Roles and responsibilities for VICSES in Flood Education (report)

Neil Dufty
Roles and Responsibilities for VICSES in Flood Education

Final Report
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FINAL REPORT

for

The Victoria State Emergency Service

by

Molino Stewart Pty Ltd
ACN 067 774 332

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A Project Board, consisting of representatives from key stakeholder agencies, guided the preparation of this report. These representatives support the recommendations of the report.

The Project Board consisted of:

**Bureau of Meteorology**
Mark Williams, Regional Director, Victoria

**Department of Sustainability and Environment**
Mike Edwards, Manager of Floodplain Management

**Victoria Police**
Superintendent Rod Collins

**Melbourne Water**
Gerard Thurbon, Manager of Floodplain Services
Bruce Rush, Officer of Flood and Waterways

**Municipal Association Victoria**
Norman Free, Policy Advisor Emergency Management

**Goulburn Broken Catchment Management Authority**
Guy Tierney, Floodplain Manager

**Office of the Emergency Services Commissioner**
Paul Gabriel, Manager Emergency Management Policy

**VICSES**
Mary Barry, Chief Executive Officer
James Haley, Community Awareness & Education Manager
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Flood education is any learning process or activity that builds community resilience to flooding. It includes processes and activities such as awareness raising, community engagement, training, evaluation, communications, preparedness and community capacity building.

Flood education is viewed as an important non-structural method to mitigate the impacts of flooding in Australia. The Victoria State Emergency Service (VICSES) has recently accepted that it should take a lead role in flood education in Victoria, as well as with the sustainability of flood warning systems.

Consultancy Molino Stewart Pty Ltd was engaged by VICSES to research flood education and warning systems and to make recommendations in relation to roles and responsibilities for VICSES in these two areas. This report focuses on the flood education findings and recommendations, whilst a companion report produced by Molino Stewart concentrates on flood warning systems.

Molino Stewart conducted a literature search of flood education programs throughout Victoria, nationally and internationally. It also searched for details of education programs related to other natural hazards such as bushfires, tsunamis, cyclones and earthquakes.

Through an in-depth investigation of psychological research related to community resilience-building and evaluations of flood and other natural hazard education programs, Molino Stewart identified the following ten leading practices for flood education programs.

1. Flood education programs should be delivered through community groups where communities are empowered to research, plan, implement and evaluate their own activities
2. Community flood education plans should be developed to help communities maintain and improve their flood education activities
3. Emergency agencies such as VICSES should act as consultants to communities (e.g. facilitators, resource providers, change agents, coordinators) rather than directing the change process in a top down manner
4. Flood education programs should address the psychological aspects of preparedness, response and recovery, including their psychological barriers
5. The emphasis of flood education programs should be on developing preparedness plans (e.g. through personal or organisational preparedness plans) and building community resilience (e.g. capacity building) rather than just awareness raising
6. Opportunities for cross-hazard (and cross-agency) programs should be identified and implemented where possible
7. Flood education planning should be part of floodplain and emergency planning processes (a recommendation from the companion Molino Stewart interim report)
8. Flood education programs should be evaluated as they proceed to ensure continual improvement
9. Social research should be used in the planning, implementation and evaluation of flood education programs
10. Flood education programs should be strongly linked into the total warning systems e.g. warnings should trigger appropriate response behaviours and this relationship should be clearly communicated through education programs
Molino Stewart also investigated linkages between resilience and the broad Victorian government goal of ‘sustainability’. It argued that flood education is an important way to build natural hazard resilience which is critical to ensuring the State’s move towards sustainability. This has implications for governance of flood education within the sustainability context.

Molino Stewart assessed current VICSES flood education programs and other activities against the ten leading practices. It found that the FloodSmart program, being piloted by VICSES in Benalla, addressed at least half of the leading practices. Other activities poorly addressed the leading practices. The NSW SES’s FloodSafe Program and the Victorian CFA’s Community Fireguard Program were identified from the literature search as education programs that VICSES could learn from as they addressed most of the leading practices.

Other issues for VICSES flood education were identified as the need for a baseline of equitable education provision across the State, improved profiling of VICSES, better coverage of storm surge flooding and improved engagement of and information for culturally diverse groups.

This report concluded by recommending the following roles (in italics) and strategies for VICSES to lead flood education in the State.

