personnel and immigrant residents so as to raise awareness of emergency procedures; the 'When industry is your neighbour' brochure and fridge magnet; and a trial of a telephone warning message service.

- New South Wales Fire Brigades: the CALD community program presents broad safety education and provides 24-hour access to translation services through radio communications. Firefighters provide general fire and community safety advice and support materials. Its aim is to reduce the

frequency and severity of fires in the homes of immigrant residents.

- Whittlesea City Council, Victoria: 'CALD bushfire preparedness project' prepared by CUBE Management Solutions for the council (March 2008).

Processes and outcomes

Country Fire Authority

LOTE Marketing Pty Ltd prepared a project in April 2007 to evaluate the multicultural media campaign it designed for the CFA. The project evaluated the effectiveness of the advertisements that LOTE Marketing made for the CFA that were broadcast on SBS Radio. Thirty-two people from four immigrant groups were interviewed: eight each from Croatian, Somali, Turkish and Vietnamese groups. A majority of those interviewed confirmed that they were aware of the advertisements. LOTE Marketing recommended that a ten-minute video be made on the risks of fires in the home and be produced in English with capacity for voice over of additional languages.

Metropolitan Fire and Emergency Services Board, Melbourne

The MFB's diversity strategy seems to have two purposes. The first is to increase CALD community awareness of the MFB as an organisation and its role in assisting individuals and families in the event of an emergency, and the second is to raise awareness in the MFB of the advantages of having a culturally diverse workforce. In pursuing the first part of its diversity strategy, the MFB has arranged for fire prevention information to be included in English-language classes for newly arrived immigrants. As well, the MFB organises focus groups with CALD individuals to help gauge their levels of awareness about natural hazards and how to call for help in the event of one. Other activities the brigade undertakes with immigrant communities include (a) involvement in inter-faith services and school visits; (b) consultations with community representatives and international students; and (c) use of bilingual community workers. In regard to the second part of its diversity strategy, the MFB reported that it is in constant dialogue with stakeholders such as the firefighters' union, management and immigrant communities to increase representation of people from CALD backgrounds in the MFB workforce.

Municipal councils

The focus in this section is on the processes or outcomes that became apparent for the Shire of Whittlesea as a result of engaging with its CALD individuals and communities. The council mostly seemed interested in (a) working in conjunction with the CFA to find funding sources to extend its CALD education programs; (b) more research to determine how to communicate with CALD citizens

(fridge magnets appeared here); (c) developing with the CFA an 'emergency communications plan'; (d) seeking funding to present information to CALD residents on a DVD; and (e) seeking a cooperative venture with the State public service to prepare and publish a newsletter ('CALD bushfire preparedness project' prepared by CUBE Management Solutions for the council, March 2008). In summary, the anticipated outcomes appeared to be, first, to find funds to develop a plan so that the shire could communicate with its CALD residents and, second, to communicate more effectively with them. The extent to which any of these outcomes proved useful or beneficial to CALD residents in the bushfires that struck the Whittlesea region in February 2009 may become clear when the Victorian Bushfires Royal Commission hands down its recommendations in 2010.

Discussion and conclusion

Emergency services are known for (and their members often seem proud of) their reputation as 'mono-cultural' organisations. For example, when Sue Lewis from Swinburne University of Technology undertook a research project on gender issues in firefighter training for one emergency services agency, she found a male culture that was hostile to women and other groups of people:

> Joking was a very powerful tool for making it clear whose behaviour was unacceptable ... in the recruit course. The clear outcome of many of these jokes was to make sure the group humiliation through laughing meant that you did not repeat the behaviour. The joking drew on stereotypes to categorise and denigrate particular people or groups and the target for many of the jokes are women or behaviour associated with being feminine in stereotype terms (Lewis 2004, p 20).

A similar attitude to multicultural issues appears to exist and, paradoxically, alongside their resistance to actively taking part and facilitating their own cultural change, the emergency services are being asked to engage more genuinely with multicultural Australia. Exacerbating this transition is the fact that they are being required to undertake it during a time of increased public anxiety and questioning of multicultural policy and practice.

There have, however, been a number of achievements to date that point the way to better relations between immigrant groups and emergency services in Australia. And it seems fairly clear that employees of emergency services, local councils and government departments know the arguments in favour of being more actively involved in engaging with CALD communities. It also seems clear that they know that different CALD communities are differently integrated into mainstream society; that, for example, the more established ethnic communities such as the Chinese and Italians have different needs to the newly arrived settler groups from Africa. Thus while emergency agencies have clearly

adopted in principle the need to engage with CALD communities, and while institutionally they are committed to the principles, their practices on the ground are often less engaged that they could be (appearing to be frequently focused on the translation of community awareness and education materials into a range of locally relevant community languages). What seems to be most needed are (a) a clear policy to progress beyond provision of materials in community languages to the use of more diverse communications media and engagement strategies (EMA 2007, p 30), and (b) for staff at all levels of emergency services to show a greater willingness to practise integration themselves and develop policies that encourage any reluctant peers to do so.

Finally, it is important to note that engagement with CALD communities is one of a number of aspects of emergency management where partnership arrangements between emergency services and local government are potentially very fruitful. Local government personnel are most likely to be in contact with different CALD communities in their localities and, through their existing services, aware of the needs of newly emerging CALD groups.

CHAPTER 12

Cyclone preparation for itinerant populations

Introduction

Increasing awareness of cyclones among itinerant populations in northern Australia is a challenging area for providers of community education, awareness and engagement programs. Itinerant populations are many and varied. They include international and interstate tourists and travellers such as backpackers, 'grey nomads'[26] and other tourists, as well as people who move to the area for work, particularly those doing seasonal work in agriculture and those involved in the mining industry.

Cyclones are a major natural hazard in Western Australia, the Northern Territory and Queensland. This case study focuses on the Cairns region in north Queensland, where cyclones are a regular occurrence. This is a major tourism region attracting more than two million domestic and international visitors each year and acting as a gateway to the Great Barrier Reef.[27] Many of these

---

[26] 'Grey nomad' is an Australian colloquialism for a retired person who travels extensively, especially by campervan etc (Australian pocket Oxford dictionary).

[27] According to Tourism Tropical North Queensland (http://www.tropicalaustralia.com.au/about_tropical_queensland).

visitors are backpackers who stay at low-cost accommodation such as hostels. There are also large numbers of grey nomads who often stay in caravan parks. Major employers in the region are sugar cane and banana plantations, which provide seasonal work to itinerants who also often live in hostels and caravan parks. While the cyclone season coincides with the off-peak season for tourism, school holidays and the advent of cheap flights mean large numbers of tourists still visit the region when the cyclone risk is at its highest.

On 20 March 2006 cyclone Larry struck the Cairns region. The eye of the storm passed over Innisfail, about 80 kilometres south of the city of Cairns in the neighbouring Johnstone Shire, and in doing so highlighted the potential for severe cyclones (and associated storm surges) in the region. Research following Larry attributed the lack of serious injury to the level of preparation among well-networked communities, most of which had prior experience of cyclones, trusted the weather and emergency services, followed advice and acted sensibly (see, for example King, Goudie & Dominey-Howes 2006; Australian Bureau of Meteorology 2007). Of concern to local authorities is that, by contrast, many tourists are likely to have had no previous experience of cyclones, to be less prepared and not well networked locally, all of which would make them vulnerable in the event of a cyclone. The issue of drinking and 'cyclone parties' has also been raised as an area of concern with the potential for adding to the danger in a cyclone.

A research project published in the *Australian Journal of Emergency Management* (Hoogenraad, van Eden & King 2004) examined awareness of cyclones among backpackers in Cairns and found that it was generally high. However, the authors also found that backpackers had minimal knowledge and concerns about the cyclone risk. Recommendations in the research included that accommodation providers supply their guests with pamphlets that have been designed to take account of backpacker interests and behaviour and refer them to an Internet site for more information. The report also suggested that information be provided at bus stops, as buses are a major mode of transport for backpackers.

The focus of our research is low-cost accommodation providers such as hostels, resorts and caravan parks, which typically are where backpackers, grey nomads and other low-budget independent travellers stay. Their visits are often typified by extended stays in the region. Language differences can also add to the challenge of providing information to these groups.

The aims of this study are as follows:

- to survey accommodation providers, including backpacker hostels and caravan parks, to explore (a) whether the providers actively promote cyclone awareness information (prior to cyclone

season and during a cyclone warning); and (b) whether their cyclone response plans include information and advice that they provide to guests when a cyclone threatens

- to follow up the survey of accommodation providers with a number of interviews with accommodation providers

- to review backpacker guide books and web-based information sources to identify what information is provided to tourists.

Another itinerant population that is potentially vulnerable during a cyclone in tropical north Queensland is the group of mine workers. A major incident review that FESA, Western Australia, conducted in November 2007, in the aftermath of cyclones George and Jacob, identified a need to review cyclone education, awareness and information dissemination in conjunction with industry. An additional component of this case study is to look at an example of a mine site in the Cairns region with the aim of identifying the information that is provided to mine workers (and their families where relevant).

Accommodation providers

Survey results

As mentioned in the introduction, a mixed-method approach was taken with this case study, involving a survey of accommodation providers and follow-up interviews with a sample of respondents. The aim of the interviews was to add further qualitative insights into the results of the survey.

The results were of interest for what they said about where accommodation providers were getting information about cyclone awareness and preparedness and how they used it to inform guests about cyclones. Half the respondents said they had received information from the Cairns City Council (now the Cairns Regional Council) during the previous cyclone season (November 2007 to April 2008). This was an increase from the 35% who said they had received cyclone preparation information from the council in previous years. There was a decrease of more than 10% of accommodation providers who indicated that they had not received any cyclone awareness and preparedness information during the most recent cyclone season (November 2007 to April 2008) compared to previous years.

Accommodation providers generally received cyclone information from brochures, pamphlets or booklets provided by the Cairns City Council. More than 60% of accommodation providers who responded to the survey make cyclone information available to their guests. Additional comments from respondents suggested that information is only made available to guests in the event of a cyclone or when requested. More than 40% of respondents said that information was displayed at the

reception counter. Other comments suggest that information was conveyed (in the event) verbally, displayed on walls and put under doors.

More than 40% of respondents thought that the information provided during the previous cyclone season was useful for backpackers and tourists, compared with more than 25% who said it was not applicable—which may support the suggestion that information is only provided under the threat of a cyclone, as there was no incidence of a cyclone warning in the previous cyclone season. More than 70% of accommodation providers said backpackers and tourists were not well aware that Cairns is located in a cyclone risk area, while more than 70% felt their businesses should provide backpackers and tourists with cyclone information.

A minority of participants felt that cyclone information was detrimental to tourism and less than 25% said that it was quite or very detrimental. Some respondents suggested that sensational accounts of cyclones in the media had a detrimental effect on tourism. More than 80% of accommodation providers had an emergency plan with specific provisions for cyclones and in all cases staff were made aware of this plan. More than 60% of respondents indicated that their plans were reviewed prior to every cyclone season.

Interview results

The interviews with accommodation providers in the Cairns region provided some interesting findings. Two interviews were conducted with backpacker accommodation providers in Cairns and two interviews with caravan park owners in the Cairns region. An additional interview was conducted with a caravan park owner in Innisfail, in the neighbouring Johnstone Shire.[28]

Experience of cyclones

The accommodation providers interviewed gained their experience of cyclones locally and from where they had previously lived in Australia, notably Darwin and other parts of the Northern Territory. Many recalled previous cyclone events and warnings, including cyclone Larry, and much of their knowledge and understanding of cyclones came from their experiences rather than formal channels. Their preparedness activities and emergency plans, for themselves and guests, were in large part self-driven, based on their past experiences. As one caravan park owner put it, 'A lot of it is drawn through my own experience of going through cyclones and what to do and what not to do'.

---

[28] The Johnstone Shire Council amalgamated with the neighbouring Cardwell Shire in March 2008 to form the Cassowary Coast Regional Council.

Caravan park owners described what they did when the Bureau of Meteorology issued a cyclone warning. Typically this involved tying down or packing away outdoor furniture and securing any loose items, ensuring caravans and annexes were tied down, and keeping guests informed. Park owners generally encouraged guests to leave the premises. Cyclones occur in the 'off-peak' season, which generally means that caravan parks are relatively empty. The providers that we interviewed suggested that being responsible for the least number of people was the preferred option. In the event that guests were unable to leave, operators would identify a safe place for them to shelter.

One of the two backpacker providers interviewed discouraged guests from coming to or remaining on the premises during a cyclone. If guests did choose to remain, they were advised to shelter downstairs. The other backpacker facility adopted a different approach; it gathered guests together, ensured that they understood what to do and provided shelter in the strongest part of the building.

Information about cyclone and storm surge safety

Most accommodation providers received their information through the local newspaper (*Cairns Post*) or a similar source such as information disseminated by the council. This information commonly came in the form of a booklet or leaflet and provided general but detailed information. All the accommodation providers claimed not to have received any industry-specific information. People tended also to draw on their own experiences of cyclones and adapted to the particular situation. Other sources of information mainly came from reports on the radio. In contrast to Cairns Regional Council, the caravan operator in the Johnstone Shire mentioned that information booklets were not generally disseminated every season, but were available upon request:

> When [the] cyclone season officially starts there is information on the radio weeks or days before ... Some information is provided in the newspaper, however most people know what they need to do.

One accommodation provider had information to disseminate to guests staying at the facility. This situation was not typical but does highlight that agencies or organisations can and do recognise that detailed information is needed for some groups. The backpacker accommodation at the time was operating as an international student house for students aged 19 to 22. Ultimately, the school the students attended was responsible for their safety and the accommodation facility sent information packs to ensure students understood the cyclone risk. Our interviewee was unable to recall the information that was provided in the packs or its source, but said it was quite detailed.

In addition to people receiving printed information, the Bureau of Meteorology website was widely used. All but one accommodation provider found this resource extremely useful, as they were able to

monitor the progress of the cyclone, which allowed them to provide 'in time' updates to guests either via the Internet or facsimile service. One accommodation provider said that using the Internet made it easier:

> The Internet makes it a lot easier to make decisions, about what you should do and where you think it's going, it gives you a lot of confidence as you know what is happening with it.

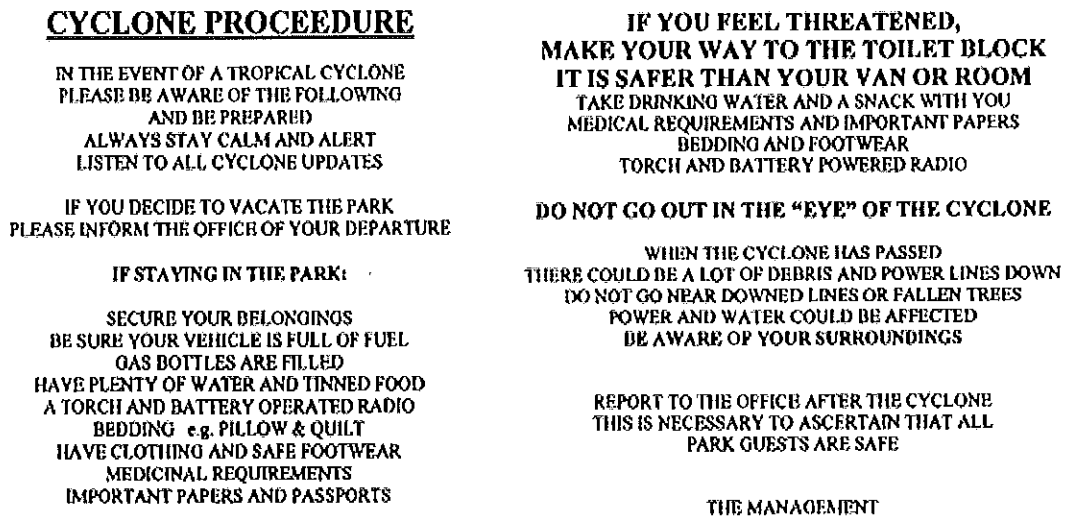
Another accommodation provider preferred to rely on radio updates. A provider who did use the Internet as a monitoring tool implied that she had difficulty understanding what the warnings and plotting meant and needed to rely on her longer-term guests to explain the information to her.

Information about cyclones and storm surge in emergency plans

The purpose of our interviews was to identify what practices existed for providing cyclone information to tourists and backpackers. They suggest that cyclone information is rarely provided to tourists and backpackers except in the event of a cyclone, in which case accommodation providers generally tell guests verbally and display updates and information on noticeboards. In only one circumstance was it clear that information was 'actively' displayed on the reception counter every cyclone season, regardless of cyclone warnings. One caravan park owner advised that she handed out spare copies of cyclone leaflets to her guests:

> It's on the counter in the office, if people want to take it away and read it they can, if I have a couple of copies I will hand it out.

This same interviewee had also created an A4 poster outlining cyclone safety information (Figure 12:1). This A4 flyer is handed to all guests staying at the park if a cyclone warning is issued. It was sourced from official information published in leaflets, brochures and newspaper, and outlined safety procedures, what to do and what not to do. Two of the accommodation providers have longer-term guests and, as they had more experience of cyclones and knew what to do in a cyclone, the accommodation providers do not need to provide them with as much information. In one of these facilities, some printed information is available. However, it was not clear what it consisted of or how accessible it was to guests.



CYCLONE PROCEEDURE

IN THE EVENT OF A TROPICAL CYCLONE
PLEASE BE AWARE OF THE FOLLOWING
AND BE PREPARED
ALWAYS STAY CALM AND ALERT
LISTEN TO ALL CYCLONE UPDATES

IF YOU DECIDE TO VACATE THE PARK
PLEASE INFORM THE OFFICE OF YOUR DEPARTURE

IF STAYING IN THE PARK:

SECURE YOUR BELONGINGS
BE SURE YOUR VEHICLE IS FULL OF FUEL
GAS BOTTLES ARE FILLED
HAVE PLENTY OF WATER AND TINNED FOOD
A TORCH AND BATTERY OPERATED RADIO
BEDDING e.g. PILLOW & QUILT
HAVE CLOTHING AND SAFE FOOTWEAR
MEDICINAL REQUIREMENTS
IMPORTANT PAPERS AND PASSPORTS

IF YOU FEEL THREATENED,
MAKE YOUR WAY TO THE TOILET BLOCK
IT IS SAFER THAN YOUR VAN OR ROOM
TAKE DRINKING WATER AND A SNACK WITH YOU
MEDICAL REQUIREMENTS AND IMPORTANT PAPERS
BEDDING AND FOOTWEAR
TORCH AND BATTERY POWERED RADIO

DO NOT GO OUT IN THE "EYE" OF THE CYCLONE

WHEN THE CYCLONE HAS PASSED
THERE COULD BE A LOT OF DEBRIS AND POWER LINES DOWN
DO NOT GO NEAR DOWNED LINES OR FALLEN TREES
POWER AND WATER COULD BE AFFECTED
BE AWARE OF YOUR SURROUNDINGS

REPORT TO THE OFFICE AFTER THE CYCLONE
THIS IS NECESSARY TO ASCERTAIN THAT ALL
PARK GUESTS ARE SAFE

THE MANAGEMENT

Figure 0:1 **An example of cyclone information flyer provided to guests at a caravan park (from a document put together by an accommodation provider)**

Accommodation providers' recommendations

The five accommodation providers we interviewed said that industry-specific, detailed information would be useful. Their suggestions included the following.