1. Coordinate and guide the provision of flood education across the State with other agencies.
   – Develop and support a Victorian Flood Education Committee comprised of agency and other stakeholders (e.g. indigenous, ethnic group, business representatives) that coordinates and guides flood education across Victoria
   – Investigate opportunities (e.g. as part of education for sustainability) to position flood education as an important way for the Victorian government to build resilient communities for sustainability

2. Implement the FloodSmart program, as a leading practice flood education program, in the most vulnerable and least resilient communities or where there are the greatest opportunities for implementation.
   – Amend future FloodSmart programs in line with improvements recommended in 9.1
   – Seek funding and local support to implement the program particularly in the most vulnerable and least resilient communities

3. Provide flood preparedness support to all flood prone and affected communities.
   – Train and support volunteers to educate their communities about flooding and preparedness in formal and informal situations
   – Provide preparedness guidance through the VICSES website, including in non-English languages
   – Further profile the VICSES, especially in relation to the 132 500 number.
2 INTRODUCTION

2.1 Flood education

Flood education is defined in this report as any learning process or activity that builds community resilience to flooding. It includes processes and activities such as:

- Awareness-raising
- Training
- Preparedness planning
- Communications
- Program evaluation
- Engagement
- Capacity building

These and other terms are defined in the Glossary in Appendix A. Unless specifically referred to, these processes and activities will be covered under the term ‘flood education’.

It should be noted that flood education can occur through ‘formal’ processes (e.g. in schools, universities and training organisations) and ‘non-formal’ processes (e.g. through community participation, media, information services such as the Internet).

2.2 Importance of flood education

Flooding in Australia attributes the least amount of deaths but causes more damage than any other natural hazard. The Annual Average Damage (AAD) of flooding in Australia is approximately $314 million (Bureau of Transport Economics, 2001). This value is attributed only to the tangible impacts, thus if combined with the intangible impacts, this cost would be greatly exceeded. Due to the relatively slow lead times (compared to some other natural hazards) and a relatively high level of predictability, the cost of flooding and risks to human safety can be substantially reduced with effective floodplain and emergency management.

There are three main ways to mitigate the impacts of flooding (Department of Transport and Regional Services, 2002):

1. **Flood modification** aims to avoid loss by keeping the water away from development. This is the traditional form of mitigation, provided by structural measures (e.g. levees, detention basins, dams) aimed at modifying the flow of floodwater.

2. **Property modification** aims to avoid or minimise loss by keeping development away from the floodwater using land use planning or building design, siting and materials.

3. **Response modification** aims to modify human behaviour through activities such as education, warning systems and preparedness planning.

It has become increasingly apparent that flood modification measures by themselves cannot protect communities in all flood events. As a result in recent times, the emphasis of floodplain management has moved from the implementation of structural solutions such as levee banks to non-structural solutions such as flood warning, education and land-use management (Victorian Flood Warning Consultative Committee, 2005).
“People need to respond to protect life and property in cases where water cannot be
directed away from developed land or where flooding will exceed the design event”
(Department of Transport and Regional Services, 2002, page 32). Community
education is viewed as an important response modification mechanism to prepare
people for flooding and recovery in these situations. Moreover, some researchers and
managers believe the improvement in community education is “the single most
important action that could be taken to improve flood warning and associated
response in Australia” (Elliott et al., 2003).

2.3 Project background

On average, floods in Victoria cause $38.5 million (1998) of damage per annum.
Major riverine flooding occurs about 10-20 years in Victoria and recently (2007)
devastated the Gippsland area. Flash flooding is also prevalent in parts of the State
and can have major impacts especially in urban areas such as Melbourne.

There is a growing body of evidence that accelerated global warming is likely to lead
to more frequent, intense storm events. A recent paper by the Victorian Government
concluded that the intensity of extreme rainfall events had increased in Victoria over
the last 90 years and that this trend would continue (Auditor General Victoria, 2005).

According to the Victoria State Emergency Service (VICSES), “given this level of risk,
actual community awareness and preparedness for flood (in Victoria) is far below that
implemented and practiced for other emergency events as a result of governmental
inquiries and other associated research, for example bushfire awareness and
preparedness campaigns” (Tender Brief).