- A coloured and laminated poster should be on display in accommodation facilities. The poster would be displayed all year round and should be clear, simple, in big print and provide an explanation of the warnings that are provided over the radio. There could also be a link to a website that would provide more detailed information.

- An information pack that could be handed to guests. This pack should provide simple instructions with details for other contacts if people wanted more information. It would be useful to provide these packs in several different languages and they should raise awareness and highlight dangers of the cyclone season.

- A pamphlet to be made available during the cyclone period. Federal and State governments should advise tourists when cyclone seasons occur.

- Cyclone and tourist-specific information that can be displayed in the laundry or camp kitchen for people to look at in their own time. There is also the need for a more detailed industry-specific (tourist) brochure that provides information without scaring people—perhaps highlighting the fact that there is so much warning and tracking detail that provides a lot of time for people to prepare

and leave the area.

- A two-sided leaflet with information advising tourists what to do if they hear a warning on the radio. Details of the different terminology they may hear should be provided in different languages. These leaflets could be available from car hire companies, motor home companies and at airports. The rational for this suggestion is that 'people need to be made aware of cyclones, rather than only relying on radio warnings because they won't understand' (caravan park owner).

In summary, accommodation providers wanted 'tailored' information for tourists to the region that gave simple instructions, contacts and explanations for the warnings broadcast on the radio.

The Cairns Local Disaster Management Plans (Cairns City Council 2007) advise that cyclones affect Cairns on average once every two years, though 'direct hits' by severe tropical cyclones are not common. The plans identify the level of risk from category 1–3 cyclones as high, with consequence as minor but likely, while category 4+ cyclones are rated as high risk but rare, with major to catastrophic consequences. In both cases the potential exists for damage to infrastructure and injury to people. Furthermore, there is also an associated high risk of a storm surge, which, while considered rare, would have catastrophic consequences.

The roles and responsibilities of the Cairns Local Disaster Management Group (CLDMG), which is made up of representatives from a wide range of agencies and organisations, include (a) design and maintenance of public education/awareness programs, and (b) provision of public information prior to, during and following disaster impact events (Cairns City Council 2007, p 47). A representative from Tourism Tropical North Queensland acts as adviser to the CLDMG. The Cairns Regional Council[29] undertakes an annual communication strategy in the build up to the cyclone season. This involves media releases, advertising in the local paper and involvement in a booklet published by the *Cairns Post*. According to the Operations Officer, part of the reason for doing this on a yearly basis is recognition of the transient nature of the population in Cairns. Major sources of information include:

- 'How to prepare and respond to a cyclone' pamphlet, which was developed in partnership with the Cairns City Council Local Disaster Management Group and Local Area Multicultural Partnership Advisory Group

---

[29] The Cairns Regional Council is an amalgamation of the Cairns City Council and the Douglas Shire. This merger took place in March 2008.

- 'Cyclone survival guide' brochure, which is produced annually by the *Cairns Post*, is supported by Cairns Regional Council and is also available online[30]

- 'Preparing for cyclones: Information for residents and visitors' pamphlet, which has been produced for the upcoming cyclone season by the Cairns Regional Council; Bureau of Meteorology website; Emergency Management Queensland website; Lonely Planet and other guidebooks. A new pamphlet was developed for the 2008/09 cyclone season and reflected in its title ('How to prepare and respond to a cyclone') the needs of visitors for information. Specific advice aimed at tourists included advice to evacuate from caravans and tents to more substantial shelter and, if visiting the area, to talk to the accommodation provider about what to do and where to go (Cairns Regional Council 2008).

The council has made an arrangement with Tourdex to display copies of the pamphlet alongside tour operator brochures in Tourdex booths.[31] These are often located at accommodation providers and therefore will increase the availability of information about cyclones to tourists. When asked about the responsibility for providing information to independent travellers, the council said it was the responsibility of the accommodation industry. It was willing to provide assistance and advice but did not have the resources to disseminate the information.

Mine workers

Background

Cape Flattery is located north of the Cairns region in the Cook Shire and is the site of the Cape Flattery Silica Mine, as well as the Port of Cape Flattery. It is only accessible by airplane or ship. In its emergency management plans, the Port Authority identifies cyclones as a major risk and the storm surge risk as high. The mine site has developed detailed emergency response plans, which include procedures for the event of a cyclone. The proximity of the mine to the coast, unlike many other mines in far-north Queensland, makes it particularly vulnerable to the impact of cyclones. The mining industry as a whole is heavily regulated with clearly defined emergency procedures in place for a whole range of emergencies, including cyclones.

---

30 Available on the Cairns Regional Council website at <http://www.cairns.com.au/images/global/Cairns_cyclone_ebook.pdf>.

31 Tourdex is a commercial tour brochure display service operating in the Cairns region.

The Cape Flattery mine is a relatively small operation that employs approximately 85 workers. On any given day there will be 40 people at the mine site. The majority of workers are 'fly in/fly out' and most are based in Cairns. The company has a ten-seater plane to transport workers. A limited number of employees live in Cape Flattery and, as most employees are local to Cairns or the surrounding areas, they have been exposed to cyclones. This might not be the case with larger mines, where workers often come from areas not prone to cyclones.

The mine's Workplace Health and Safety Manager has been in the mining industry for 30 years and has also been heavily involved in emergency response. Cyclone Larry did not reach Cape Flattery but did generate winds in excess of 200 kilometres per hour and put the site on a state of alert. One of the manager's main roles is controlling documents and auditing, revising and implementing changes that have resulted from testing relating to emergency procedures, including cyclones. A cyclone warning was issued in the previous cyclone season, which coincided with the testing of the site's emergency procedures.

Emergency response procedure

The mining industry has a three-colour code level alert system that is integral to the site emergency response plan at Cape Flattery. The three colours/stages are as follows. Yellow—first stage warning; with cyclone expected within 48 hours to affect coastline, the aim is to get people off site as soon as possible rather than waiting; request for volunteers to assist with securing of the mine site commences before leaving. Blue—second stage, will have moved most people out by this stage, remaining volunteers will be evacuated, leaving only essential personnel on site. Red—third stage all preparations should be done and site secured with remaining personnel locked in.

The general safety approach as summarised by the manager is, 'Lock it down, get rid of the people and sit it out'. Information and training are provided to mine workers as part of the compulsory induction process, which is cyclone specific. Prior to the cyclone season, safety meetings take place to remind workers of the cyclone safety plan and colour-alert system. Attendance is mandatory and mine workers have to sign to say they have attended and understood the information. A major priority is getting miners out of the mine site to ensure their safety and enable them to prepare their homes and be with their families.

At the outset of a cyclone watch, information is disseminated to all the managers and displayed on noticeboards to keep workers updated. The managers are advised when 'to move their blokes out'. Information on these noticeboards includes cyclone tracking maps showing speed, location, intensity, category and what to expect. Two weather stations monitor cyclones and all relevant information is easily accessible. Miners with property and family in cyclone-affected areas are typically the first to

be evacuated. Volunteers carry on with the tie down, preparation and securing of the area. People are evacuated by the company. The flight to Cairns is roughly 50 minutes, and three or four trips would get everybody off site. A skeleton workforce has to remain on site in order to clean up after the cyclone, assist emergency services to get in and update the office in Cairns. Of crucial importance is the airport, which is the major way in and out of the site.

If the manager is not at the mine site in the event of a cyclone, the rostered duty manager will take the role. Responsibilities of all personnel are clearly defined. Essential staff remain at the site until the cyclone is over (essential staff includes the Workplace Health and Safety Manager or duty manager, site senior executive, general manager, one electrician, one operator and one fitter). Their priority is to ensure that the airstrip is clear to allow airplanes back and decide if they need extra help. Local emergency services could provide the mine with assistance but the mine appears to have enough resources for the initial response, although it might utilise them as a back-up support. For example, the mine site has a control centre, which has provisions with emergency power. It is also equipped with satellite telephones. With these resources, the mine staff can remain in contact with the crisis management team in Cairns, the emergency services and other agencies such as the Bureau of Meteorology.

A test of the cyclone emergency procedure takes place every 12 months as a requirement under the Mines Act and is documented to ensure it is done thoroughly. Testing conducted in February 2008 coincided with a cyclone alert. It identified simple matters that had been overlooked, for example updated telephone numbers to key contacts. Due to the wide range of emergency situations that are possible on a mine site, the standards appear to be exacting and mine workers are kept well aware of the risk of cyclones, as well as a range of other potential hazards. As the interviewee put it, 'mining is in the box seat when it comes to safety procedures'.

Every six months, the Workplace Health and Safety Manager meets with emergency services, police and the Ports Corporation to discuss potential hazards—both natural (including cyclones) and human (eg terrorism, industrial sabotage, illegal immigration)—and emergency and safety procedures. The Cairns Harbour Master is responsible in the event of a cyclone or other disaster for vessels in the port at Cape Flattery. Information exchanged at these meetings includes changes in personnel, changes in procedures, upcoming or likely events and joint exercises. Information is generally shared from mine to mine. If there is an accident in one mine, the mines inspector will share the information on the findings of reports and investigations and make recommendations. If this results in any changes to procedures, the Workplace Health and Safety Manager at Cape Flattery is responsible for implementing these and taking appropriate action.

Discussion and conclusion

There was a perception among the people we interviewed that raising cyclone awareness might affect regional tourism. The accommodation providers implied, however, that if awareness is raised in a responsible way that educates and informs potential tourists of the risk of cyclone and what this risk would actually mean to them, this would have little impact on tourism. In most instances our interviewees wanted more to be done to tell or notify tourists that far-north Queensland is a cyclone-prone area for several months of the year, but without scaring them:

> People are interested, but they also do not want to be scared, they are on holiday and people who have never experienced cyclones do get scared, there is a lot of fear there (caravan park owner).

Another accommodation provider felt that despite trying to discourage people from coming to the area during the cyclone season, some people are drawn to the region out of curiosity.

Most of the accommodation providers felt the media played a role in promoting cyclones in the area and that this usually has a detrimental effect on tourism:

> In the tourist industry, we actually tend to think that the media sometimes starts panicking people earlier than what is required as such, without being complacent, and we are the last people to be complacent, but the media just grabs hold of it and all of a sudden it's this category 5 bearing down on you when it's not (caravan park owner).

This interviewee also said that in the aftermath of cyclones, the media will re-publicise old footage of 'palm trees laying flat on the ground' that give the impression the whole region has been flattened. Such images can be detrimental and in the aftermath of cyclone Larry it took some effort to restore confidence in the region because tourists thought the 'area had been wiped out'.

Many of the accommodation providers believe it is their responsibility to ensure the safety of their guests, provide information and take safety precautions. However, one caravan park owner said that 'community awareness programs were quite non-existent'. He and other caravan park owners were concerned about the responsibility of providing correct advice. He cited one occasion when a park owner advised guests to go inland, which put them in more danger than if they had stayed. This reinforces the unpredictable nature of cyclone behaviour, as well as the dilemma accommodation providers have when advising guests what to do.

The caravan park in Johnstone Shire was heavily affected by cyclone Larry. Despite the effort caravan park owners made to ensure their guests were aware of the strength and imminence of the cyclone, a number did not heed the warnings and remained in caravans that were overturned by the storm. The

occupants then had to crawl up the path in the midst of the cyclone, exposing themselves to flying debris. After the event, news reporters came to the property and interviewed some caravan park residents who were angry and criticised the owners for their predicament. The owners of the park provided free accommodation for guests who were caught in the cyclone, some of whom stole and damaged property. One backpacker accommodation provider also recounted an occasion when guests blamed the owner because it was raining and 'how dare there be a cyclone when ... [they were] trying to go diving'. Other examples of reckless behaviour include so-called 'cyclone parties', where people sit 'in the dark with lots of beer, not knowing if ... [they] are going to survive'. In one circumstance the caravan park owner suggested that the main reason people did not heed advice was because they were drunk.

There are no specifically designed cyclone information strategies for independent travellers in the Cairns region. Information is made available at the discretion of accommodation providers and is typically 'borrowed' from that provided for the general population in the Cairns region by the regional council and the local newspaper. Recent inclusion of the Cairns Regional Council cyclone leaflet by Tourdex suggests some industry awareness of a specific need, but there is little evidence of other awareness or focused activity at the industry level. The information made available follows a simple Knowledge–Attitude–Behaviour approach to risk communication through media materials (primarily leaflets and booklets) that is coordinated through the local municipality.[32]

While cyclone recovery procedures in the Cairns region appear to be carefully planned and implemented, the same approach does not appear to have been applied to awareness, preparedness and response education. In contrast, cyclone awareness, preparedness and response procedures at the Cape Flattery mine site appear to be planned and organised in detail as part of an integrated emergency risk management approach (presumably governed by occupational health and safety requirements).

---

[32] The Knowledge-Attitude-Behaviour (or K-A-B) model of behaviour change in relation to natural hazards assumes that risky behaviour is the result of inadequate knowledge and inappropriate attitudes towards the hazard. Consequently, improvement in knowledge about the likelihood, possible severity and consequences of an event should result in changes in people's attitudes (risk appreciation, beliefs that preparation increases personal and property safety etc) and thus to appropriate safety responses. K-A-B models of behaviour change are not well supported by research. Criticisms often include that these models ignore both individual capabilities to understand media messages and translate them into action and external constraints on action such as available resources, social norms, legal requirements and broader socioeconomic conditions.

CHAPTER 13

Flood awareness and preparation program—a pilot community program in South Australia

Introduction

In 2004 representatives from the Adelaide municipalities of Unley and Mitcham, the South Australian SES and the Bureau of Meteorology established a flood working group. The principal aim was to develop better links and promote better cooperation between local government and emergency services during flood events. Serious flooding in November 2005 had caused significant commercial and residential property damage in Unley and Mitcham. During the cleanup, anecdotal evidence emerged from affected residents that the level of awareness and preparedness for flooding was minimal. This prompted the working group to think about ways it could better inform and prepare residents in high-risk flood-prone areas.

The working group devised a project and sought funding from the Working Together to Manage Emergencies Local Grants Scheme. The application proposed a pilot community engagement program targeted at residents who were at risk of flooding. Funding was secured through the scheme and the two councils also contributed funds for an initial 11-month trial, which ran from December 2006 to November 2007. A Flood Project Officer was appointed to develop resources and implement the pilot program. At the same time, the South Australian SES began work on a similar project that would build on the work done in Unley and Mitcham, as well as extending the initiative to three other local government areas.

This case study is based on information collected by group and individual interviews with the key stakeholders involved with the pilot program. The pilot is also described in a published journal article (Johnston, Wright & McArthur 2007).

Context

The cities of Unley and Mitcham are prone to major flooding. Flash floods as a result of storms affected Keswick Creek, which runs through Unley and Mitcham, in January and June 2001. In November 2005 major floods (50-year ARI[33]) affected Brownhill Creek and the upper Sturt River, again impacting on the two cities with property damage to private residences and businesses. The

[33] ARI is the 'average recurrence interval'; the estimated average number of years between an event of a specific magnitude.

speed of the floods in 2005 caught many people off-guard and suggested that residents were either unaware that they lived in a flood-prone locality and/or that a flood was imminent.

> With the 2005 [flood] we had people that couldn't get to their door. A guy woke up and stood out of his bed into ... water. Had no idea ... he was in a flood prone area or was even going to get flooded. He was just sleeping (Unley Council employee).

In the Sturt Emergency Management Plan (developed in partnership between four municipalities, including Unley and Mitcham) floods are identified as the greatest risk, ahead of bushfires.[34] This gives some indication of the severity and nature of the risk in this part of Adelaide, where heavy rainfall in the upper catchments, combined with saturated ground and low pressure systems, can lead to large downpours and flooding that lasts for up to two hours. More than 3800 properties are in the 100-year ARI floodplain in the cities of Unley and Mitcham (Johnston, Wright & McArthur 2007, p 74) and it has been estimated that the total damage bill from such an event in this catchment area could be in excess of $200 million (Hydro-Tasmania 2005). The last recorded floods of this magnitude in the area were in 1930. Since then, however, significant development, coupled with low levels of flood protection, has increased the risk of a major flood.

The infrequent but potentially damaging reality of the flood risk prompted Mitcham, Unley, the SES and the Bureau of Meteorology to form a working group in 2004. The initial aim was to develop working relationships between the organisations in order to more effectively respond to flood events. The representatives from the two municipalities wanted to raise the profile of flooding as a hazard in their communities. The legislative framework for floods in South Australia is not as comprehensive as for bushfires (where it is a requirement to have a bushfire prevention officer), and less time and focus has traditionally been placed on flood prevention. At the same time there was interest at the Bureau of Meteorology's South Australian regional office in going beyond simply disseminating flood warnings to the public; as one hydrologist put it, 'we realised at an early stage it's not sufficient to provide a warning and fire it out into the blue and expect other things to happen'.

A study commissioned by the Adelaide and Mount Lofty Ranges Natural Resources Management Board added further weight to the initial development of the pilot program by the flood working group. The Brownhill and Keswick Creek Flood Mitigation Study (Hydro-Tasmania 2005) recommended a variety of measures to reduce flood damage in the area, which included non-

---

[34] While there is a mandate in place for a bushfire prevention officer in municipalities in South Australia, there is no such requirement for a flood control officer. This has implications for resources and budgets available for flood mitigation across the spectrum of activities.

structural components such as flood preparedness for the community. Another factor that influenced the development of the pilot program was the feedback (or lack thereof) received from the distribution of flood maps to residents in Unley and Mitcham. Maps had recently been redone and the decision was taken to send copies to residents living within the floodplains, along with a letter explaining what the maps represented. There was very little response from the community to this circular. This helped convince the councils and the flood working group that the impact of sending out generic information *en masse* to the general public was negligible and had little impact on levels of awareness.

The flood working group developed an application for funding through the Working Together to Manage Emergencies Local Grants Scheme for an 11-month pilot awareness and preparedness program. The program commenced in December 2006 and was supported by the funding from the grant and a contribution from Mitcham and Unley councils. A full-time project officer was employed to develop resources for the program and to implement the pilot. The position was filled by an employee of Unley Council who had been an active member of the flood working group and had a history of involvement in flood-related issues.

These contextual factors are critical to understanding the reasons for developing the pilot program and why meeting with individuals in their homes was the chosen strategy. The project officer developed a range of resources based on the collective knowledge and experiences of the working group representatives, with additional input from related organisations. For example, the Country Fire Service was able to make some suggestions based on its experiences with community engagement programs for bushfire such as Community Fire Safe and Bushfire Blitz. Advice and expertise was also sought from elsewhere in Australia, including the New South Wales SES, which had a considerable amount of experience with its FloodSafe program. The two major aims of the pilot were (a) to better educate and prepare communities in ways they can help themselves before, during and after flooding through a targeted program, and (b) to encourage behaviour leading to a reduction in damage and an increase in levels of personal safety during flood events (paraphrased from Johnston, Wright & McArthur 2007, p 72).

Activities and strategies

The project officer had responsibility for developing resources and implementing the home-based meeting approach in Unley and Mitcham. There were three main phases of the program. First, a letter was mailed out to about 6000 properties in the two cities to raise awareness of the new project. Owners of high-risk properties were also advised about the availability of two-hour consultation meetings at their properties and encouraged to contact the project officer to arrange a time. Second, a flood information pack was developed and included background information on flooding, an

emergency flood plan, action guides and catchment-wide mitigation brochures. These were made available to residents on request and more than 250 were distributed. These resources were based on existing information and advice received from other agencies such as the New South Wales SES. Third, meetings at the residents' homes were organised with the flood project officer and a hydrologist from the Bureau of Meteorology. A total of 63 meetings were conducted. Meetings went for approximately two hours and were split between an hour of discussing the flood risk with the resident and an hour discussing practical ways to improve flood preparedness around the property.