Under the Victorian State Emergency Services Act 2005 and the DISPLAN, prepared
under the Emergency Management Act 1986, VICSES has control agency
responsibility for flood response in Victoria. VICSES also has responsibility to provide
advice and guidance to local councils on all-hazards emergency management
planning.

In 2005, the Victorian Flood Warning Consultative Committee (VFWCC) released its
Flood Warning Development Plan report, which focussed on the non-structural
solutions to flood management and warning. The Plan made 22 recommendations
which are to be addressed by the State Flood Policy Committee (SFPC).

Of these recommendations, the VFWCC identified State-wide attention to flood
awareness and preparedness, forecast interpretation, and information dissemination
and communication as the most critical flood warning priorities (note that these are
covered under the definition of ‘flood education’ in Section 2.1).

The SFPC sorted the 22 recommendations into 10 ‘themes’ for action by the
participating agencies. VICSES identified two of these themes that align with and
extend its responsibilities as control agency for flood response and an advocate of
emergency management planning and preparedness.

These themes are:

1. Flood awareness responsibility and roles
2. Sustainability of flood warning systems

VICSES is conscious of the need to fill existing gaps within the State-wide flood
warning system, and is committed to working in close partnership with the other
agencies involved with flood warning systems and in floodplain management (Tender
Brief).

VICSES sees dissemination of flood warnings and community education as part of its
core functions declaring that it is willing to take on the role of ‘champion’ outlined by
the VFWCC (Tender Brief).
As this is a role VICSES has not performed in the past, VICSES needs to determine, in partnership with other relevant stakeholders, the level of resources and expertise required to perform this role effectively and efficiently. This will also involve the development of an effective implementation plan (Tender Brief).

Molino Stewart Pty Ltd was engaged by the VICSES to research and recommend the level of resourcing and expertise required and to prepare an implementation plan for the new role. More specifically this project aims to:

1. Determine the roles and responsibilities for the VICSES in flood education
2. Assess the sustainability of flood warning systems in Victoria including gaps
3. Determine the roles and responsibilities for the VICSES in relation to flood warning systems
4. Determine the resourcing and expertise required for flood education and warning systems and the steps required to meet these responsibilities for VICSES.

### 2.4 This report

Molino Stewart originally proposed to provide VICSES with a First Interim Report that would outline roles and responsibilities for VICSES based on research and a Second Interim Report providing recommendations and a possible way forward. To provide reporting continuity it was decided to amalgamate these two reports into an Interim Report. The Interim Report would still be the prelude to the Final Report (including the implementation plan) as originally proposed.

Due to the respective expertise of Molino Stewart researchers in ‘flood warning systems’ and ‘flood education’, it was decided to provide VICSES with companion Interim Reports on the two themes. After comment by the Project Board, the two Interim Reports were then amended to produce two Final Reports. The outcomes of a study of the effectiveness of flood warning systems used in the Gippsland 2007 floods was included in the ‘flood warning systems’ Final Report. The recommendations from the two Final Reports will then be combined to form the basis of an implementation plan and business case that positions VIC SES as the leader in flood education and flood warning systems in the State.

This report is therefore the Final Report dealing with the Flood Education theme. It aims to:

- Assess current flood education programs and publications throughout Victoria, nationally and internationally
- Determine leading practices and levels flood education required to improve community resilience to flooding
- Assess other natural hazard education programs for potential lessons and opportunities
- Define the role of VICSES and other bodies within Victorian flood education
- Determine what structural and procedural agreements need to be established to support and ensure the continued success of a community education program
- Establish resource requirements for the sustainability of flood education programs, including requirements for education of diverse communities
- Identify options for funding these resources
- Make recommendations for flood education regarding the above points
- Identify residual gaps post-VICSES implementation of any recommendations
- Identify linkages for flood education with recommendations and resourcing for warning systems from the companion Interim Report
2.5 Methodology

A literature search was used to scope current flood and other natural hazard education programs and products throughout Victoria, nationally and internationally (see Sections 3, 4, 5 and 6). The information in the literature report section was primarily collected through internet resources. Much of the information was found through official State government department websites as well as Catchment Management Authority websites, and local government websites. Most of the international documents were found through internet search engines (Google) and pre-existing knowledge that flood education information existed.

Some of the information about education programs and products was accessed directly through liaison with staff from the VICSES (including a meeting with Mr James Haley, Community Awareness and Education Manager), the Department of Sustainability and Environment and a number of Victorian Catchment Management Authorities.

Academic journals were primarily accessed to gain an insight into leading practices and principles (Section 7) in flood and other natural hazard education especially in relation to broader governance issues of resilience and sustainability (Section 8). This was used as a basis for the assessment of flood education programs and products in Victoria (Section 9). Feedback from stakeholder interviews conducted by Steven Molino of Molino Stewart in metropolitan and regional Victoria was also used in this assessment.

The suggested roles and responsibilities of VICSES (Section 10) were derived from this analysis. A full summary of recommendations in the report is provided in Section 11.

A reference list is provided in Section 12.

2.6 Limitations

As much of the research was confined to internet resources, the literature search findings are limited by the extent and applicability of the available information through this source. In addition, the sourcing of the international education resources is subject to the effectiveness of the search engine used to find the relevant material.
3 LITERATURE SEARCH - FLOOD EDUCATION IN VICTORIA

3.1 Victoria State Emergency Service

VICSES has implemented flood education programs and services both at the State-wide and local level. These programs/services include:

- FloodSmart community engagement program
- VICSES website at www.ses.vic.gov.au
- Engagement by VICSES volunteers including at events and face-to-face
- Provision of information to at-risk communities before, during and after flood events

There are numerous documents that support these programs and services including:

- Information about what people should do before, during and after floods (located on the VICSES website)
- ‘Kid’s Corner’ activity sheets (located on the VICSES website)
- Stickers, posters and guides related to FloodSmart and StormSmart programs
- VICSES profiling information (e.g. cards) that highlight SES role and the 132 500 number for emergencies
- Flood Response Guidelines for flood-affected communities (produced by local councils with SES support)

Of particular note from the above list is FloodSmart, a new proactive community engagement program being developed by VICSES with local communities. It aims to prepare at risk communities for flood and storm events. Currently, FloodSmart is being piloted in the Rural City of Benalla with some elements being validated in the Gippsland area. A similar program, StormSmart, that targets the impacts of storms and flash flooding, is being piloted in the City of Wodonga.

The FloodSmart activities in the Benalla pilot were identified and activated by a community working group consisting of business, community group, local council and government agency representatives (including VICSES and the Goulburn-Broken CMA). The Benalla pilot involves:

- A six month static program to initially raise flood awareness. This includes distribution of brochures and posters and media releases.
- An intensive, high visibility eight to ten week campaign that further raises awareness and engages the community in preparedness and response behaviours. This includes distribution of a preparedness guide (including a family flood emergency plan) linked to FloodSmart zones and meter box stickers related to the zones, street meetings, school student resources and oral histories of floods.

At the time of writing, the Benalla pilot is still in the development stage, however, the FloodSmart resources should start to be distributed by the end of August 2007. The basic brochures will be supplied to all of the residents in the two local government areas (LGA’s) via a letter box drop. The FloodSmart Guide will be distributed in conjunction with community engagement events. It is proposed that BBQ’s will take place in local parks where, flood education and historical flood information will be presented to groups and individuals by SES volunteers and community members.
The flood action plan will also be workshopped at these community engagement events. The meter box stickers are planned to be stuck on each meter box within the flood prone area. These stickers will only be stuck on the meter boxes if residents are home and the SES local unit can train the residents in the use of the stickers in relation to the Flood Action Guide. The local units will also be providing assistance to residents in the development of a family flood action plan.

An assessment of current flood education programs and products in relation to the new role of VICSES is provided in Section 9.

### 3.2 Catchment Management Authorities

The general role of the Victorian Catchment Management Authorities (CMAs) in regards to flooding is to facilitate the implementation and enhancement of flood warning systems and emergency response plans through providing advice, establishing priorities for funding and providing appropriate assistance to the VICSES and local councils during the floods. The CMA should also be involved in the process of augmenting the data collection networks for flood warning systems where considered appropriate.

The responsibility of the CMAs in regard to flood education is limited. In the past it was often not seen as a responsibility of the CMAs to develop education strategies, however, contributions were made to community education through distributing existing education material, promoting education activities, and contributing to media articles.