The pilot project finished in November 2007 when a further funding application was unsuccessful and this brought to an end the meetings in residents' homes. The flood working group has continued to meet and discuss issues related to community awareness and preparedness. The flood information pack and other resources have also remained available. The project officer has continued to offer a level of advice and resources to residents upon request. At the same time, the SES has begun work on developing its flood awareness program, which has involved some consultation with the members of the flood working group.

Intended outcomes

Johnston, Wright & McArthur (2007) developed a list of outcomes for the project. Figure 13:1 adapts this list and turns it into a hierarchy of intended outcomes, which is read from the bottom-up. It provides an overview of the general logic behind the program and the timescale in which outcomes, at both an individual/household and community level, are expected to be achieved.

Outcome 1 (resident needs to be aware of the nature of the risk) is an antecedent outcome, in that unless residents have a basic understanding that a risk from flooding exists, they will not be receptive to learning about what they can do to reduce their vulnerability. In the case of the pilot, this was intended to be achieved through the mass mail out to 6000 properties that drew attention to the flood risk in the area and the subsequent targeting of high-risk properties using flood mapping for one-on-one meetings. The meeting is anticipated to provide residents with education and practical advice (Outcome 2) in order to effectively manage the risk which, in turn, enables them to take actions (Outcome 3) appropriate to their contexts and needs.

Timescale	Outcomes	Pilot phase
Ultimate outcomes (longer term).	8 A reduction in damage and an increase in levels of personal safety during flood events.	Contingent on extension of project and outside factors.

	7	Better educated and prepared communities that can help themselves before, during and after flooding.	
Required in the hours and minutes leading up to an event, and during.	6	Resident is confident that he/she can achieve a level of protection of life and property, and aware that this will require ongoing vigilance.	Contingent on achieving outcomes 1–4.
	5	Resident implements an appropriate and timely response.	Contingent on achieving outcomes 1–4.
	4	Resident needs sufficient warning of impending floodwaters that could inundate property, to enable critical decisions and to trigger the next step.	Pilot provides education on what is available by way of warning information.
Take place weeks and months prior to event, and needs to be ongoing (short to medium-term outcomes).	3	Resident needs to take appropriate action, eg purchase insurance; write up a flood action plan; invest in materials and retrofit home and property with devices to help prevent water entry (or engage a contractor to do this); consider flood risk in any future development on site.	Pilot to provide advice and encouragement for individuals to act upon.
	2	Resident needs education and advice on practical measures to manage the risk.	Pilot to assist individuals.
	1	Resident needs to be aware of the nature of the risk to household and property, and understand the extent of the potential damages.	Pilot to assist individuals.

Figure 0:1 Outcomes hierarchy for flood pilot program (based on Johnston, Wright & McArthur 2007, pp 76–7)

Intended outcomes 4, 5 and 6 deal with the issue of flood warnings in terms of residents understanding where to find the information at the time of a warning and what it means (Outcome 4). Equipped with this knowledge, the residents are able to respond accordingly, putting their flood action plans into use (Outcome 5). This, in turn, results in residents feeling confident and prepared that they can minimise damage to

their properties and keep themselves safe if a flood warning escalates into a major event (Outcome 6).

The ultimate anticipated outcomes in the hierarchy are longer term and the result of both the successful implementation of this flood program and other outside factors: educated and prepared communities (Outcome 7) and a reduction in the damage caused by floods and an increase in personal safety (Outcome 8). These outcomes would likely only be achieved with an extension of the pilot into a longer-term program.

Outcomes and causal processes for individuals and households

Raising levels of awareness in Unley and Mitcham was a key reason for developing the pilot project. The flood working group had anecdotal evidence from past flooding events that awareness of the flood risk was minimal. The floods in 2005 provided the impetus:

> The actual flooding was sort of like the trigger ... we need to do something, definitely with our community because we had people coming out the following day saying why didn't the council knock on my door and tell me there's a flood? (Project Coordinator).

The need for a community-based program was reinforced by the Hydro-Tasmania (2005) study that highlighted the benefit of programs aimed at increasing awareness and preparedness of the flood risk in the Brownhill/Keswick catchment area. Furthermore, the flood working group was able to draw on the experiences of other State emergency services and agencies in South Australia.

Emphasising the level of risk and making it locally specific were crucial factors in people engaging with the issue. An extension of this was to use pictures of floods in Unley and Mitcham in a PowerPoint presentation to emphasise the reality of flooding in the area. The project officer came up with this idea after previous involvement with a flood history project. The pictures were particularly worthwhile because major floods are so infrequent and hard to visualise in the local context. The project team found that residents engaged with the risk of flooding when they could see the local relevance.

The resource-intensive approach had limitations in terms of the number of people who could be reached, but by focusing on those who were most vulnerable (in terms of the flood risk), it was felt that the impact of a major flood could be significantly moderated. It also had the major advantage of being able to tailor the discussion to the specific needs and interests of the individual residents. This required a level of skill from the project officer to get a feel for what the residents would readily engage with and to modify the presentation accordingly. This included whether or not residents used computers. If they did or wanted to learn, the project officer and hydrologist could talk them

through a number of websites, including the Bureau of Meteorology, SES and local council websites. They showed residents where flood warning information could be found, what it means and where to access additional information. However, in some cases, particularly with more elderly residents, this would not have been worthwhile, so the discussion focused more on other ways of receiving warning information and managing the risk.

Another important aspect of the meeting was the property inspection, which helped to contribute to the resident's understanding of the local risk and vulnerabilities. The project team was able, first, to discuss with the resident the need for a plan for the whole family and pets. They would then walk through the garden and point out likely entry points for water and give an indication of the depth of flooding that could occur. The focus would then shift to the building itself, examining likely entry points for water, whether seepage under doors was likely and issues such as ventilation panels. The project officer could offer suggestions about how to cover panels and discuss with the residents where to strategically place sand bags. All this was done in the context of discussing the experiences of recent floods in the area and helped to clarify the level of risk, which in most cases was very high. Although a whole range of factors such as building design had implications for what the residents could realistically expect and needed to prepare for, project team members were able to use 'their experience of flood risk to interpret how it was going to affect them [the residents] and what they want to watch out for' (hydrologist).

Towards the end of the pilot, the project team used an alternative meeting strategy that targeted a small group of residences where there was a high flood risk. They held a meeting for five families and included a social aspect with a barbeque and drinks, as well as a modified version of the presentation and property inspection. The experience was positive for the project team, as they found a strong community feel and a willingness to discuss the issues among the group because they felt it was a shared problem on the street. From a cost perspective it also seemed to make sense, both in terms of time and resources. However, a caveat was that the team felt that the numbers needed to be less than ten people. The project team was enthusiastic about this alternative approach, which was included in a subsequent funding application. The move to a group meeting was also in part recognition that the highest-risk residents had been targeted individually and that those in less risky locations might not require the same level of individual attention. In reference to the group meeting, the project officer said:

> Those properties, none of them got flooded inside the house. All their yards did. The flooding wasn't catastrophic so the group thing worked well. Whereas some of them we've done [referring to one-on-one meetings] ... they had water running through their houses ... Those sort of people need

one-on-one.

The project team asked participants to complete a brief survey after the two-hour meeting to help assess what they had learned from the experience. The results provided a pretty clear indication that the level of flood awareness among participants was significantly higher subsequent to the meeting (average 5.08/10 prior and average of 8.48/10 after). It should be noted that this is a self-assessment but it correlates with the general impression that the project team had after undertaking the meetings. The survey also asked participants to rate their current level of flood preparedness (average 4/10). However, there has been no formal follow up to see what changes in the level of preparedness might have taken place as a result of the meetings.

The project team's perception was that the meetings appeared to be generally positive. Comments on the reaction from residents included positive response from participants; participants were accepting and interested; participants responded to the proactive approach; participants grateful for the personal attention provided. In addition, there was some feedback from participants about preparedness activities being undertaken. For instance, the installation of wall vent covers and storm-proof seals, updating of flood plans and consideration in future design modifications at a commercial premises. The project officer acknowledged that while a lot of people said they would be taking measures to be better prepared, there were only limited examples of this. This further reinforces the need for ongoing work to enable return visits in order to provide additional encouragement and support.

At the completion of the pilot, 63 meetings had been held, which was about 30 less than the original target. The meeting locations included a mix of the highest-risk properties (38), which the project team had principally been targeting, as well as properties where the risk was lower but where residents were keen to participate. In addition, more than 250 flood information packs were distributed to interested residents. A second application for funding to extend the project to other at-risk populations in Unley and Mitcham was unsuccessful and consequently there has been a gap in the delivery of flood awareness and preparedness since October 2007.

> It's a problem to provide the continuity ... the program's not going to have a great deal of effect unless you can run it continuously ... we see the flood awareness program as being of very limited value if we can only run it once in a while (hydrologist).

The flood working group realised in the development of the pilot that much of the benefit derived from the program would result from continuation beyond the 11 months. This is reflected in the outcomes hierarchy (Figure 13:1). Extension of the project was seen as a way to 'consolidate on the achievements of the pilot program, and to complete the sequence in the protection of life and

property' (Johnston, Wright & McArthur 2007, p 77). The working group recognised the importance of sustaining the program and adding inputs that would help increase the uptake in the community and provide prolonged benefit to participants. Measures suggested included (a) extending the approach to other high-risk properties (possibly as small group meetings), (b) conducting annual visits to already targeted properties, (c) sustaining levels of awareness with a newsletter and (d) offering incentives to motivate people to become more prepared.

Discussion and conclusion

Flood warnings are an extremely important aspect of information provision to the community prior to and during an event. An additional area explored in the pilot program was the issue of a local community warning system. Questions were included in the brief post-meeting survey that asked participants what their preferred form of warning system would be (eg radio, SMS etc) and whether they would be willing to pay for such a service. The findings helped the project officer to develop a report on the potential for such a system for Mitcham and Unley, recommending that a working party be established to implement a feasibility study. The survey response was very much in favour of a subscriber-based service, with SMS and telephone messages being the preferred delivery methods. More than 60% of respondents were willing to pay up to $100 for this service (McArthur 2007). This is a further illustration of the increased community involvement in decision making and the efforts to establish working relationships with the community.

Cooperation between the cities of Unley and Mitcham and the other agencies on the flood working group has also developed further through the pilot. It has had the impact of extending the focus of their collaborative endeavour beyond flood response and recovery to prevention and preparedness as well. The group has continued to meet since the completion of the pilot, despite the setback with the second application for funding, and is in an excellent position to contribute to the development of the SES FloodSafe program through involvement on the steering committee. In part, the development of the pilot was a learning process for those on the flood working group and it appears to have generated confidence that this type of awareness and preparedness program is of value. Other legacies include the resources that continue to be of use, such as the flood plan *pro forma* and information materials.

Another broader-level outcome from the pilot has been the move to develop a FloodSafe program by the South Australian SES. The SES is represented on the Unley and Mitcham flood working group by its 'metro south region' and Disaster Management Services. It provided backing and support in the development and implementation of the pilot. After the project finished, the SES applied for EMA funding to run its own community flood awareness program that would include Mitcham and Unley, along with a number of other councils in close proximity to the Adelaide CBD. This is still in an early

stage of development but it is intended to involve SES volunteers to deliver street meetings, loosely based on the format of the pilot program, to targeted high flood-risk areas. However, the program will not use individual householder meetings, except in the cases of people with particular needs, such as those with limited mobility.

CHAPTER 14

Recovering from bushfires

Introduction

The focus of this case study is community engagement and education activities initiated during recovery periods following specific fires in the period 2002–06. It includes some discussion of recovery in a general sense as it applies to all types of natural disasters. In particular, this case study looks at a community development recovery program that the Victorian Government instigated after the bushfires in that State in 2006. It also draws on documentation of recovery processes and activities that followed the fires in Victoria in 2002/03 and the Australian Capital Territory in 2003, and other documentation relevant to this area, such as reports that were prepared for COAG in 2004–05. The remaining sections examine the context in which the programs were devised and implemented and then discuss the meanings of the terms 'recovery' and 'community engagement'.

Bushfire recovery programs typically involve community education and engagement programs that utilise community development approaches. This is consistent with the widely accepted practice of involving communities in planning recovery priorities and processes. As discussed in the National Inquiry on Bushfire Mitigation and Management, 'the aim of a recovery program should be to ensure that affected communities emerge from the event as stronger, more cohesive communities' (Ellis, Kanowski & Whelan 2004, p 178). To be effective, recovery has to involve local governments, State departments and agencies, community organisations and residents, as well as emergency service agencies.

In the aftermath of the 2006 bushfires, the Victorian Department of Human Services supported community recovery committees and funded six community development officers in fire-affected municipalities. The purpose of community recovery committees is to address immediate short-term needs, as well as longer-term issues that relate to sustainable community wellbeing. Community development officers support community recovery through information provision about how individuals and families can access health and other services and activities designed to stimulate community wellbeing. Community development approaches to bushfire recovery employed after the 2003 fires in the Australian Capital Territory and the 2005 fires in the Lower Eyre Peninsula were

documented and researched to varying degrees. Program C7 of the Bushfire Cooperative Research Centre documented aspects of the community development approach used in South Australia after the Wangary fire on the Lower Eyre Peninsula.

Fires often reveal gaps in community education, awareness or engagement, which, when filled, can improve safety in future bushfires. Recovery processes therefore provide opportunities to develop and refine community knowledge and improve engagement strategies and to address, for example, the needs of vulnerable sub-groups in a local region. During recovery from a major bushfire, people are acutely aware of risks and general safety needs, particularly in the phase after immediate physical needs have been addressed. Recovery usually involves processes and structures that allow residents to be involved in planning for better fire safety in the future. Recovery processes offer a unique opportunity to strengthen community resilience in the longer term and for this reason we believe it is important to document and disseminate the lessons learned about whether different strategies increase or diminish community safety following a natural disaster.

The rationale behind a sample of programs

There are at least three sets of factors that explain why, since 2002, governments in Australia, at all three levels, have paid special attention to the recovery phase of natural disasters. The first set relates to overseas and domestic threats, whether human-made, technological or biological in nature (such as deaths and restrictions on personal freedom that the severe acute respiratory syndrome (or SARS) virus caused in Asia, the so-called 'war on terror' and the Bali bombings). The second set of factors relate to the domestic political landscape in this country since the mid-1990s. And the third set specifically relates to the natural environment. Here the discussion concerns extreme bushfire events in the south-eastern States between 2002 and 2006 and the broader threat that climate change brings in the form of continuing drought and therefore continued risk of extreme fire events in Australia.

Overseas and domestic human-made, technological and biological threats

A number of domestic and international emergencies since the mid-1990s have concentrated the attention of Australian governments on disaster management, which necessarily includes how best to organise recovery after the event. These emergencies include the Port Arthur shootings in 1996, the Longford gas disaster (Victoria) in 2000, the so-called 'war on terror' in which Western governments, including the Australian Government, took part after the attacks on New York and Washington in September 2001, and the Bali bombings in October 2002. As well as these human-made and technological threats, there have been serious biological ones, such as bird influenza, the SARS virus, and mad-cow disease, all of which called for emergency responses at national and international levels. Recently, in Australia, emergency responses were called for in the face of the threat that the H1N1

virus, or swine flu, posed to public health.

Domestic political landscape

The rise of conservative rural lobby groups, the political party One Nation and independent Members of Parliament, on the one hand, and the growing political strength of a national environmental political party, the Greens, on the other hand, have, since the mid-1990s, affected how the two major political parties treat non-urban electorates. One notable result has been that governments of all political persuasions have become increasingly sensitive to calls for assistance from rural and regional Australia, partly through fear of what voters are capable of doing at election time (eg defeat of the Goss Labor government in Queensland and Jeff Kennett's conservative government in Victoria).

Environment

When considering the effect the environment has had on raising governments' awareness of the need to plan for recovery, we have in mind three events or sets of events of varying magnitude that have affected Australia since the mid-1990s. The first set of events relates to the relatively high number of significant bushfires that have occurred in south-eastern Australia since 2002. These include fires in Victoria during the summer of 2002/03 and in the Australian Capital Territory in January 2003, as well as those on the Lower Eyre Peninsula, South Australia, in 2005 and those that occurred in Victoria in 2006/07 and in February 2009. The second event is the drought that has persisted for at least a decade in most parts of eastern and south-eastern Australia. The third environmental event, which is of global proportions, relates to climate change and the extreme climatic events that it is likely to set in train. Given this continent's delicate ecosystem, climate change is thought most likely to increase the frequency and severity of bushfires. A recent study has argued that 'very high' fire danger days are expected 'to increase by between 2% and 30% by 2020, and by 5% and 100% by 2050' (Hughes & Mercer 2009, p 130).

Definitions

Defining 'recovery'

Published in October 2004, the *Review of community support and recovery arrangements following disasters* (hereafter, the CSMAC review), a report of the Community Services Ministers' Advisory Council disaster recovery sub-committee, observed that any recovery program would have five purposes. These were to assist in the re-development of (a) the community, (b) the psycho-social wellbeing of individuals, (c) infrastructure, (d) the (local) economy and (e) the environment (CSMAC 2004, p 3). The report emphasised the importance of cooperation between governments (State and federal),

recommended frameworks and models to guide practice in the field, and underlined the need for adequate funding, research and education for recovery. It also strongly recommended centralising and making changes to the coordination and organisation of recovery.

The report of the COAG bushfire inquiry (Ellis, Kanowski & Whelan 2004) firmly embedded recovery in the so-called '5Rs' risk management framework. According to the report, recovery would occur alongside the response effort and focus on 'individual support, community and economic renewal, and environmental restoration'; recovery needed emphasising because 'part of recovery is learning from the experiences of each fire event, and from other emergencies, to maintain our awareness and improve our knowledge, planning and responses' (Ellis, Kanowski & Whelan 2004, p ix). As well, the CSMAC review noted that effects of emergencies were not always bad. For instance, they can provide opportunities for 'community development, ranging from revitalisation of infrastructure and other physical assets to community strengthening through development of community capacity and enhanced resilience' (CSMAC 2004).

The importance of stakeholders being aware of the crucial connection between response and recovery is outlined in the following quotation from the report from the ministerial taskforce set up in Victoria in 2007 to oversee and manage recovery following the bushfires in that State in 2006/07.

> The response to the 2006/7 fires benefited from the lessons learned from the fires of 2005/6. Improvements covered a range of response and recovery activities, including improved coordination between the emergency service agencies at regional and state levels, and timely activation of emergency management arrangements, especially municipal and recovery elements (including stock loss management). The establishment of agreed processes to gather data and information, particularly relating to loss assessment, for dissemination to relevant users was a key—and much improved—element in the recovery process (Ministerial Taskforce on Bushfire Recovery 2007, p 6).

According to a senior State public servant interviewed for this study, recovery was increasingly being linked to preparation, prevention and response: 'when people plan for prevention, they're planning for the consequence'. In particular, emergency services needed reminding, he argued, that their decisions in the field had consequences for local communities. For example, if they had to back burn, bulldoze a road or put back a levy, the reasons for doing so and their likely consequences needed to be communicated to the local community at the time. Letting a community know about the consequences that actions taken would have for its members is at the heart of effective community engagement.