A number of the CMAs are now playing a more active role and engaging in community flood education activities. There is also evidence of them supporting existing and planned flood education programs including FloodSmart (see Section 3.1) and many of those initiated by local councils (see Section 3.5). Some examples of CMA involvement in flood education are described below.

The Goulburn Broken CMA is currently in the tender process for the development of a dedicated flood education web-portal for Victoria. The CMA, in conjunction with the Greater Shepparton City Council, completed the Shepparton-Mooroopa Flood Warning and Emergency Management Project in 2006. According to Crapper, Muncaster and Tierney (2006), “the project was principally focussed on flood prevention and response for the Shepparton-Mooroopa community and consisted of several key components aimed at delivering reduced flood damages and trauma for residents, businesses and property owners during future flood events”. Community education initiatives identified included a brochure (explaining flood risk, how the flood warning system works, how to develop a personal flood action plan, interpreting property-specific flood chart), historical/design flood markers along riverside pedestrian/bicycle paths, education information for schools, regular reminders through the media and Council newsletters.

The West Gippsland CMA has produced a Community Participation Model for flood monitoring, awareness and response in rural areas. The model was developed to enable direct community participation in the monitoring of significant flood events. The model was designed for small rural river catchments that are unlikely to have formal flood warning or flood monitoring arrangements in place. This model therefore should be able to be easily transferred to most rural river catchments in Australia.

The main components of the model are:

- A Flood Reference Group to develop and implement the monitoring project
- A Flood Monitoring Network, which is comprised of all of the residents and landholders who agree to be monitors
- A Flood Monitoring Kit which comprises coloured sticks, surveyors tape, monitoring guidelines, a contact list and pro-formas for recording details of photographs, which is supplied to every flood monitor
Permanent peak flood height recorders, installed at agreed locations
Agreed processes for initiation of monitoring activities, and for the collection and dissemination of the information.

The Community Participation Model was largely developed and refined in a case study on the Powlett River. The trial of this model demonstrated that community participation can raise community flood awareness, uncover previous historical flood information, increase the community understanding of catchment process, focus community interest on flooding, and most importantly provide a quick, effective and economic response to monitoring floods (Burns & Gilmore, 2003).

The Wimmera CMA is currently in the process of making available all of the current flood studies undertaken in the region, on their website. It is also in the process of developing information brochures and installing flood information signs in some of the local council areas, providing information on past events and other educational material

East Gippsland CMA produced a number flood warning brochures produced for East Gippsland region in 2002. These brochures have not been updated or redistributed since they were first produced, which may be due to a lack of resources.

There is currently no education material produced by the Glenelg Hopkins CMA, however it is currently in the process of producing some educational material with the help of the Victorian SES.

3.3 Other Government Departments

Some basic flood education material has been developed by other government departments; however, it is unknown how much of this material was originally disseminated.

For example, the former Victorian Department of Natural Resources and Environment produced a flood education brochure in 1998 entitled ‘Focus on Floods – Are You Prepared?’. The brochure explains flooding situation in Victoria and ways in which communities and individuals can prepare for flooding.

The Department of Primary Industries has produced a two page fact sheet regarding horses and floods. This fact sheet was the only information found regarding animals and flooding at the DPI website. Often domestic pets are mentioned in emergency plan guides, however, this never extends to more intensive captive animal management.

The Department of Human Services has also compiled some simple fact sheets regarding recovery from floods. These facts sheets include:

- Boil Drinking Water – Flood Areas
- Steps to Check on Wall Insulation
- Control of Mould and Fungal Growth In and Under Flooded Houses
- Flood Action Guide
- Mosquito Prevention Should Start Now
- Repainting After Flood Damage
- Repainting Flood Damaged Buildings
- Possible Water Damage to Internal Wall Linings
3.4 **Melbourne Water**

Melbourne Water is the floodplain management authority for the Port Phillip and Westernport region. Its objectives for flood management are to provide:

- A safe and effective system for dealing with stormwater runoff
- A reduced risk of flooding in priority areas
- The prevention of inappropriate development in flood-prone areas

In relation to these objectives, Melbourne Water provides the community with information and advice at its website: [www.melbournewater.com.au](http://www.melbournewater.com.au). Through its animated Floods Explorer on the website, it shows students and the broader community the impacts of flash flooding on a community and how the Bureau of Meteorology (BoM), VICSES and Melbourne Water work together on planning and responding to floods. Also on the website are:

- Link to Emergency Management Australia’s (EMA) booklet ‘What to do before, during and after a flood’.
- Property planning information including on obtaining flood level information, contacting Melbourne Water about development and submitting plans to Melbourne Water
- Drainage questions and answers

Melbourne Water has recently released a Flood Management and Drainage Strategy Discussion Paper for the Port Phillip and Westernport Region. The Discussion Paper identifies “enhanced community education, awareness and preparation” as an issue that needs to be addressed by the Strategy. Some of the ideas in the Discussion Paper about flood education programs, roles and responsibilities are further discussed in Section 9.4 of this report.

3.5 **Local Government**

Even though local governments have a legislative requirement to produce a municipal emergency management plan, there is a general lack of information available on council websites in regards to flooding, flooding emergencies and emergencies in general. Of the 79 local government areas in Victoria only seven councils had specific information on flooding and flooding emergencies on their websites, and further seven councils had a small amount of information on flooding in general.

The majority of councils acknowledged that they had an Emergency Management Plan (EMP), however, only 15 of these councils had the plan available on their websites. Eight of these councils had emergency management resources, or brochures that have been distributed to residents and/or businesses, and were also available for download over the internet.

This may not be representative of the actual role the local governments play in flood emergency management, however, the vast number of local governments in Victoria meant that they were unable to be contacted directly and therefore defining the specific role these local governments actually play. However, a similar outcome was found and reported upon in the Flood Warning Service Development Plan Report. It stated that it was “apparent that Plans [Municipal Emergency Management Plan Flood Sub-plans] are not as prevalent across the State as expected and in many cases not as comprehensive as anticipated (VFWCC, 2005).” In addition, the report also found that a high proportion of the plans that were viewed lacked the linkage between flood impact and the necessary response actions and timings as well as the
flood intelligence built up over the years of what happens at critical heights on reference gauges in those areas subject to flooding (VFWCC, 2005).

Some local councils did however have a substantial amount of information on floods, flood education and flood emergency management. Examples are provided below.

**Greater Shepparton Council**

The Greater Shepparton Council has developed a flood kit called the Shepparton-Mooroorupna Flood Kit brochure. The flood kit provides information on developing a personal flood action plan, however it is not as comprehensive as the proposed VICSES FloodSmart guidelines. The flood kit does have a flood category guide for key locations within the catchment and the actions that should be taken when different categories of flood have been designated (i.e. minor, moderate, major).

Property-specific flood charts have been produced for each potentially flood affected property on the current Shepparton-Mooroorupna flood database up to and including the 100-year flood. Each flood chart indicates how a predicted flood on the Goulburn River, Broken River or Seven Creeks may impact on that property (Figure 1).

The flood charts provide important flood gauge information for each property such as: the location of gauges that are most relevant to each property; the approximate gauge height when flooding of the property is likely to commence; explanatory notes detailing peak gauge heights; and key sources of flood information.

![Figure 1 Sample of the personal flood action plan information chart that was produced for each property located in the Greater Shepparton Council area.](image)

The Greater Shepparton Council, in combination with the Goulburn Broken CMA, has developed a web resource designed for emergency services and hazard risk management groups. It is a GIS-based resource that provides mapped scenarios for different locations and different Average Recurrence Intervals (ARI). It is designed to provide predictive outcomes for different flood levels so as emergency services can plan accordingly. This resource unfortunately is not open to public access at this stage, and is limited to the Shepparton-Mooroorupna area, therefore it is limited as an educational resource.
Wangaratta Rural City Council

The Wangaratta Rural City Council has developed a community education document called ‘Flood Response Guidelines’. These guidelines form part of an ongoing program of educating the community in flood response. The intent of these guidelines is to minimise the impact and cost of flood damage to properties in the area, by assisting the understanding of the flood warning system, and to assist stakeholders in managing their responsibility in the event of a flood. Unfortunately, these guidelines are not available through the website.

The Wangaratta Council website however, also provides information on the characteristics of the waterways within the council area. There is also a detailed explanation on the flood warning system, what the warnings mean, and how this affects certain areas within the catchment. A detailed description of how to develop your own flood plan is also supplied on the website, which includes downloadable flood record sheets and a personal checklist to supplement the information provided.