Defining 'community engagement'

Community is, as Marsh and Buckle (2001, p 5) argue, an overused term: 'there is no such thing as an all-embracing "community". Each of us belongs to a number of communities that may or may not be geographically based.' Thus, Marsh and Buckle (2001, p 7) suggested, emergency personnel needed to be 'more astute and sophisticated in the ways in which they analyse communities' and that all those involved in community education and engagement—government officials, researchers and academics, and agencies' staff—had to be more aware of the diverse nature of present-day communities and include in the planning and management processes 'diverse and sometimes differing groups and their aspirations'. The use of terms such as 'individuals and families' to supplement the ubiquitous 'community' in a recent recovery publication of the Victorian Government might well signify an awareness of the argument that Marsh and Buckle made about the term's limitations and the need for recovery programs to have a broad understanding of who and what comprise the 'community' that emergency service staff and, later, government officers or their representatives have to work with.

Because the concept of 'community engagement' is central to so much that is written about recovery, public servants we interviewed were asked to describe how they understood the term. In general, they agreed that if officers from emergency agencies and/or government departments wanted to work effectively with communities (which one public servant described as 'individuals, families, neighbourhoods or the broader community'), they had to communicate clearly. The senior public servant was quite specific about the type of communication he thought was necessary if agencies or department officials wanted to engage with a community:

> They need to be out there to understand and put themselves in the position of locals who are being affected by the event. We're trying to get the control agencies to understand that it is no longer sufficient for them to make decisions and let the community find out about them later. Sometimes ... [they] don't get what communities are about. It's easy to bring in the tanks and the big artillery to do the job but the community has to be told that these things are happening on their behalf. They need to ... let them know because some community members have a great ownership of their own neighbourhood and community. And you can guarantee that those in their big red fire trucks are not going to be there at the rebuilding end of the process, which is where the connection needs to be strong.

As mentioned, in the aftermath of the 2006/07 Victorian bushfires, the Victorian Government convened a ministerial taskforce to supervise the recovery process. The financial measures the taskforce approved to support 'individual and community' comprised emergency grants; temporary living expenses grants; re-establishment grants; a community recovery fund; community assistance;

education maintenance allowance; school support; and neighbourhood houses. Broadly speaking, the funds were either allocated directly to individuals and families or to third parties such as charities, not-for-profit organisations or small businesses, which then took on the role of assisting individuals and families with recovery.

One particularly valuable initiative of the taskforce was to fund the employment of Community Development Officers in six municipalities affected by fire: Alpine Shire, Mansfield Shire, Wellington Shire, La Trobe City, East Gippsland Shire and Wangaratta Shire. The officers' role was to provide information to help individuals and families gain access to State and other assistance. In the eyes of the senior public servant interviewed for this project, this measure was seen as central to the recovery that the government initiated in fire-affected communities.

> We have Community Development Officers who work with communities after significant events. They help join communities together and also connect them to other people who will support them—whether it be insurance or the bloke from the municipality or the Salvation Army. You become more resilient in the community not only by bouncing back yourself, but with the right support mechanisms put in a little earlier ... [Community Development Officers] ... [need] to have an understanding of organisational ... and human behaviours, as well as facilitation, conflict management, and negotiation skills.

As well as financial measures to assist communities recover, the ministerial taskforce allocated considerable expenditure to rehabilitate businesses, landholders, the natural environment and ecology, Indigenous and cultural heritage, the forests and infrastructure, and to strengthen the SES, which received more than $46 million from the more than $138 million allocated to assist in the recovery from the 2006/07 bushfires (Ministerial Taskforce on Bushfire Recovery 2007, pp 15–16, 30–41).

The programs

Introduction

An account of early recovery strategies and activities is included in an article that Margery Webster wrote for the *Australian Journal of Emergency Management* in 2006. In her article, Webster reflects on her experience of recovery in the aftermath of the Mount Macedon (Victoria) fires of 1983. Among her recollections are useful pointers to what worked then for the people of Macedon, the neighbouring town of Gisborne and surroundings.

Webster notes that local residents did not make use of psychiatric support services the government provided and which were set up on the Gisborne football oval. She surmises two reasons for this. The first is that people did not want to identify publicly as 'psychiatric patients' and the second is that the services were introduced too early: 'At that time people were more concerned with rebuilding their homes than focusing on their emotional wellbeing' (Webster 2006, p 57).

A theme running through Webster's article concerns the tension that is fairly common in many Australian rural towns and communities that arises from residents' belief in the virtues of individualism and their fear of stigma associated with welfare dependency. She suggests this might explain why country people are less willing than others to accept welfare assistance. The local people were quick to complain of government 'inaction' and responded by setting up their own representative organisation:

> At the first public meeting two women were elected to coordinate an action group staffed by community volunteers who would work out of a caravan supplied by a service club ... All of the action group meetings were held in a pub, a place of solidarity which had protected so many people on the night of the fires (Webster 2006, p 57).

In the early days of recovery, people's needs were overwhelmingly practical in nature, while they sought 'clothing and household goods, assistance with clearing blocks ... advice from local authorities regarding planning and building regulations' (Webster 2006, p 57). Later in the recovery stage, local residents began to exhibit psychological stresses and these were addressed in a number of ways. First, using local residents as 'frontline' workers for welfare and government agencies helped build 'trusting relationships with the community, which enabled them to facilitate psychosocial support if required' (Webster 2006, p 57). Second, the community development officer helped arrange street meetings, from which local leaders were selected. Third, a community theatre group from Melbourne visited the region, collected stories from the victims and produced a piece of theatre, which the group performed for local residents later in the year. Called *Phoenix rising*, a television program based on this community theatre experience was later broadcast on the ABC.

Webster enunciates at least six lessons for good recovery practice from the Macedon fires of 1983. First, effective recovery is best managed by the local community and its own leaders, with support from appropriate professional bodies. Second, services provided to assist recovery should be centrally located in the affected area. Third, residents, service providers and governments must accept that recovery is a long-term process. Fourth, people often manage to recover as long as they are given appropriate information and sufficient resources. Fifth, 'well meaning and mandated external services' should be introduced sensitively. Sixth, the initial stages of recovery are the best time to

introduce change, especially 'mitigation strategies' (Webster 2006, p 58).

These recommendations, which were drawn from field notes and memory, are a good example of effective recovery practice. They are all the more convincing because of the author's simple, direct language and commonsense argument. The following section looks at examples of strategies and activities drawn from key reports of State Government bushfire inquiries and other reports written for COAG.

Examples of strategies and activities

Inquiries were set up by respective State governments after the Victorian bushfires in 2002/03 and the Australian Capital Territory fires of 2003 (the Esplin and McLeod reports, respectively). Extracts from the inquiries' observations and recommendations are included in the following summaries of recovery after the fires in Victoria in 2002/03, the Australian Capital Territory in 2003 and Victoria in 2006. COAG commissioned two separate recovery reviews: the 'natural disasters' report (Department of Transport and Regional Services 2004) and the 'bushfire' report (Ellis, Kanowski & Whelan 2004).

Victorian fires 2002/03

The 'Esplin report' (State Government Victoria 2003) was named after the Emergency Services Commissioner who chaired it. Also known as the Victorian Bushfire Inquiry, it identified failings in regard to provision of assistance to unemployed people and other people who lost incomes as a result of the fires. The report stressed the inter-relationship between response and recovery: close physical proximity of personnel involved in recovery with those directing responses was considered essential for the accurate and timely flow of information.

It emphasised effective criteria for recovery, including the following: recovery should be pre-planned and include appropriate infrastructure; be initiated at the same time and in conjunction with response; provide predictable and equitable relief consistently among victims; use a case management approach; be flexible and extensive; and operate with support of community development officers as long as they are required.

Following the 2002/03 fires in Victoria, the State Government produced two 'joint-agency' strategies to stimulate awareness of community engagement skills. They were known as 'Community engagement about fire on public land: Plan to improve 2005–2009' and 'Community engagement about fire on public land—A practical guide'. The aim of the first program was to build on existing abilities and types of community engagement and was to be implemented over four years. The second program was intended to guide staff as to the appropriate nature and level of 'engagement' with local

people.

Australian Capital Territory fires 2003

The report into the Australian Capital Territory fires of 2003 (McLeod 2003) referred to both immediate actions taken during the fires and medium- and long-term processes. Immediate actions the report identified included the setting up of an evacuation centre, informing the public of events via radio and a toll-free line, and providing victims with immediate financial and material relief. The McLeod report identified the benefit of pre-season fire-training exercises, which, it said, led to rapid establishment of the evacuation centre and implementation of an emergency plan. In all, the report praised the recovery and said it operated well. It also observed that the case management support for victims was a particular strength of the recovery.

Council of Australian Governments

In the first decade of the 2000s COAG commissioned two reviews in which recovery is discussed. The first, on natural disasters, was completed in 2002 and its report was published in 2004. The second, on bushfires, was also completed in 2004. Some of the reports' more significant findings are discussed below.

Natural disasters report 2004

Following a report in 2001 by the Bureau of Transport Economics on the high costs of natural disasters in Australia, COAG commissioned a review of national arrangements for dealing with them. A high-level group of senior officials from the three levels of government undertook the review, which received submissions from 24 interested parties, including governments, academics, researchers and government agencies. The report recommended the following six-point approach to relief and recovery:

- build community resilience by constraining and ... reducing ... costs to the community and all levels of government through cost-effective mitigation ...
- reduce the incidence of ad hoc and disparate relief measures by introducing a more disciplined, holistic and systematic needs-based approach to relief and recovery assistance to communities
- introduce new flexibility to enabled damaged public infrastructure to be rebuilt to a more resilient standard where that is feasible and cost-effective
- ensure equitable assistance and support to individuals and communities affected by comparable

natural disasters across Australia

- better integrate the relief and recovery arrangements of all levels of government, and
- address the special needs of remote Indigenous communities (Department of Transport and Regional Services 2004, p viii).

In all, the review contained 66 recommendations, which COAG accepted in principle in December 2003. The Australian Police Ministers' Council was to have overall responsibility for implementing the recommendations, with the support of the Australia Emergency Management Committee. Responsibility for implementing land use and planning reforms was given to the Local Government Committee and the Planning Ministers' Council.

Bushfire report 2004

COAG called for a report on bushfire mitigation and management in the context of the 2002/03 fires in the Australian Capital Territory and Victoria, and it emphasised the need for national cooperation in dealing with bushfires. Included in its terms of reference was the following:

> the inquiry will examine the efficiency with which major bushfire fighting resources are managed on a national basis and the effectiveness of current management practices particularly in crown lands, state forests, national parks, other open space areas adjacent to urban development and private property (Ellis, Kanowski & Whelan 2004, p 243).

The report identified 46 findings and made 29 recommendations. The findings are best summarised by a statement known as 'Vision for 2020', which is included in the report's introduction and outlines what its authors hope Australia will have achieved by 2020: 'Decisions about bushfire mitigation and management are made within a risk-management framework, known as the 5 Rs—Research, information and analysis; Risk modification; Readiness; Response; and Recovery' (Ellis, Kanowski & Whelan 2004, p ix). In regard to recovery, 'Vision 2020' observed:

> Recovery occurs concurrently with the response effort and focuses on individual support, community and economic renewal, and environmental restoration. Part of recovery is learning from the experiences of each fire event, and from other emergencies, to maintain our awareness and improve our knowledge, planning and responses (Ellis, Kanowski & Whelan 2004, p ix).

The recommendations of the COAG bushfire inquiry are less detailed and prescriptive about implementation than those in the COAG natural disasters report. In the bushfire report, the focus is on 'outcomes of the process' rather than specific procedures (Ellis, Kanowski & Whelan 2004, p 91), and education is its underlying emphasis:

> Improvements in bushfire mitigation and management will be significant only if the community is better educated and engaged. More effective education about bushfires is central to the realisation of the Inquiry's vision for bushfire mitigation and management (Ellis, Kanowski & Whelan 2004, p 42).

Victorian fires 2006/07

In the weeks following the bushfires in Victoria in 2006/07, a ministerial taskforce was established to oversee the recovery process.

> The role of the taskforce was to assess the impact of the fires, to quickly put in place a range of recovery measures ... and to develop policies to foster recovery from the fires (Ministerial Taskforce on Bushfire Recovery 2007, p 1).

The activities of the taskforce included a number of regional community consultations. Townships and settlements that ministers visited included Benalla, Mansfield, Lakes Entrance, Toongabbie, Craig's Hut and Mount Stirling. In the Victorian public service, a community recovery fund was set up, which, according to one interviewee, allowed community groups to 'lobby and put in reports to request ... funds for a particular community activity'. In the following interview extract, another public servant explains the connection between preparation and recovery:

> To prepare communities for a bushfire we're also preparing them for recovery too, to understand that there are services that could help their mental health preparation and recovery. We help them access information. So, not just services, information and services for their health.

Outcomes

Australian Capital Territory fires 2003

One of the most empathetic accounts of recovery outcomes arising from the 2003 Australian Capital Territory bushfires can be found in a report written by the ACT Council of Social Service Inc

(ACTCOSS). The report drew attention to three vital aspects of recovery: staff and community sector issues, recovery centre, and housing. In respect to each, ACTCOSS recommended the following.

Concerning staff, the paper's author(s) noted that pressure and stress affected staff members' ability to do their jobs effectively, especially if they were concerned about the safety of their own homes and families.

> At the time there was a concern that there may be overwhelming demand for services and that the workers did not have clear guidelines to make decisions about prioritising need—'who was more deserving'. Furthermore, agencies reported that there was a lot of anxiety and stress for clients immediately following the fires. This meant on top of their normal responsibilities, staff spent considerable time reassuring clients (ACTCOSS 2003, p 13).

On top of this, staff employed in community organisations were restricted in their ability to work well and effectively because of funding shortages their sector faced. ACTCOSS recommended that community sector workers involved in bushfire recovery work be permitted time to de-brief and allowed access to counselling if they so wished.

The recovery centre was, according to the ACTCOSS (2003, p 14) paper, 'an excellent example of normal bureaucratic processes being put to one side in order to get through a crisis'. ACTCOSS recommended that an individualised or case management approach be used in future to assist victims of bushfires.

Housing became an issue in the aftermath of the bushfires because of the effect on the supply of affordable and government housing stock, which, according to the report, 'added to the existing backlog of applications for public housing' (ACTCOSS 2003, p 15). ACTCOSS recommended that authorities seriously consider 'fire safety, accessibility, sustainability, quality, quantity and the size of blocks' (ACTCOSS 2003, p 15) when planning to replace housing destroyed in the fires—in other words, that new housing should be built according to designs that will maximise their ability to withstand similar fires in the future.

Victorian fires 2006

In the recovery period that followed the fires in Victoria in 2006/07, the State Government nominated the following general categories for assistance and support: (a) individual and community, (b) emergency responders, (c) farmers and rural landholders, (d) business and tourism operators, (e) environment and natural assets, (f) local councils and (g) other community support (eg Red Cross) (Ministerial Taskforce on Bushfire Recovery 2007, pp 14–23). The government's immediate response

to 'support individuals, families and communities' (category (a) above) included a variety of financial supports (Ministerial Taskforce on Bushfire Recovery 2007).

The summary table of expenditures attached at the end of the report (Ministerial Taskforce on Bushfire Recovery 2007, pp 42–3) shows that of approximately $69 million allocated to 'stronger and safer communities', 93%, or approximately $64 million, was to provide funds for a 'stronger emergency service', *viz* more than $26 million to 'strengthening the SES'; a further $8 million for 'new and improved SES units'; and $4 million for new equipment for the SES. The other $22 million was allocated to the 'Valuing volunteers' program ($3 million), grants for emergency services volunteer groups ($11 million), new equipment for volunteers (approximately $3 million), and new and upgraded CFA stations (approximately $8 million) (Ministerial Taskforce on Bushfire Recovery 2007, p 43).

The remaining monies for making communities stronger and safer, approximately $4.7 million (approximately 7% of the total), were allocated for personal hardship grants ($130,000), community recovery fund ($700,000), volunteer groups' operation costs ($100,000), community development officers ($480,000) and school support ($41,000). Interestingly, the two largest allocations, of $1 million for better community halls and $664,000 for Department of Primary Industry case managers for farmers, are dwarfed by the smallest allocation for a 'A stronger emergency service' (Ministerial Taskforce on Bushfire Recovery 2007, p 43).

News of the State Government's recovery strategies and activities was quickly disseminated as the following précis suggests. In January 2007 the *MAV Emergency Management Bulletin* announced that the Victorian Government's bushfire taskforce was allocating bushfire recovery grants (of $50,000 each) to six municipalities affected by the December 2006 fires—they were the Alpine, Mansfield, Wellington, La Trobe, East Gippsland and Wangaratta shires. As well, the Premier, Steve Bracks, announced funding worth $900,000 for 23 local projects in the municipalities of Wellington, La Trobe and East Gippsland (MAV 2007).

Discussion and conclusion

It would seem that putting recovery into practise is less straightforward than one might imagine. No one will know this more fully than the many teams of Victorian public servants and community sector workers who are dedicating themselves to assisting victims of the Black Saturday bushfires (February 2009) in Victoria.

The relatively large numbers of government and agency documents on the topic testify to its elusive nature and perhaps also to the difficulties governments and emergency services have in managing

recovery effectively and without undue controversy, and in finding the means of developing the processes to incorporate recovery lessons in preparation activities.

Indeed, what this case study seems to suggest is that, perhaps with the exception of the Australian Capital Territory, nowhere is there strong evidence that knowledge gained from recovery is being used to inform preparation and response practices—a desire that was first enunciated in the aftermath of the Ash Wednesday fires in 1983.

While what this might suggest is that a lot of work is still needed to make better use of knowledge gained in bushfire recovery, the principle underlying it, which is that a useful relationship exists between recovery, preparation and response, is one that can be transferred to other areas of natural hazard response. In other words, emergency services responsible for preparing for and responding to cyclones and floods, for example, might benefit from recognising the relationship and testing its usefulness in their areas of practice.

Section D What works in community education, awareness and engagement for natural hazards?

CHAPTER 15

A general program theory model for community education, awareness and engagement

Introduction

Reviewing the available evaluative studies of community education, awareness and/or engagement (EAE) activities and programs for natural hazards in Australia and developing a synthesis with the case studies conducted especially for the 'National review of community education, awareness and engagement for natural hazards' (the review) was a challenging task. The publicly available evaluation studies were quite diverse, ranging across a wide variety of programs and activities and varying considerably in detail and methodological rigour. While some explicitly utilised mixed-method approaches (eg surveys, individual interviews, focus groups, expert appraisal etc), others were more or less anecdotal accounts for which the data gathering and analysis methods used were not clearly apparent. Most, however, contained a rich discussion of the actual or potential causal processes that were activated by the initiative and that, potentially, resulted in the desired outcomes. Additionally, for many, a useful description of the context of the program could be derived, either from the study itself or from other sources (eg municipal or State Government websites). It is also interesting to note that a number of the available studies, in one way or another, were either based on an explicit theory of causal processes and desired outcomes or had the development of a logic or theory model of the program or activity as an objective of the investigation.

The previous section included full accounts of the six case studies conducted especially for the review. Again, these studies covered a wide range of programs and activities, and two focused on an issue of concern rather than a specific program or activity (engagement with CALD communities and the potential relationship between recovery processes and preparation and mitigation for subsequent events).

This concluding section contains four chapters. First, a summary program theory model for community EAE programs and activities for natural hazards is presented and discussed in this chapter. While (following the ideal of realist synthesis) the model is arranged in a context – causal process – outcome sequence, it does not, at this stage, contain specific context – mechanism –outcome configurations as envisaged by Pawson and colleagues. This level of detail must await more complete evaluation studies specifically designed to gather data for the purpose of developing these configurations, such as the work on Bushfire Blitz by Rhodes (2001).

Second, a number of 'principles of effective practice' are generated from the studies reviewed (Chapter 16). Importantly, these principles are not asserted as specifications for 'best practice'. Best practice recommendations are typically context free, based on the idea that there must be 'one best way' to 'solve' a social problem. This assumption is incompatible with one of the foundational principles of the realist approach to program planning and evaluation taken in the review—that context in not just important, but critical, in determining when and how the causal processes that lead to program outcomes in social settings are generated. Hence the limits to the generalisation of any notions of effective practice must be clearly understood, and this understanding must be based on both a thorough *prior* analysis of the proposed program and the context within which it will be implemented, as well as on a *subsequent* evaluation of whether it did, indeed, work in that context in the way that was intended. Our effective practice recommendations are thus meant as tentative first steps in an ongoing process of theory development, program improvement and review.

Third, Chapter 17 contains a more expanded discussion of community participation in developing safety approaches to natural hazards and links participation with the idea of a 'continuum' of programs and activities. A consistent theme in much of the material reviewed is that success in community EAE can only be achieved if citizens are actively involved in understanding their own local problems and participate in generating appropriate solutions that are relevant to their communities and localities. This theme is elaborated by drawing on a small selection of literature from planning, public health and emergency management. The aim is to recommend an approach to future program development and evaluation that seeks to find a balance between the policy-related, legal and agency imperatives to develop and maintain consistent and coherent public safety advice and the necessity that this advice be locally relevant, understood and 'owned' by individuals, households and communities in vulnerable localities.

Finally, Chapter 18 concludes this manual by re-stating the central conclusion of the review, noting the necessity for continuing evidence-based development of community EAE programs and their systematic evaluation, and highlighting three important challenges for the community safety approach to natural hazards.

A theory model for community EAE programs

The summary model in Figure 15:1 is based on those aspects of the theory models and theoretical summaries developed for each community safety initiative that was judged to be the more important in (potentially) generating the desired outcomes of the community safety approach to natural hazards. Overall, there appeared to be a very high level of consistency and coherence between the results and discussion of the available studies; both among the studies themselves and with the principles,

recommended strategies, processes and desired outcomes of the community safety approach reviewed in the earlier sections of this report.

This was particularly the case in relation to the recommended processes and desired outcomes for individuals, households and communities. Some initiatives, however, involved explicit agency–agency, agency–consultant and/or agency–community partnerships (eg the Ferny Creek Fire Alert Siren, the Moondarra Fire Information Unit and the Coffs Harbour floodplain management community consultation) that were reported to have resulted in increased community trust and effective collaboration and participation.

What is lacking from the studies, however, is any explicit indication of the way the implementation of these various initiatives may have influenced ongoing and developing government and agency policy for community safety (although some of the initiatives are mentioned as examples of effective practice in the various government reports reviewed in the first phase of the review). This is perhaps not surprising, as many of the evaluation studies were 'published' in a manner that suggested that they did not get wide circulation.

Context

A notable feature of the summary theory model is the richness and diversity of the contexts that are discussed or alluded to in the evaluations. These differences in context range across:

- the locality, including its history of past and recent natural hazard events and disasters, the characteristics of individuals, households and families in the locality (including CALD and Indigenous community members) and the extent to which they are linked by informal ties and more formal social networks and organisations (which, when present, might constitute the locality as a community with varying degrees of already established 'strength' and resilience (Black & Hughes 2001; Pacioni 2005; Walmsley 2006))

- the agencies involved in program implementation and their inter-relationships (informal and formal partnerships), and

- the prior nature of any relationships between these agencies, partnerships and the community.

Additionally, there is some evidence from the studies reviewed that elements of this context interact with the nature of the program or activity such that it might only generate its anticipated outcomes if those elements are present. This evidence of context–program interaction is sketchy at present, however, and considerably more analysis is required to make it more systematic. For example, the evaluation of the Street FireWise program in New South Wales highlighted the role played by a

combination of geographic and socio-demographic characteristics of a neighbourhood (small townships with a pattern of side streets, parks etc) in facilitating the specific format of the intervention (a Saturday street meeting) and providing a clientele that was potentially receptive to the content of the meeting. Similarly, the studies of the Moondarra Fire Information Unit and the Gippsland implementation of the VICSES FloodSmart initiative suggest that 'during event' community engagement initiatives that are built around a 'suite' of activities including community meetings, one-on-one household visits, street walks, information points, school visits and the like are better suited to longer-running events.

Causal processes

The causal processes highlighted in the model are engagement, trust and self-confidence, confirmation and re-assessment, and community involvement, participation and collaboration.

Engagement (of individuals, households, families and community groups) with the program issues, messages and ideas is the first challenge in the development of a successful community safety initiative for natural hazards. Engagement is a broad idea that includes individual curiosity and interest, and the motivation to learn more, think carefully and, crucially, to *form the intention* to commence appropriate planning and preparation activities. The idea of engagement as used here is also meant to include processes at the community level, such as agency personnel seeking out, listening to and utilising local knowledge, and community participation activities that are inclusive, respect and value local needs and viewpoints, and incorporate community members into program design and planning processes.

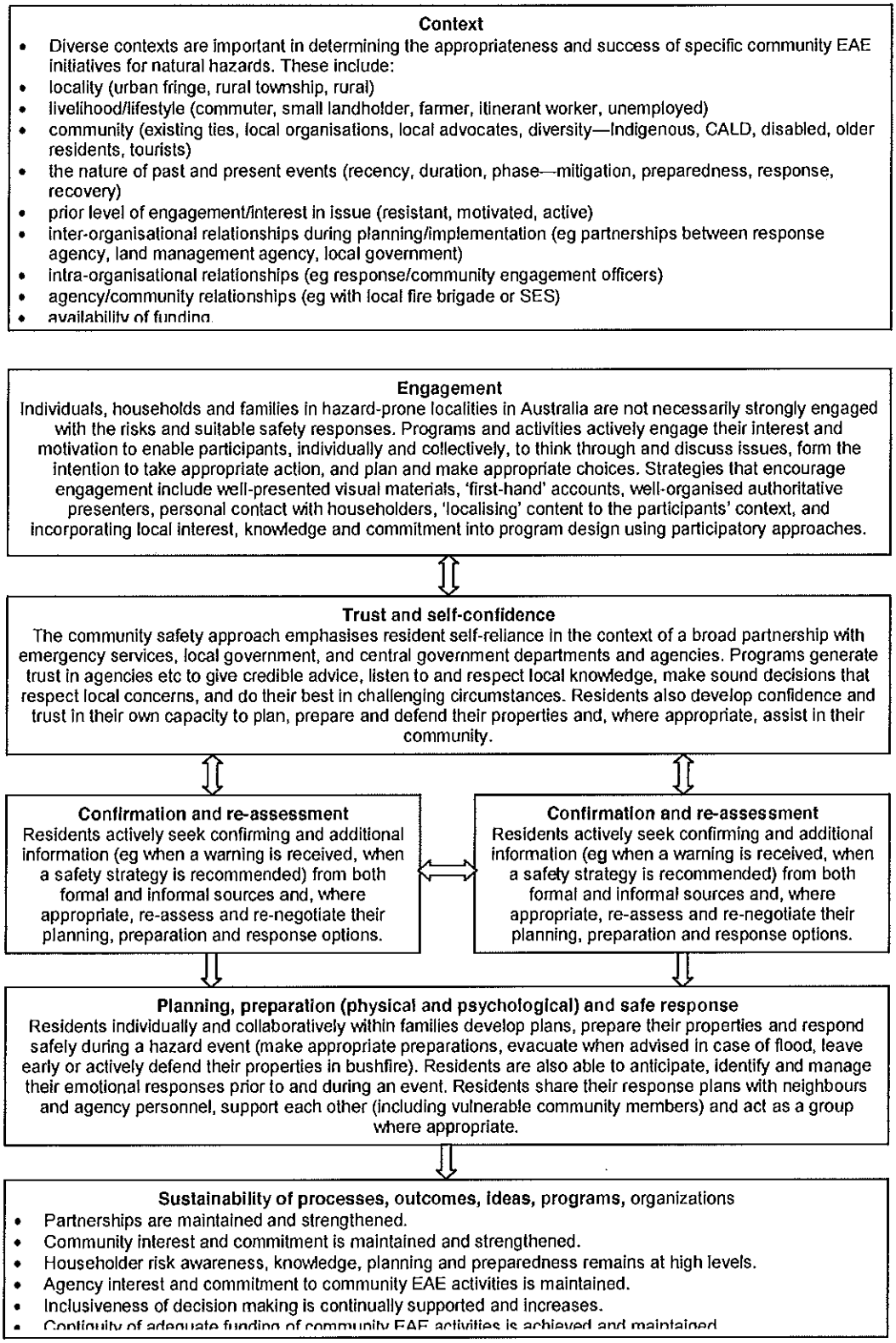


Figure 0:1 A preliminary theory model of community engagement/education initiatives

Various strategies for gaining and maintaining engagement are discussed in the studies reviewed.

Perhaps the most clear-cut recommendations from these studies are that, to activate and enhance engagement, natural hazard safety materials and activities should be:

- visually attractive, with simple explanatory images not overburdened by text
- localised, that is to say, carefully and explicitly adapted or tailored for the locality and community by utilising, where possible, local knowledge and expertise, and
- developed through procedures that utilise inclusive community participation and/or consultation strategies (possibly involving 'external' facilitators, particularly when there is a need to discuss technical issues).

The generation of *trust and self-confidence* is proposed to result from successful engagement and to interact with it in such a way that a positive feed-back loop can be established. Residents need to be assisted to overcome possible initial hostility to agencies and their staff—'why bother talking to you, no one ever gets back to us' (Drummond 2007)—so that agencies can be seen to be offering credible advice, that negotiated solutions continue to be accepted, and that agencies with finite resources can be seen to be making sound decisions, taking coordinated action and doing their best for communities that are threatened by a hazard. Trust and self-confidence also suggests the idea that residents believe they can rely on themselves, their families and their neighbours during an event; that they come to believe in the efficacy of what they know and have learned, and understand their own and others' capacities and limitations so that they have the confidence to make decisions that are appropriate for themselves, their families and their communities and to put those decisions in to action.

The studies by Rhodes (2001) of Bushfire Blitz and Rohrmann (2000, 2003) of media-based communication both suggest that the process of seeking *confirmation and re-assessment* of information that is received from media or in face-to-face events and the use of this information to confirm or re-assess and re-negotiate prior decisions is a critical causal process at the individual and household (and potentially community) levels. Confirmation, elaboration, re-assessment and re-negotiation can be supported by both formal and informal sources of information and it is very likely in some communities that informal sources of information may be critical for this process, particularly during an event (Goodman, Healey & Boulet 2007; Handmer 2000; Parker & Handmer 1998). While the theory that these processes are critical for effective planning, preparation, and a successful and timely response is plausibly argued, there is only scattered evidence in the studies reviewed that they are actively and consciously supported and encouraged in community EAE materials and activities. However, exceptions include:

- the insertion of 'workbook' sections in hazard awareness and preparedness booklets

- the encouragement of 'two-way' interaction in street corner and other community meetings rather than didactic presentations, and one-on-one engagement activities (eg the flood awareness program in the Adelaide suburbs and FloodSmart-type activities that provide 'tailored' stickers or charts and ideally require house visits for their installation), and

- the acknowledgment of the importance of one-on-one meetings with residents following community meetings in the Moondarra Fire Information Unit study.

Community-level processes (*community involvement, participation and collaboration*) such as collaboration with neighbours, generation of shared understandings of the nature of the threat in a locality and possible mitigation approaches, and collaborative planning, decision making and action were hypothesised in the preliminary program theory model for the review (Figure 2:4) as 'also/otherwise' causal processes (ie possible unintended processes leading to intended or, indeed, unintended positive outcomes of an activity that was primarily concerned with achieving desired response at the individual level). It is, however, clearly apparent that a number of the programs reviewed actively seek, in quite different ways, to encourage community-level engagement, decision making and collaborative action as a primary causal process or, indeed, as a desired outcome.

These include, for example, the ongoing community safety programs such as Community Fireguard, where groups, having completed the 'formal program' over the first four or five meetings, are then encouraged to consider specific community characteristics and needs and to explore the development of local solutions such as setting up a telephone tree and the identification and support of residents with special needs. Similarly, while the possibility of Street FireWise leading on to the formation of formal ongoing fire safety groups was abandoned as a specific program objective, there was evidence that informal groups had been formed and were, indeed, being assisted by agency volunteers.

Also, among the multi-hazard programs and those for other natural hazards, the AWARE program in Western Australia was primarily concerned with providing support to local municipalities as they progressed through to the development of their local emergency risk management arrangements, a process centrally involving community consultation and community engagement in decision making. And the Coffs Harbour floodplain management community consultation successfully trialled 'third party' facilitation during the development of a municipal flood management plan to overcome the potential alienation of community participants that could arguably flow from the technical nature of many discussions and the sense of a preconceived agenda generated by the structure of the consultation process.

Short- and medium-term outcomes

The expert consultation conducted by Rhodes and Reinholtd prior to the series of evaluation studies

of Bushfire Blitz (Rhodes 2001, 2003) identified a comprehensive list of the specific short- to medium-term outcomes at the individual/household level that might be achieved through community safety initiatives. They were:

- *awareness* and *recognition* of the wildfire risk
- *knowledge* of fire behaviour and fire safety measures
- *planning* for the event of fire
- *physical preparations* of property and household, and
- *psychological readiness* involving confidence and self-reliance (reported by Rhodes 2003, p 1, emphasis added).

This broad conception of individual and household outcomes of the community safety approach to bushfire is equally applicable to the other natural hazards and multi-hazard programs.

Positive reports of outcomes across the full spectrum identified by Rhodes and Reinholtd were found in the review. A selection of conclusions from the studies summarised in Chapters 4-7 is presented in Figure 15:2. It is apparent that the majority of reports highlight positive changes in awareness and knowledge of the potential threat of natural hazards in a specific locality, along with physical preparedness, while a range of program types appear to have the potential to generate these desired outcomes. Positive changes in planning and psychological preparedness are less frequently reported. There is sufficient indication in the review, however, that these desired attributes are amenable to change strategies, but may require a more focused approach (as, for example, the approach taken by the James Cook University 'Awareness, endurance, recovery' psychological preparedness guide).

Positive program outcomes at the community level were also reported in a number of studies. The following points discuss some aspects of the potential impact of community-based activities.

- Studies conducted by the Victorian Office of the Emergency Services Commissioner (the trial of the Telstra Community Information and Warning System and the evaluation of the community consultation and participation process in Ferny Creek) demonstrated the positive role that extensive community consultation and, if possible, participation may play in generating community trust in agency activities and, particularly, in potentially achieving a 'shared meaning' of warnings (Handmer 2000).
- Early in the establishment of the Moondarra Fire Information Unit (FIU), a decision was made to take a community engagement approach to encourage the development of lasting positive

relationships with the community. The case study suggests that the community meetings were a critical link with the community and that the portrayal of the fire as a 'community fire' (and not an 'agency fire') was 'a very powerful message' (Drummond no date, p 3). Early in the fire period it became apparent that the community at one township (where the FIU was based) was 'using the meetings to check on community wellbeing after difficult nights and pass on local messages'. At the meetings, residents were encouraged to look out for others, to visit neighbours to see if they needed help, and to share information gained at the meetings as a way to contribute. A shopkeeper from one of the townships commented, 'The community updates helped me to help others' (Drummond no date, p 4).

- Lowe, Haynes and Byrne (2008, pp 29–30) suggest that the evidence from their study confirms that the formation of a Community Fire Unit (CFU) in a locality led to increased community resilience and cohesion (connections expanding from an initial core group to a wider range of residents). CFUs that had been actively involved in an incident 'worked well together' and benefited from 'understanding fire brigade operations and procedures'. Further, successful defence of homes and properties resulted from 'a more detailed knowledge of pre-fire preparations, fire behaviour, likely ignition points and each other's strengths and assets'.

- Comparison of the relatively unsuccessful community consultation process associated with the East Gippsland floodplain management strategy and the Coffs Harbour consultation suggests that 'third-party' facilitation of community consultation may be an effective strategy to encourage active and continuing community representation, by addressing both (a) the 'technical alienation' that community members may experience when scientific information is presented by professionals in a manner that emphasises 'insider' language and concepts, and (b) the 'perceived-agenda alienation' that may occur when, for example, municipal representatives structure the consultation in a way that suggests that seeking community input is a token activity and that critical decisions have already been taken.

- While community engagement during recovery from a natural disaster appears to have a robust potential to 'feed-back' to encourage the development and/or strengthening of community networks and community–agency partnerships focused on mitigation and preparation for future events, the review was not able to locate any specific Australian studies of activities of this kind. It is possible that a major impediment to developing linkages between recovery processes and planning and preparation for subsequent events is that different agencies tend to be involved in the two distinct processes. In the Moondarra FIU study, for example, it is mentioned that one of the activities of the unit was that it 'Assisted people in the transition from the fire event to recovery—a long process requiring the efforts of a number of agencies and providers …'

(Drummond 2007, p 3). While the study reported that the activities of the FIU continued beyond the immediate event in collaboration with the Department of Human Services and other agencies, the emphasis in the report is on continued community contact to resolve the trauma associated with the present event and not the possible link to further planning and preparation.

Education for warnings, and public information provision	• Information packages for 'secondary providers' of warnings education more successful than public campaigns or meetings. • Success of warnings systems dependent on householder knowledge and resources to enable appropriate integration into household decision making and emergency plans. • Shared understanding (agency–community) of intent and content of warnings messages necessary for effective communication. • Printed materials and websites more effective if information is provided in a variety of formats; eg simple text, graphics, 'real-life' images of events, action statements, worksheets. • Tourist-specific information needed to increase cyclone awareness among independent travellers. • A psychological preparedness self-instruction kit found to be effective, particularly in relation to decreased self-reported levels of concern and increased levels of confidence and preparedness. • Simple Knowledge–Attitude–Behaviour approaches to public information campaigns appear to have limited effectiveness and should be replaced by more sophisticated models that, for example, are based on 'stage-like' risk communication theories and recognise the importance of emotional and well as cognitive processes.
Localised information provision	• While a number of examples of engagement activities with CALD communities were located (including translation of brochures and trial telephone warning messages into local community languages and provision of translation services), it was concluded that much more work is required to include newly arrived immigrant communities in planning for natural hazards. • A multi-activity community fire information unit located with an incident management team during a long-running event (bushfire) was found (among other outcomes) to encourage implementation of bushfire plans, reduce community concern during and after the event, and encourage agency–community rapport. • Multi-activity flood preparedness strategies (eg FloodSmart) increase awareness of potential for locality to flood and information sources for warnings, and improve levels of planning and preparedness and knowledge of appropriate safety responses.

Localised community engagement and education activities and programs	• Face-to-face resident consultations in flood-prone suburban localities were found to increase householder awareness of flooding and (anecdotally) pre-flood household mitigation activities. • One-off bushfire street meetings valued by residents for information about the local environment, the opportunity to test present knowledge and to interact with other community members. Repeat attendees had higher levels of bushfire knowledge. • Attendees at ongoing bushfire community group meetings were more likely to accept responsibility for bushfire preparedness and safety, rated their overall preparedness higher and undertook more preparedness activities than comparison non-attendees. • Members of 'first-response' community fire units found to have enhanced local knowledge and increased confidence in planning property defence, to feel more independent and self-reliant, and to trust in and be 'connected' to neighbours.
Community consultation, collaboration and development approaches	• A majority of residents in a locality where community consultation and participation had resulted in installation of a fire alert siren had a thorough knowledge of the siren and believed it would be valuable for the community. The process was also found to support the development of bushfire plans and safer bushfire response. • 'Third-party' facilitation in a floodplain planning activity effective in reducing alienation of community representatives.

Figure 0:2 Summary of outcomes at the individual/household level reported in reviewed evaluations and current case studies

Longer-term outcomes

The final section of the model in Figure 15:1 highlights aspects of the sustainability of programs and activities for natural hazard community safety. The potential linkage between recovery activities and subsequent planning and preparation (for an event of the same kind (eg flood), but also, potentially, for events of different kinds) can be thought of as one aspect of sustainability (here, of outcomes such as risk awareness and preparedness activities at the household level, as well as community networks and community–agency and agency–agency partnerships). The study of the sustainability of social programs and activities has become a significant area of work in evaluation over the past decade or so and it was not possible to review the extensive literature systematically for this report. One important theme that has emerged is the proposition that 'sustainability begins with first events' (Elsworth & Astbury 2007; Pluye et al 2005). The general idea is that events that occur early in the planning and implementation of a behaviour change program or activity are critically important for sustainability.

Thus sustainability can (and should) be actively planned from the beginning rather than towards the end of the program's initial cycle. In a study by Elsworth and Astbury (2007) of pilot health promotion projects, three critical 'early events' were identified, while a further two were discovered in the literature (Pluye et al 2005). They were:

- the *congruence* of the proposed program's philosophy and activities with those of the implementing organisation (the notion of an appropriate 'fit')

- the level of *support* for the program, both within and outside the implementing organisation—important aspects of support include the presence of a program 'champion' within the implementing organisation and the ability of the organisation to access multiple funding streams for the program

- the existence of a strong *conceptual model* for the program that might be available within the implementing organisation or developed as an early event of implementation—the model might take the form of a 'program logic' or a more fully elaborated 'program theory' with an emphasis on causal processes and appropriate contexts for implementation

- *continuity and stability* of program resources, including funding and, importantly, appropriately skilled program officers

- *organisational risk-taking* including, for example, the ability to make and implement a timely decision to change the trajectory of a program if early evidence suggests that critical processes are not working as planned or important short-term outcomes are not being achieved.

An important outcome of these 'early events' that potentially results in program sustainability is the 'routinisation' of the program within organisational processes. While routinisation may include the incorporation of funding for the new program within the organisation's standard 'budget lines', it also, importantly, includes incorporation of program activities within ongoing organisational planning and work routines.

Finally, it was noted in the review of the Mitcham/Unley flood preparedness program in South Australia that it is frequently the case when a grant is received for a pilot program that the recipient organisation will be expected to continue the program, if it is successful, using its own or alternative sources of funding. In reality, this aspect of the routinisation of the program may be very difficult to achieve and the program momentum is lost, along with the learning that resulted from the successful implementation. While the basic idea of a specially funded experimental implementation of a program is strongly supported, the review team believes that organisations that fund pilot programs should

accept the responsibility to both:

- continue to support successful programs (at least through an interim routinisation phase) and/or actively assist agencies locate alternative sources of financial support, and
- provide adequate initial funding for the detailed documentation and rigorous evaluation of the pilot program so that the learning achieved is not lost.

CHAPTER 16

Principles of effective practice in community education, awareness and engagement

Six recommended 'principles of effective practice' for community EAE programs and activities for natural hazards, drawn from the synthesis of evaluation findings and the general theory model, are outlined. The list should not be regarded as definitive, but rather should be taken as a basis for discussion and debate among the diverse stakeholder groups in community safety. It should be open to amendment as further theoretical development, research and evaluation illuminate this complex field of social change.

Principle 1

Localise programs and activities where possible by:

- adapting generic media materials to specific localities and communities
- developing strategies to access and incorporate local knowledge and expertise in planning activities
- building activities that encourage awareness of the locality into community education activities (eg street-corner meetings, 'during event' briefings)
- identifying community champions and supporting them with necessary resources and training, and
- consulting with communities to understand their diversity, values and risk perceptions.

Principle 2

Develop a program theory model for present and new programs and activities that will provide

a template for detailed planning and implementation, a 'roadmap' for evaluation and a permanent record of the thinking that occurred during program development.

The theory model might specify:

- the nature of the 'problem' to be addressed and its causes
- the outcomes to be achieved
- the people and settings (communities and localities) that the programs/activities will be designed for
- the detailed strategies/activities to be offered, and their sequence (the 'treatments')
- the resources (personnel, materials etc) required
- the causal processes that will be activated by the treatments, and
- the diversity of community contexts where the program will be implemented.

Further, it will:

- utilise both expert and local knowledge in its development, and
- be sufficiently flexible to encourage optimal local 'adaptation'.[35]

Principle 3

Develop a small suite of programs and/or activities that focus on achieving different intermediate steps (processes) along the pathway from 'risk awareness' to 'preparedness' (planning, physical preparation, psychological preparation) that are integrated into a general plan for enhancing natural hazard preparedness in a locality or region.

At the macro level a possible suite of activities could focus on:

- awareness and engagement
- building trust and self-confidence (in self, others in the community, the agencies involved)

---

[35] Strategies for developing program theories in the natural hazards domain are outlined by Rhodes & Gilbert 2008.

- encouraging confirmation or re-assessment of present thinking and plans (both at household and community levels)
- encouraging community engagement, active participation and collaboration, and
- encouraging workable partnerships (formal) and collaborations (informal) between agencies.

Principle 4

Where appropriate, consider an integrated approach to planning, program development and research including:

- a multi-hazard approach
- an approach that links plans, activities, agencies and communities across the spectrum of mitigation, preparedness, response and recovery, and
- an approach that seeks to learn actively from the response and recovery phases of an event, and capitalises on the diversity of community experience during an event.

Principle 5

Conduct and report frequent evaluations of programs and activities to continually enhance the evidence base for what works in particular contexts in community safety approaches.

- As the evidence base for developing effective EAE programs for natural hazards is sparse (both in Australia and overseas), the review team believes that all agencies should be encouraged to conduct and publicly report evaluations of both their existing and new programs wherever possible, particularly 'pilot' programs where continued funding may not be guaranteed.
- Simply written but comprehensive evaluation reports are a valuable resource for program developers and managers, particularly if they are theory-based and contain rich descriptions of program processes and contexts.
- All evaluation is valuable. While randomised experiments with appropriate comparison groups may be appropriate in some (limited) situations, they are not crucial. Mixed-method (quantitative and qualitative) approaches can be as rigorous and are typically more useful for policy and practice improvement, particularly if they focus on the improvement of the underlying theory of the program for a range of appropriate contexts.

Principle 6

Optimise the balance between 'central' policy positions, agency operational requirements and specialist expertise on the one hand and community participation in planning, decision making, preparation and response activities on the other by:

- developing open strategies for community participation in planning activities that acknowledge and respond appropriately to the diversity of the Australian community
- ensuring equity in community representation and participation on planning committees and volunteer agencies/activities
- supporting open consultative groups that extend membership invitations to the broader community to incorporate a range of cultural backgrounds, knowledge and expertise and allow for new members to join during the process
- maintaining a transparent information-sharing approach throughout the engagement and consultation process
- considering independent facilitation, particularly in planning situations where it is necessary to work with technical detail, that will promote two-way dialogue
- valuing, hearing and understanding ideas, comments and feedback from diverse participants
- bridging power imbalances and levels of technical knowledge and expertise
- encouraging resident involvement in preparation and response organisations and activities (Community Fireguard-type groups and/or the Community Fire Units offer possible models), and
- developing and fostering partnerships with a range of organisations and community groups.

CHAPTER 17

Community participation in community safety

Programmatic interventions into many fields of social change and improvement are based on two contrasting broad approaches and their associated strategies that are frequently labelled 'top-down' and 'bottom-up' (Elsworth & Astbury 2007; Laverack & Labonte 2000). Seeking an optimum balance between these two broad approaches is, we argue, the most general principle of effective practice, one that is entailed by each of the others listed in the previous section. These contrasting approaches are

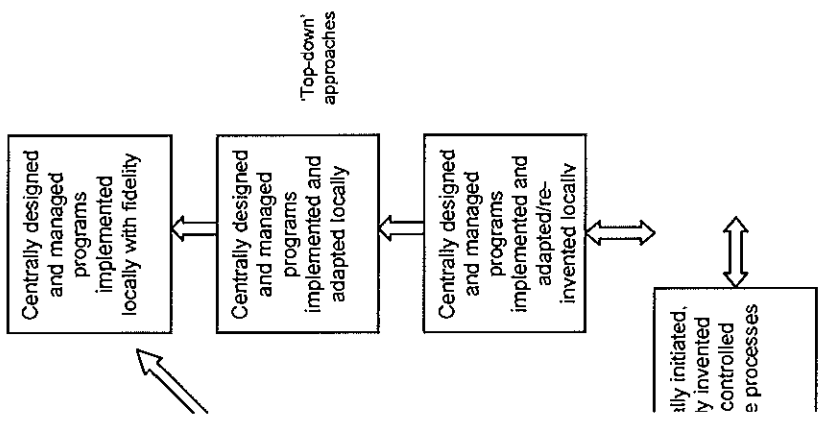
represented in Figure 17:1.

'Top-down' approaches

Theory and research associated with top-down approaches are based around a central concern with the 'fidelity' of implementation of the original program design. In this way of thinking, fidelity implementation is contrasted with the possibility that the program might be adapted or even re-invented by a local organisation or community. Thus Mayer, Blakely and Davidson (1986, p 274), for example, defined fidelity implementation as 'the degree to which a replicated innovation as implemented in an adopting site is similar to the original demonstration model as prescribed by the intervention developer'.

Re-invention and adaptation, in contrast, are terms that capture the 'nature of the active change process that occurs locally'. The implementation of school-based drug and alcohol education programs is one field where a particular concern for fidelity of implementation of the original program design (and 'script') is frequently expressed (see, for example Dusenbury et al 2003). The continuum between fidelity implementation and local adaptation/re-invention is represented along the vertical axis of Figure 17:1.

The top-down approach has also been characterised as the 'conventional discourse'. It emphasises risk management and the prevention of unwanted outcomes at the individual level (disease, death or injury, loss of assets etc) through behaviour and lifestyle change. Typically, the safety, social welfare or health needs of a community are determined 'objectively' by quantitative research, and program development follows a predetermined cycle of strategies involving overall program design, setting objectives, selecting and/or designing intervention and management strategies, and (frequently mandated) program monitoring and evaluation focused on specified outputs and outcomes (Laverack & Labonte 2000). This is also referred to as a 'supply side' approach (with the research and development community as 'supplier' of know-how to 'solve' the problems), where the primary purpose is to contribute to a knowledge base through academic theorising and investigation (even if the research explicitly involves program development, implementation and evaluation) and where the relationship between the researcher and the 'end user' of the research is indirect, diffuse and frequently problematic.



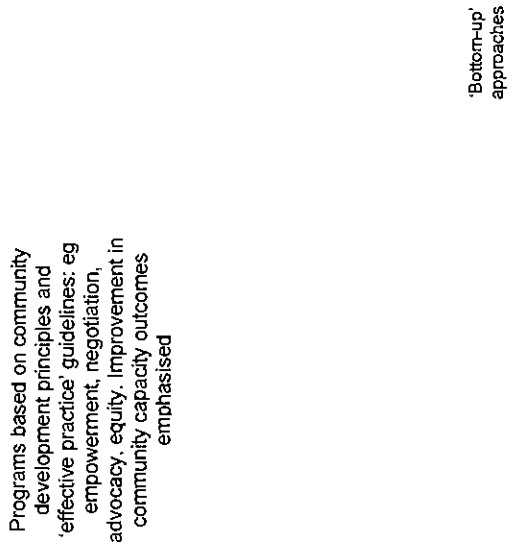


Figure 0:1 **Top-down versus bottom-up approaches to program development and implementation for natural hazards**

'Bottom-up' approaches

In contrast, community consultation, collaboration and participant approaches can be considered along an axis that is independent of the fidelity approach but leaves from a roughly common starting point; where fidelity comes into conflict with processes of adaptation and re-invention when a tightly scripted program is implemented in a particular context by locally focused program staff (the horizontal axis of Figure 17:1).

Zakus and Lysack (1998, p 2), for example, defined community participation in public health in a way that is directly applicable to community safety as:

> the process by which members of the community, either individually or collectively and with varying levels of commitment: (a) develop the capability to assume greater responsibility for assessing their health needs and problems;

> (b) plan and then act to implement their solutions; (c) create and maintain organizations in support of these efforts; and (d) evaluate the effects and bring about necessary adjustments in goals and programmes on an ongoing basis.

Similarly, speaking from the perspective of bushfire risk in Australia, Hodges (1999, emphasis added) defined a safe community as:

> locally organised and resourced, well informed about local risks, proactive in prevention, risk averse, motivated and *able to manage the majority of local issues through effective planning and action.*

Both definitions have a number of elements associated with an 'empowerment' perspective on community engagement and action, but might be criticised as being overly 'technocratic' and as ignoring the essential political nature and emancipatory ideals of empowerment thinking and approaches. Again from the perspective of health promotion, Laverack and Labonte (2000, p 255) encompass these ideals much more directly, defining community empowerment as 'shifts towards greater equality in the social relations of power (who has resources, authority, legitimacy or influence)' and arguing that this 'is an unavoidable feature of any health promotion effort'.

It is necessary to acknowledge, however, that community participation is rarely entirely initiated by community members. Typically, participation requires some 'outside' encouragement and support (Morgan 2001, p 222) because:

> marginalized or disenfranchised communities are powerless to effect participation precisely because they have no power, and ... outsiders might succeed in fostering community mobilization if they act with great sensitivity and humility.

The community participation and empowerment approach is thus represented in Figure 17:1 along the horizontal axis from a position that rests on strong central initiation and early planning (and might be seen as quite close to the adaptation/re-invention of 'received' approaches and strategies) on the one hand to complete initiation, development, implementation and control of an innovation by the local community on the other. Most community development programs and activities are probably located somewhere towards the centre of this continuum, being centrally supported with financial grants and expertise (and possibly centrally initiated) on the one hand, but realistically committed to community engagement and empowerment (together with local 'ownership' of the problem and solutions) on the other.

Can 'top-down' and 'bottom-up' approaches be reconciled?

Figure 17:1 also portrays a diagonal line that directly links top-down and bottom-up approaches. Laverack and Labonte (2000) proposed that the tension between these two approaches is not irresolvable. They present a framework that is designed to assist those engaged in health promotion to accommodate community empowerment goals within more traditional top-down and individualistic approaches. The framework identifies a number of opportunities in the program design, implementation and evaluation of top-down health promotion programs where approaches that are envisaged to promote community empowerment might be incorporated. These opportunities and approaches include using participatory strategies at the program design stage, ensuring that empowerment is given equal priority with risk and lifestyle management when the specific objectives of the program are being considered, and that evaluations focus on program processes rather than more long-term outcomes and highlight the subjective experiences, opinions and knowledge of all program participants.

Community participation within a spectrum of activities and programs

The broad theory of community involvement and participation in program decision making suggests that benefits will be achieved at three levels:

- the individuals involved in the participatory process
- the wider community of which they are part, and
- the program decisions that they are involved in.

Referring to community involvement in the 'area-based initiatives' (wide-ranging social renewal programs in urban localities) in the United Kingdom, Burton, Goodlad and Croft (2006, pp 301–02) summarised these benefits in a manner that is directly applicable to the potential of community participation in EAE activities and programs in Australia.

> For individuals who get more involved, it is assumed that they will benefit personally through feeling more valued as a result of their contributions; that they will feel more connected with their fellow residents and that they will develop the valuable capacity to help themselves more effectively in the future as their self-confidence and self-esteem grows.
>
> The communities of which these individuals are a part will also benefit from the greater and denser social ties and connections that are established through

> greater involvement and which then serve as infrastructure (or social capital) for further positive social relations. A further benefit is seen in the enhanced collective self-confidence and in the wider recognition that problems which might not be amenable to individual solution can be tackled through collective action.
>
> The third area of benefit assumes that better decisions will be made about the substance or content of ... programmes if local residents are more involved. Decisions will be better in two respects: they will command greater respect from local residents and hence carry more local legitimacy and they will benefit from the insights and local knowledge brought by local residents and acquired through living in the area.

At present, community involvement in the development and implementation of EAE for natural hazards appears to be largely restricted to the kinds of activities classified as 'community consultation, collaboration and development approaches' earlier in this report. These include the participatory processes that resulted in the Ferny Creek Fire Alert siren and the Coffs Harbour floodplain management plan, as well as the processes occurring in some municipalities in Western Australia that are funded under the AWARE program (which encourages and supports community involvement in the development of local emergency management arrangements). Additionally, the authors are aware of the consultative processes that are currently being used in the development of the Integrated Fire Management Planning Framework for Victoria.

Drawing from the early work of Arnstein (1969) on a 'ladder of participation' and, more recently, Pretty and Hine (1999) at the Centre for Environment and Society, University of Essex, and Rhodes (2005) in Australia, the authors have developed a hierarchical classification of participatory activities in natural hazard EAE programs and activities (see also Robinson 2003). The hierarchy, presented in Figure 17:2, moves 'upwards' from completely 'passive' programs (where citizen participation is not offered or utilised) through 'functional' and 'informative' participation (where community involvement is seen by agencies largely as a mechanism to reach their own pre-determined goals), towards those forms of participation that place increasing value on diverse community perspectives and knowledge, 'two-way' communication and equitable deliberative decision making (potentially resulting in empowerment across the community).

In presenting this hierarchy, it must be emphasised that it is meant as a device to *describe* present practice and to highlight that only a small sample of present activities might be seen as truly participatory. There is no *a priori* reason that community involvement should not be built into the design of all community safety programs and activities, including, for example, natural hazard safety

media campaigns (both those for widespread general dissemination and those that are being 'tailored' for a specific locality or community).

In this sense, it is also useful to distinguish three broadly different meanings or 'types' of community participation in natural hazard safety:

1 community members actively participating in planning and preparation to enhance their own (and family and neighbours') safety

2 programs that, themselves, require the active involvement of community members, and

3 community participation in the initiation, design, implementation and management of programs ('empowerment' participation in Figure 17:2).

The review demonstrated that not all potentially successful program strategies necessarily involve face-to-face engagement activities (community participation of Type 2). It is, however, important to recognise that the broad aim of community EAE programs is to achieve the active engagement of residents in their own natural hazard safety (Type 1). It is argued here, also, that programs that seek to achieve this engagement would be greatly improved if they involved *active community participation during their development and implementation* (Type 3). Thus one of the major goals of the community safety approach is to achieve all three types of community participation listed above. Levels of community participation of the Type 3 kind that move towards wide consultation, collaborative development of activities and programs, and democratic forms of policy-related decision making require conscious design, considerable effort in implementation and ongoing evaluation. Just as with community EAE programs themselves, successful participatory involvement itself entails the study of 'what works' and 'how' in particular social contexts.

Types of participation	**Example**	**Description**
8 Community empowerment participation	Potentially, Community Fireguard and Community Fire Unit type programs (also the Bushfire Ready Action Groups in Western Australia) as they develop towards maturity	Community members are actively engaged in all aspects of the project or program; skills and knowledge are appreciated and maximised. Empowering the community is a key outcome.

7 Collaborative participation	Ferny Creek Fire Alert Siren	Engagement of the wider community; collaborative community engagement and consultation process.
6 Facilitated participation	Coffs Harbour Floodplain strategy	Independent facilitation, which promotes effective dialogue between stakeholders. Value and understanding of stakeholder input.
5 Functional with limited engagement participation	AWARE program in Bunbury, Western Australia; VICSES FloodSmart trial in Benalla	Steps taken to recognise the diversity of community needs; attempts to incorporate community engagement strategies.
4 Informative participation	Telstra Community Information and Warning System trial	Providing an opportunity for community members to participate in an intervention trial. Ongoing, passive and limited interactive feedback is requested.
3 Functional participation	East Gippsland floodplain management strategy	Closed consultation with selected stakeholders, non-collaborative consultative committee and community input is not valued (perceived or real).
2 Passive participation	Psychological cyclone information	Pre- and post-survey data collection; requires passive interaction with community members to provide feedback on intervention.
1 Information dissemination or non-participation	Passively distributed education material (pamphlets etc), many websites	Information dissemination; passive learning and no physical interaction from agency to community.

Figure 0:2 A hierarchy of styles of participatory engagement in community EAE programs for natural hazards

CHAPTER 18

Conclusion

The central review conclusion

The COAG report on natural disasters in Australia appeared to be sceptical of the present value of community EAE programs, stating that:

> Public awareness of natural hazard issues is arguably the least practised and most poorly funded mitigation measure in Australia. With very few exceptions, it is undertaken as a limited auxiliary activity to other disaster management initiatives, rather than as a sustained strategic measure to raise public consciousness and understanding of hazard risks, impacts and minimisation.
>
> Genuine efforts in public awareness are certainly made from time to time. However public awareness programmes are generally limited by the following deficiencies:

- low levels of resources
- lack of professional design and delivery
- limited audiences being targeted
- few programmes being subject to evaluation to assess success or otherwise, and
- efforts being sporadic rather than sustained (Department of Transport and Regional Services 2004, pp 124–5).

More explicitly, some social scientists have argued that very little in community EAE initiatives for natural hazards 'works'—that the desired outcome of enhanced community safety is rarely achieved by current programs and activities (see, for example, Dufty 2008; Paton, D 2003; Paton, D et al 2006).

Contrary to this apparent scepticism, the synthesis of Australian evaluation studies clearly suggests that programs across the broad spectrum of 'top-down' to 'bottom-up' activities have considerable potential to achieve desired community safety outcomes at the individual (resident, household, family) level and, more broadly, at locality, community and agency levels. The evidence is not

necessarily 'hard' in the sense that it is derived from randomised control trials or other 'strong' designs and/or sophisticated statistical analysis of complex quantitative data. It is nonetheless very persuasive, both from the perspective of the 'triangulation' of data from different sources (eg survey with qualitative data from interviews and/or focus groups etc) across a wide range of different program types for bushfire and the significant weather-related hazards in Australia, and also in relation to the plausible and firmly grounded theoretical discussions contained in the material reviewed about how and where particular approaches have been found to work.

A note on the need for further research and evaluation

It is all too easy in a review such as this to conclude with the exhortation that 'more research is urgently required'. But if the range and volume of research and evaluation conducted in the field of community EAE for natural hazards is compared, for example, with that in many specific fields of health education (eg for asthma, arthritis, cardio-vascular disease etc), it is apparent that the community safety approach to natural hazards comes perilously close to a 'evaluation-free zone'. As well, the social research effort in community safety is manifestly insignificant and impoverished in comparison to that conducted in the 'hard-science' and technology of natural hazards.

As one of a small number of principles of effective practice, the review team proposed ongoing evaluation of community EAE programs and activities as the necessary 'infrastructure' for the further development of effective evidence-based practice in the field and we reiterate this as a recommendation here. We believe that the insights for effective practice that can be generated from careful theory-based review of ongoing evaluations in the field were clearly demonstrated in the review. Additionally, we suggest that there are five specific areas where more focused research and evaluation programs would be particularly valuable. They are:

- psychological preparedness, in particular the integration of psychological preparedness into other planning and preparedness programs and activities
- effective strategies to support household and community planning for natural hazards (as distinct from physical preparedness)
- theory and strategies for effective and equitable resident participation in the development of local and state-wide community safety plans and programs (including participation of Indigenous, CALD and disabled communities)
- theory and strategies for the effective development of partnerships in the community safety field, particularly partnerships with local government

- the potential effectiveness of integrated multi-hazard approaches.

Three challenges in implementing the community safety approach to natural hazards

To conclude this final chapter, we wish to highlight again three broad challenges in implementing the community safety approach to natural hazards that became apparent from the review and the principles of effective practice outlined in Chapter 16.

The central importance of context

First, the critical importance of context in successful program implementation is clearly evident. We are thinking here of both the setting in which the program is implemented and the people who are its audience. A specific aspect of context that has only recently been consciously addressed is community diversity. There is, perhaps, a tendency for community EAE activities for natural hazards to be 'one size fits all' activities. There have been some recent initiatives that have explicitly considered aspects of community diversity, for example a post-bushfire interview study and follow-up community forums focused on the needs of disabled residents in regional Victoria and the translation of printed brochures into a wide range of community languages. But the increasing trend towards technology-based communication solutions suggests that the diversity of the Australian community is still an important challenge for emergency management agencies.

The need for a consistent and coherent message

Second, from an agency perspective, it is clearly important that a consistent and coherent message of planning and preparation for natural hazards is disseminated to householders and communities,[36] and, where community members are engaged in response activities, that a shared understanding of necessary 'command and control' structures is generated and accepted (as stressed, for example, in the Community Fire Units program). As discussed earlier, the community safety approach entails acknowledging that communities will adapt and perhaps re-invent these messages both to fit them to their own setting and to achieve a measure of control of them. The importance that both agency and community groups accorded the concept of 'greater community ownership and responsibility for bushfire safety' in the Bushfire Cooperative Research Centre concept mapping study suggests a critical task for policy institutions, agencies and communities; to seek to achieve greater community engagement with and responsibility for natural hazard safety while encouraging appropriate agencies

[36] For example, the 'stay and defend or leave early' message for bushfire and the 'prepare, evacuate, relocate' message for flood.

to continue to provide expert professional support through relevant policy principles and objectives and the institutional arrangements, broad strategies and programs necessary to implement them.

Development of an integrated suite of programs and activities

Finally, if the length and complexity of the causal chains between a community safety activity and the desired medium-term outcomes of planning and physical and psychological preparedness are carefully considered, it becomes evident that a single standalone initiative is unlikely to achieve all the desired changes. This suggests that the careful selection and integration of a small suite of initiatives and strategies that are, for example, focused sequentially on generating *engagement, trust and self-confidence, confirmation and re-assessment, and community involvement, collaboration and participation* may be more successful than any individual standalone initiative. An overarching program theory that links different activities and programs to these different outcomes in a manner similar to that derived from Rohrmann's model of the stages in the risk communication process (see Figure 4:1) would, we believe, greatly facilitate this development.

APPENDIX

A classification of community safety programs and activities

	Type	Description	Examples
Warnings	General hazard warnings	Warnings about hazards in high-risk areas or high-risk seasons.	Severe weather warning Total Fire Ban Roadside signs

	Warnings of imminent threat	Specific warnings related to an actual event that prompt responses to minimise risks.	Severe weather warnings on Bureau of Meteorology website Standard emergency warning system Radio/TV Sirens and public address systems (eg Ferny Creek siren)
	Electronic warning systems	Accompanied by training in what to do if a warning is received. Many warning systems require that people opt in—the technology is available for an automatic system for landline telephones; however, privacy and data security issues need to be addressed.	Community information and warning system trial Sydney alert Flood trial
Public information provision	Media campaigns	Media campaigns are widely used to raise awareness about natural hazards and related sources of information.	Media releases Agency-developed television campaigns (eg bushfire awareness campaign television commercial)
	Publications	Publications include print material, such as brochures and leaflets, as well as more interactive forms of publications including DVDs and websites. Publications are widely used to raise awareness about natural hazards and provide information about action to take before, during and after a natural disaster. Publications also include maps, plans, kits, checklists and workbooks.	Brochures (eg SES Storm Safe leaflet, Cairns City Council multi-language cyclone brochure) Booklets (eg CFA Living in the bush) CD/DVD (eg FESA Be prepared DVD) Websites (eg emergency services, Bureau of Meteorology and EMA) Maps (eg Geoscience Australia) Portals (eg Ausdin)

Public information provision	Telephone information lines	Dedicated hotlines providing advice about preparation and response to natural hazards. In some cases the information lines operate all year; others are established in response to a specific incident, or in recovery phase. The content is often based on scripted FAQs and responses, with referrals to relevant departments/agencies. Information hotlines are also often linked to the Incident Management Team and websites.	Victorian Bushfire Information Line Hotlines linked to local disaster coordination centres Rural Fire Service Bushfire Hotline
	School education and other programs targeting children	A large amount of educational material about natural hazards has been developed for schools. A range of education packs and specific natural hazard programs exist across a range of media.	EMA teaching resources—online, DVD and from library Smart Sparx, Northern Territory Flood Heroes Comic, NSW SES Storm Watchers Game, Bureau of Meteorology, JCU, EMQ
Localised information provision	Publications tailored to local area/household	Some publications provide information tailored for a specific area or property such as brochures that show safe areas. This includes specific local information on agency websites.	Flood level guides for individual properties Latrobe City's Flood response guidelines for the community information pack Cairns tsunami guide—includes a map of safe areas on high ground
	Local agency activity (Fire brigade, SES, local government)	Day-to-day activities of emergency services that help to raise awareness and educate about natural hazards and preparedness. This ranges from attendance of volunteers at a school event through to displays at community events.	Information stands at community events (local festivals) Open days, visits to schools Community education trailer Launceston Bureau of Meteorology 'shopfront' office

	Telephone information lines—local information	May be established during an incident or be provided via an existing telephone information service.	Victorian Bushfire Information Line Rural Fire Service Bushfire Hotline Hotlines linked to local disaster coordination centres
Localised community engagement	Community meetings	These take on several forms and are most commonly found in the bushfire area. These include localised street corner meetings with a focus on preparedness, through to large community briefings held during or after a natural hazard event with a strong emphasis on keeping the community informed.	Street/community meetings (eg Street FireWise, Blue Mountains, NSW) Community briefings at the time of an event Proposed SA SES community FloodSafe meetings
	Community groups	Members of a community working together typically to increase their preparedness for a natural hazard event. These groups are facilitated by the emergency services agencies. Groups with a predominant response focus also exist in the bushfire area.	Preparedness groups (eg Community Fireguard groups) Response groups (eg community fire units)
	One-on-one consultations	Personnel from agencies providing face-to-face consultations with members of the community. This approach involves a high level of engagement but is also resource intensive.	Flood awareness and preparedness pilot project, Cities of Unley and Mitcham and SES, South Australia
Community consultation, collaboration and	Planning incorporating community consultation	Varying levels of community involvement in planning—identifying risks, prioritising treatments to reduce risks.	Emergency risk management committees (eg projects funded through AWARE program, WA) Wildfire overlay and integrated fire management planning (Vic)

	Agency-initiated community development approach	This is embedded in a number of programs for natural hazards, where a major driver of the group is the community. In some cases natural hazard awareness and education may be part of a broader community development strategy.	Elements of BRAG, Western Australia, and CFA Community Fireguard
	Community development activities initiated during recovery	Community development activities initiated after a major natural disaster to support communities to recover. Activities often developed by local recovery committees in response to local needs and opportunities.	Community development officers appointed in bushfire-affected areas in Victoria to support community recovery
	Community-initiated community development	Not initiated by an agency—hard to hear about but may eventuate out of recovery process.	Eyre Peninsula (CFS) model utilising community education officer from local community
	Specific issue partnerships	Often multi-agency, multi-purpose, multi-hazard, multi-provider and incorporating elements of various programs and activities.	Halls Gap community safety project. Maribyrnong City Council (Vic) CALD policy and action plan 2006–2011
Other	Activities that incidentally reduce risks	Wider coverage of natural hazards across the spectrum of media and popular culture. A wide diversity of examples ranging from ABC documentaries to art exhibitions.	Documentaries, television coverage, newspaper supplements, non-agency websites, plays, art, films

ACRONYMS

ACTCOSS: Australian Capital Territory Council of Social Service Inc

ARI: average recurrence interval

ATWS: Australian Tsunami Warning System

AWARE: All West Australians Reducing Emergencies

BRACS: Broadcasting for Remote Aboriginal Communities Scheme

CALD: culturally and linguistically diverse

CBD: central business district

CEEWPR: Centre for Ecological Economics and Water Policy Research

CFA: Country Fire Authority

CFU: Community Fire Unit

CIWS: Community Information and Warning System

CLDMG: Cairns Local Disaster Management Group

COAG: Council of Australian Governments

CSMAC: Community Services Ministers' Advisory Council

DIMIA: Department of Immigration, Multiculturalism and Indigenous Affairs

DSE: Department of Sustainability and Environment

EAE: education, awareness and/or engagement

EMA: Emergency Management Australia

ERM: emergency risk management

ERMC: Emergency Risk Management Committee

FAQs: frequently asked questions

FESA: Fire and Emergency Services Authority

FIU: Fire Information Unit

HMA: Hazard Management Agency

K-A-B: Knowledge–Attitude–Behaviour

LEMC: Local Emergency Management Committee

MFB: Metropolitan Fire and Emergency Services Board

NSWFB: New South Wales Fire Brigades

OESC: Office of the Emergency Services Commissioner

SES: State Emergency Service

SMS: Short Message Service

VFWCC: Victorian Flood Warning Consultative Committee

VICSES: Victoria State Emergency Service

REFERENCES

Australian Bureau of Statistics, 'Feature article 3: Understanding natural hazard impacts in Australia' (electronic version), *Australian Bureau of Statistics Yearbook Complete 2008*, 2008, viewed January 24, 2010, <http://www.abs.gov.au/Ausstats/ABS@.nsf/94713ad445ff1425ca25682000192af2/00408ced366bb56aca2570de00029f46!OpenDocument>.

ACTCOSS (Australian Capital Territory Council of Social Service Inc), *Lessons learnt from the ACT fires: An issues paper*, ACTCOSS, Canberra, 2003.

Arnstein, S R, 'A ladder of citizen participation' (1969) *35*(4) *Journal of the American Planning Association* 216.

Australian Bureau of Meteorology, *Severe tropical cyclone Larry*, Australian Bureau of Meteorology, Melbourne, 2007.

Baranowski, T, K W Cullen, T Nicklas, D Thompson and J Baranowski, 'Are current health behavioral models helpful in guiding prevention of weight gain efforts?' (2003) 11(Supplement, October) *Obesity Research* 23S.

Barnes, P, 'Approaches to community safety: Risk perception and social meaning' (2002) *17*(1) *Australian Journal of Emergency Management* 15.

Betts, R, *Living with risk: A summary report of the Ferny Creek fire alert siren trial*, Office of the

Emergency Services Commissioner, Melbourne, 2001.

Betts, R, 'The missing links in community warning systems: Findings from two Victorian community warning system projects' (2003) 18(3) *Australian Journal of Emergency Management* 37.

Bird, D and D Dominey-Howes, 'Testing the use of a "questionnaire survey instrument" to investigate public perceptions of tsunami hazard and risk in Sydney' (2008) 45 *(1) Natural Hazards* 99.

Black, A and P Hughes, *The identification and analysis of indicators of community strength and outcomes*, Occasional Paper No 3, Department of Family and Community Services, Canberra, 2001, viewed 18 September 2009, <http://www.fahcsia.gov.au/about/publicationsarticles/research/occasional/Documents/op03/No.3.pdf >.

Blong, R, 'Natural hazards risk assessment: An Australian perspective' (electronic version) (2005) *Issues in Risk Science*, 1, viewed 13 October 2008, <http://www.abuhrc.org/Publications/Issues%20in%20Risk%20Science%20-%204.pdf>.

Boura, J, *Community Fireguard: Creating partnerships with the community*, CFA Occasional Paper No 2, Country Fire Authority, Melbourne, 1998a.

Boura, J, 'Community Fireguard: Creating partnerships with the community to minimise the impact of bushfire' (1998b) 13(3) *Australian Journal of Emergency Management* 59.

Buckle, P, G Marsh and S Smale, *The development of community capacity as applying to disaster management capability*, EMA Research Project 14/2002 Report, 2003.

Burton, P, R Goodlad and J Croft, 'How would we know what works?: Context and complexity in the evaluation of community involvement' (2006) 12(3) *Evaluation* 294.

Bushfire Cooperative Research Centre and Australasian Fire Authorities Council, The stay and defend your property or go early policy, *Fire Note No 7*, 2006

Cairns City Council, *Cairns local disaster management plans*, 2007, viewed 26 November 2008, <http://www.cairns.qld.gov.au/cairns/council/services/documents/cairns_local_disaster_mgt_plan.pdf >.

Cairns Regional Council, *How to prepare and respond to a cyclone* (pamphlet), Cairns Regional Council, Cairns 2008.

CEEWPR (Centre for Ecological Economics and Water Policy Research), *An improved model for*

community consultation?, paper presented at the 44th Annual Conference of the Floodplain Management Authorities of New South Wales, 11-14 May, 2004.

Chess, C, K L Salomone, B J Hance and A Saville, 'Results of a national symposium on risk communication: Next steps for government agencies' (1995) 15(2) *Risk Analysis* 115.

Coffs Harbour City Council, *Discover Coffs—Overview*, 2009, viewed 23 October 2009, <http://www.coffsharbour.nsw.gov.au/www/html/119-discover-coffs---overview.asp>.

Commonwealth of Australia, *The Australian tsunami warning system*, 2009, viewed September 14 2009, <http://www.bom.gov.au/tsunami/pdfs/about_atws.pdf>.

CSMAC (Community Services Ministers' Advisory Council) (Disaster Recovery Sub-committee), *Review of community support and recovery arrangements following disasters*, Australian Government Department of Family and Community Services, Canberra, 2004.

Department of Transport and Regional Services, *Natural disasters in Australia: Reforming mitigation, relief and recovery arrangements*, Commonwealth of Australia, Canberra, 2004.

DIMIA (Department of Immigration, Multiculturalism and Indigenous Affairs), *Report of the review of settlement services for migrants and humanitarian entrants*, Commonwealth of Australia, Canberra, 2003.

Drummond, J, *Case study—Moondarra Fire Information Unit*, Department of Sustainability and Environment, Melbourne, no date, viewed 25 January, 2010, <http://www.dse.vic.gov.au/dse/wcmn203.nsf/childdocs/-CE2562D40F5A1417CA2570360015032B?open>.

Dufty, N, *Building community resilience to floods: The role of education*, Molino Stewart, Parramatta, NSW, 2008.

Dusenbury, L, R Brannigan, M Falco and W B Hansen, 'A review of research on fidelity of implementation: Implications for drug abuse prevention in school settings' (2003) 18(2) *Health Education Research* 237.

East Gippsland Catchment Management Authority, East Gippsland floods: The effect of floods, Bairnsdale, Vic, 2007, viewed 23 October 2009, <http://www.egcma.com.au/file/Floods%20Week3_July%2025_1.pdf>.

Ellis, S, P Kanowski and R Whelan, *National inquiry on bushfire mitigation and management*, Commonwealth of Australia, Canberra, 2004.

Elsworth, G, K Anthony-Harvey-Beavis and A Rhodes, 'What should community safety initiatives for bushfire achieve?' in J W Handmer and K Haynes (eds), *Community bushfire safety*, CSIRO Publishing, Collingwood, Vic, 2008, pp 139–150.

Elsworth, G and B Astbury, *Investigating the sustainability of health promotion programs*, Collaborative Institute for Research, Consulting and Learning in Evaluation, RMIT University, Melbourne, 2007.

Elsworth, G, J Gilbert, P Robinson, C Rowe and K Stevens, *National review of community education, awareness and engagement for natural hazards: Final report*, School of Global Studies, Social Science and Planning, RMIT University, Melbourne, 2009.

EMA (Emergency Management Australia), *Guidelines for emergency management in culturally and linguistically diverse communities*, Australian Emergency Manual Series No 44, Commonwealth of Australian, Canberra, 2007.

FESA WA (Fire and Emergency Services Authority of Western Australia), *Briefing note - Emergency management act 2005*, 9 November 2005, viewed 11 February 2009, <http://www.fesa.wa.gov.au/internet/upload/shared/docs/EM_Act_briefing_note_for_web_9Nov05.pdf>.

Free, N J, *Evaluation of the Ferny Creek fire alert trial*, unpublished document, Shire of Yarra Ranges, no date.

Gilbert, J, *An evaluation of the Street FireWise community education program in the Blue Mountains, New South Wales*, Collaborative Institute for Research, Consulting and Learning in Evaluation, RMIT University, Melbourne, 2005.

Gill, R A and A J Wolfenden, *A system dynamics based planning solution for integrated environmental management and policy: The IDeaMaP toolbox*, paper presented at the 16th International Conference of the System Dynamics Society, Quebec, Canada, 20–23 July 1998, viewed 18 September 2009, <http://www.systemdynamics.org/conferences/1998/PROCEED/00088.PDF>.

Goodman, H, L Healey and J Boulet, 'Community responses to bushfires: The role and nature of systems of primary sociality' (2007) 5(1) *New Community Quarterly* 11.

Grant, A and A Curtis, 'Refining evaluation criteria for public participation using stakeholder perspectives of process and outcomes' (2004) 14(2) *Rural Society* 142.

Handmer, J 'Are flood warnings futile? Risk communication in emergencies' (2000) 2000(2) *Australasian Journal of Disaster and Trauma Studies*, viewed 28 January 2010,

<http://www.massey.ac.nz/~trauma/issues/2000-2/handmer.htm>.

Handmer, J and A Tibbits, 'Is staying at home the best option during bushfires? Historical evidence for an Australian approach' (2005) 6(2) *Environmental Hazards* 81.

Hill, M, '"Taking it to the streets": Operation Bushfire Blitz: A case study in community awareness, information and education' (1998) 13(3) *Australian Journal of Emergency Management* 33.

Hodges, A, *Towards community safety*, paper presented at the Australasian Fire Authorities Conference, Priority Community Safety, Melbourne, 15-17 October, 1999.

Hoogenraad, W, R van Eden and D King, 'Cyclone awareness amongst backpackers in Northern Australia' (2004) 19(2) *Australian Journal of Emergency Management* 25.

Hughes, G, 'The shifting sands of crime prevention and community safety' in G Hughes, E McLaughlin and J Muncie (eds), *Crime prevention and community safety: New directions*, Sage Publications, London, 2002, pp 1-10.

Hughes, R and D Mercer, 'Planning to reduce risk: The wildfire management overlay in Victoria, Australia' (2009) 47(2) *Geographical Research* 124.

Hydro-Tasmania, *Brownhill and Keswick Creeks flood mitigation study—Flood management master plan*, Hobart, 2005, viewed 27 November 2008, <http://www.burnside.sa.gov.au/webdata/resources/files/Flood_Management_Master_Plan_2007.pdf >.

Johnston, L, C Wright and J McArthur 'Case study: Developing and implementing a flood awareness and preparedness programme' (2007) 2(1) *Journal of Business Continuity and Emergency Planning* 70.

King, D, 'How people responded to the April 2007 tsunami warning in Cairns and Townsville' (2008) 23(1) *Australian Journal of Emergency Management* 10.

King, D, D Goudie and D Dominey-Howes, 'Cyclone knowledge and household preparation—some insights from cyclone Larry' (2006) 21(3) *Australian Journal of Emergency Management* 51.

King, L, *Latrobe City community flood warning/response program*, 5th Flood Management Conference, Warrnambool, 9–12 October 2007.

Krusel, N and S N Petris, *A study of civilian deaths in the 1983 Ash Wednesday bushfires, Victoria, Australia*, CFA Occasional Paper No 2, Country Fire Authority, Melbourne, 1992.

Labonte, R, 'Health promotion and empowerment: Reflections on professional practice' (1994) 21(2) *Health Education and Behavior*, 253.

Latrobe City, *Flood response guidelines for the community: Traralgon township and rural surrounds*, 2008, viewed 14 September 2009, <http://www.latrobe.vic.gov.au/WebFiles/Emergency%20Info/flood-response-web.pdf>.

Laverack, G and R Labonte, 'A planning framework for community empowerment goals within health promotion' (2000) 15(3) *Health Policy and Planning* 255.

Leeuw, F L, 'Reconstructing program theories: Methods available and problems to be solved', (2003) 24(1) *American Journal of Evaluation* 5.

Lewis, S, *Gender and fire fighter training: MFB gender equity research project 2004*, Research Paper 2, Swinburne University of Technology, Melbourne, 2004, viewed 6 April 2010, <http://www.fitting-in.com/c/GenderProjectPaper2.pdf>.

Local Government Victoria, *East Gippsland Shire Council*, Department of Planning and Community Development, 2009, viewed 23 October 2009, <http://www.localgovernment.vic.gov.au/web20/dvclgv.nsf/alldocs/9b2938ede8f172cfca2571610020db94?opendocument>.

Lowe, T, K Haynes and G Byrne, 'Resilience at the urban interface: The Community Fire Unit approach' in J Handmer and K Haynes (eds), *Community bushfire safety*, CSIRO Publishing, Collingwood, Vic, 2008, pp 21–34.

McAneney, J, K Chen, R Crompton and A Pitman, *Australian bushfire losses: Past, present and future*, paper presented at the Wildfire 2007 conference, Seville, Spain, 13–17 May 2007.

McArthur, J *Community flood warning report* (unpublished), Cities of Unley and Mitcham, 2007.

McClintock, C, 'Evaluators as applied theorists' (1990) 11(1) *Evaluation Practice* 1.

McLeod, R, *Inquiry into the operational response to the January 2003 bushfires in the ACT*, ACT Government, Canberra, 2003.

Marsh, G and P Buckle, 'Community: The concept of community in the risk and emergency management context' (2001) 16(1) *Australian Journal of Emergency Management* 5.

MAV (Municipal Association of Victoria), *Emergency Management Bulletin*, January 2007.

Mayer, J P, C H Blakely and W S Davidson, 'Social program innovation and dissemination: A study of organisational change processes' (1986) 6(2) *Policy Studies Review* 273.

Meichenbaum, D, 'Stress inoculation training: A preventative and treatment approach' in P M Lehrer, R L Woolfolk and W E Sime (eds), *Principles and practice of stress management* (3rd edn), Guilford Press, New York, 2007, pp 497–518.

Ministerial Taskforce on Bushfire Recovery, *2007 report from the Ministerial Taskforce on Bushfire Recovery*, Victorian Government, Regional Development Victoria, Melbourne, 2007.

Mitchell, L, 'Guidelines for emergency managers working with culturally and linguistically diverse communities' (2003) 18(1) *Australian Journal of Emergency Management* 13.

Molino Stewart, *Evaluation of the FloodSmart and StormSmart pilot programs and their transferability to the urban environment*, Molino Stewart Integrated Sustainable Solutions, Parramatta, NSW, 2008a.

Molino Stewart, *Review of the Gippsland November 2007 flood response*, Molino Stewart Integrated Sustainable Solutions, Parramatta, NSW, 2008b.

Molino, S and J Huybrechs, *Do education strategies sink and communities swim? Evaluation of the Woronora preparedness strategy five years on*, Molino Stewart Pty Ltd, Parramatta, NSW, 2004.

Morgan, L M, 'Community participation in health: Perpetual allure, persistent challenge' (2001) 16(3), *Health Policy and Planning* 221.

Morris-Oswald, T and A J Sinclair, 'Values and floodplain management: Case studies from the Red River Basin, Canada' (2005) 6 *Environmental Hazards* 9.

Morrissey, S A and J P Reser, 'Evaluating the effectiveness of psychological preparedness advice in community cyclone preparedness materials' (2003) 18(2) *Australian Journal of Emergency Management* 46.

NSW Government, *Floodplain development manual*, Department of Infrastructure, Planning and Natural Resources, Sydney, 2005.

NSWFB (New South Wales Fire Brigades), *Do you live near the bush? Community fire units* (brochure), NSWFB, Sydney, 2008, viewed 23 October 2009, <http://www.fire.nsw.gov.au/gallery/files/pdf/community/community_fire_units.pdf>.

OESC Research Projects, Community alerting for bushfire - a local solution for a local need, Office of

the Emergency Services Commissioner, Melbourne, 2002.

OESC (Office of the Emergency Services Commissioner), *Coode Island community warning and information system*, Department of Justice Victoria, Melbourne, 2004.

OESC, *Community information and warning system: The report of the trial and evaluation*, Department of Justice Victoria, Melbourne, 2006.

Pacioni, M, *Urban geography: A global perspective*, Routledge, Abingdon, UK, 2005.

Parker, D J, and J W Handmer, 'The role of unofficial flood warning systems' (1998) 6(1) *Journal of Contingences and Crisis Management* 45.

Paton, D, 'Emergency planning: Integrating community development, community resilience and hazard management' (2000) VII *Journal of the American Society of Professional Emergency Planners* 109.

Paton, D, 'Disaster preparedness: A socio-cognitive perspective' (2003) 12(3) *Disaster Prevention and Management* 210.

Paton, D, B F Houghton, C E Gregg, D A Gill, L A Ritchie, D McIvor et al 'Managing tsunami risk in coastal communities: Identifying predictors of preparedness' (2008) 23(1) *Australian Journal of Emergency Management* 4.

Paton, D, G Kelly, P T Burgelt and M Doherty, 'Preparing for bushfires: Understanding intentions' (2006) 15(4) *Disaster Prevention and Management* 566.

Paton, D, L Smith and D M Johnston, 'Volcanic hazards: Risk perception and preparedness' (2000) 29(2) *New Zealand Journal of Psychology* 86.

Paton, D, L Smith and J Violanti, 'Disaster response: Risk, vulnerability and resilience' (2000) 9(3) *Disaster Prevention and Management* 173.

Paton, M Q, 'Evaluation, knowledge management, best practices, and high quality lessons learned' (2001) 22(3) *American Journal of Evaluation* 329.

Pawson, R, 'Evidence-based policy: The promise of "Realist Synthesis"' (2002) 8(3) *Evaluation* 340.

Pawson, R, 'Evidence-based policy: A realist perspective' in B Carter and C New (eds), *Making*

realism work: Realist social theory and empirical research, Routledge, Milton Park and New York, 2004, pp 26-49.

Pawson, R, *Evidence-based policy: A realist perspective*, Sage, London, 2006.

Pawson, R, T Greenhalgh, G Harvey and K Walshe, *Realist synthesis: An introduction*, ESRC Research Methods Programme, University of Manchester, Manchester, 2004, viewed 6 April 2010, <http://www.ccsr.ac.uk/methods/publications/RMPmethods2.pdf>.

Pawson, R and N Tilley, *Realistic evaluation*, Sage Publications Ltd, London, 1997.

Ports Corporation of Queensland, *Port handbook—Port of Cape Flattery*, 2008, viewed 26 November 2008, <http://www.pcq.com.au/downloads/CapeFlatteryPortHandbook.pdf>.

Pluye, P, L Potvin, J-L Denis, J Pelletier and C Mannoni, 'Program sustainability begins with first events' (2005) 28(2) *Evaluation and Program Planning* 123.

Pretty, J and R Hine, *Community participation—Participatory appraisal for community assessment: Principles and methods*, 1999, viewed 7 December 2008, <http://www.essex.ac.uk/ces/esu/community-participatory.shtm>.

Reams M, A, T K Haines, C R Renner, M W Wascom and H Kingre, 'Goals, obstacles and effective strategies of wildfire mitigation programs in the Wildland-Urban Interface' (2005) 7 (5) Forest Policy and Economics 818.

Rhodes, A, *A program theory of the Bushfire Blitz program,* University of Melbourne, Melbourne, 2001.

Rhodes, A, *Understanding community preparedness and response to wildfire risk*, paper presented at the Safer Sustainable Communities 2003 Australian Disaster conference, Canberra, 10-12 September, 2003.

Rhodes, A, *Householder preparedness and response in the Wangary bushfire, Lower Eyre Peninsula, South Australia 2005*, RMIT University, School of Global Studies, Social Science and Planning, Melbourne, 2005.

Rhodes, A and J Gilbert, 'Using program theory in evaluating bushfire community safety programs' in J W Handmer and K Haynes (eds), *Community bushfire safety*, CSIRO Publishing, Collingwood, Vic, 2008, pp 129–38.

Robinson, L, *Education for resilience: A community safety communication model for natural hazards*, Skills,

Tools and Strategies for Enabling Change, Kiama, NSW, 2003.

Rohrmann, B, 'The evaluation of risk communication effectiveness' (1992) 81 (2) *Acta Psychologica* 169.

Rohrmann, B, 'Assessing hazard information/communication programs' (1998) 33(2) *Australian Psychologist* 105.

Rohrmann, B, 'Community-based fire preparedness programmes: A empirical evaluation' (1999) 1(1) *Australasian Journal of Disaster and Trauma Studies*, viewed 29 January 2010, <http://www.massey.ac.nz/~trauma/issues/1999-1/rohrmann.htm>.

Rohrmann, B, 'Critical assessment of information on bushfire preparedness for residents' (2000) 15 *Australian Journal of Emergency Management* 14.

Rohrmann, B, 'The utility of the World-Wide-Web for fire preparedness of residents' (2003) 18(3) *Australian Journal of Emergency Management* 20.

Rohrmann, B, 'Exploring information for residents on websites of fire authorities—practical experiences' (2007) 22(2) *Australian Journal of Emergency Management* 10.

Sayad, A, *The suffering of the immigrant* (preface by P Bourdieu, trans D Macey), Polity, Cambridge, 2004.

Shafir, E and R LeBoeuf, 'Rationality'(2002) 53 *Annual Review of Psychology* 491.

Shire of Kalamunda, *AWARE Project Stage 1—Emergency risk management project report,* 2006, viewed 11 February 2009, <http://www.kalamunda.wa.gov.au/NR/rdonlyres/F76500F7-0490-4FA3-B421-B74445932DCB/0/EmergencyRiskManagementFinalReportStage1.pdf>.

Smith, P, J Nicholson and L Collett, 'Risk management in the fire and emergency services' (1996) 11(2) *Australian Journal of Emergency Management*, pp 5-13.

Smith, R, *Debrief outcomes: Significant fires in Victoria, December 2005 and January 2006,* Department of Sustainability and Environment, Melbourne, 2006, viewed 18 March 2010, <http://www.dse.vic.gov.au/CA256F310024B628/0/4A50B2D270C53A67CA2571F4002E5A66/$File/Debrief+Outcomes+Report-2005-2006+seasonv2.pdf>.

Squires, P, *Criminology and the 'community safety' paradigm: Safety, power and success and the limits of the local*, paper presented at the British Criminology Conference, Queens University, Belfast, 5–19 July

1997.

Standards Australia and Standards New Zealand, *Risk management: AS/NZS 4360:2004*, Standards Australia International Ltd, Sydney, and Standards New Zealand, Wellington, 2004.

State Government Victoria, *Report of the inquiry into the 2002-2003 Victorian bushfires*, State Government of Victoria, Melbourne, 2003.

Steelman, T A and C A Burke, 'Is wildfire policy in the United States sustainable?' (2007) 105(2) *Journal of Forestry* 67.

Stevens, K, *Improving the bushfire safety of communities through community awareness, education and engagement: A review of policy directions in six recent Australian reports*, Bushfire Cooperative Research Centre and School of Global Studies, Social Science and Planning, RMIT University, Melbourne, 2007.

Stevens, K, J Gilbert and G Elsworth, *National review of community education, awareness and engagement for natural disasters: Phase 1 report*, School of Global Studies, Social Science and Planning, RMIT University, Melbourne, 2008.

Tasmania Fire Service, *Prepare to survive* (DVD presentation), Hobart, viewed 3 November 2009, <http://www.fire.tas.gov.au/mysite/Show?pageId=tfsDVDDownloads2>.

Templeman, D, 'Foreword: A new paradigm for anticipating disasters' (2004) 19(2) *Australian Journal of Emergency Management* 2.

Tilley, N, 'Applying theory-driven evaluation to the British crime reduction programme: The theories of the programme and of its evaluations' (2004) 4(3) *Criminal Justice* 255.

Trochim, W M K, 'Concept mapping: Soft science or hard art?' (1989a) 12 *Evaluation and Program Planning* 87.

Trochim, W M K, 'An introduction to concept mapping for planning and evaluation' (1989b) 12 *Evaluation and Program Planning* 1.

Trochim, W and M Kane, 'Concept mapping: An introduction to structured conceptualization in health care' (2005) 17(3) *International Journal for Quality in Health Care* 187.

Trochim, W M K and R Linton, 'Conceptualisation for evaluation and planning' (1986) 9 *Evaluation and Program Planning* 289.

US Forest Service (United States Department of Agriculture Forest Service), National Database of State and Local Wildfire Hazard Mitigation Programs, viewed 30 January 2010 <http://www.wildfireprograms.usda.gov/>.

VICSES (Victoria State Emergency Service), *Benalla community FloodSmart final report*, Victoria State Emergency Service, Melbourne, 2008, viewed 2 November 2009, <http://www.ses.vic.gov.au/ca256aea002ebbf1/lookup/emergency-management-research/$file/final%20benalla%20community%20floodsmart%20report.pdf>.

Walmsley, J, 'The nature of community' (2006) 25(1) *Dialogue* 5.

Webster, M, 'Notes from the field' (2006) 21(1) *Australian Journal of Emergency Management* 56.

Wilson, A A G and I S Ferguson, 'Fight or flee? A case study of the Mount Macedon bushfire' (1984) 47(4) *Australian Forestry* 230.

Winter, L, *Bunbury emergency risk management project*, City of Bunbury, WA, 2004.

Zakus, J D L and C L Lysack, 'Revisiting community participation' (1998) 13(1) *Health Policy and Planning* 1.