This website seems to have the most comprehensive flood information and education resources amongst the local councils in Victoria.

Melbourne City Council

Melbourne City Council has developed an education resource for businesses called ‘Mind Your Own Business: An Emergency Management Planning Guide for Businesses in the City of Melbourne.’ This guide essentially provides a step-by-step guide to developing an emergency management plan, and ultimately implementing that plan. However, it also provides information on impacts on businesses from emergencies, such as flood and fire, which hopefully acts as an effective awareness tool thus potentially prompting businesses to develop an emergency management plan, reducing the impact of an emergency to the business.

Melbourne City Council has also prepared an education resource for residents called ‘Be Aware and Be Prepared’. It begins with a checklist, so residents can self assess their emergency preparedness, for both single story dwelling and multi-story dwellings. There is then a five step plan so as to develop a personal emergency management plan. There is also emergency contact information, and steps to take to recover after an emergency.

In addition to these two plans, Melbourne City Council has put together an Emergency Management Preparedness Strategy, which identifies different communities, the problems these communities may face in receiving a warning and strategies to counteract these problems so as warning dissemination and action upon that warning is successful.
4 LITERATURE SEARCH - FLOOD EDUCATION ELSEWHERE IN AUSTRALIA

4.1 National

4.1.1 Emergency Management Australia

Emergency Management Australia (EMA) coordinates the Australian Government response to emergencies and disasters. Its mission is to ‘provide national leadership in the development of emergency management measures to reduce the risk to communities and manage the consequences of disasters’.

“Engaging local communities in emergency management, as well as increasing involvement and awareness at a grass roots level, is a critical step in improving national preparedness for emergencies and disasters of all types” (Emergency Management Australia, 2007). In line with this ethos and its mission, EMA has developed and implemented a range of hazard education programs with supporting documentation.

In 2004, the Australian Government announced a new policy initiative, ‘Working Together to Manage Emergencies’ in recognition of the need to further develop self-reliance at both the community and local government level to enhance community safety. Funding from the program supports local government, communities and volunteers involved in emergency management, and aims at enhancing Australia’s capability to prepare for, respond to and recover from emergencies and disaster arising from any hazard. Funding related to this program expires at the end of the 2007/08 financial year when the Australian Government will decide on its future.

The EMA also provides other education services to support the emergency management functions of local governments. The ‘Emergency Management for Local Government’ program has been designed to introduce leaders, employees and elected officials to some of the issues and experiences faced by local governments when dealing with emergency management. EMA also provides local governments with practical application skills through courses such as ‘Risk Based Land Use Planning’.

EMAs education and training activities are managed at Mount Macedon in Victoria. They include the identification and development of best practice in emergency management, and the development and delivery of accredited training programs.

EMA has produced a range of community and school education publications, most of which can be accessed through its website: www.ema.gov.au. Some of these publications are related specifically to floods and in some instances have been co-written e.g. with the BoM. These include:

- Booklet titled ‘What to do before, during and after a flood’
- Poster titled ‘Floods-Warning, Preparedness and Safety’

The EMA has also produced the Australian Emergency Manuals Series. The Australian Emergency Manuals Series was designed to assist in the management and delivery of support services in a disaster context. It consists of a series of manuals that educate emergency managers about a range of hazard situations including floods. Specific flood manuals in the series include:

- Flood Preparedness (Manual 20)
4.1.2 Bureau of Meteorology

The BoM currently operates as an Executive Agency within the Australian Government’s Environment and Water Resources Portfolio. Its role is to ‘observe and understand Australian weather and climate and provide meteorological, hydrological and oceanographic services in support of Australia’s national needs and international obligations’.

In terms of the response to a flood hazard, the BoM is the responsible body for providing the initial flood warnings around Australia with its Flood Warning Service Program. The primary function of the Flood Warning Service Program is the provision of an effective flood forecasting and warning service in each Australian State/Territory. This service is provided in cooperation with other government agencies such as State/Territory emergency management agencies, water authorities and local Councils, coordinated through Flood Warning Consultative Committees and established cooperative working arrangements in each State/Territory.

The Flood Warning Service provides different types of information that depends on the type of flooding and the flood risk. The range of information, which may vary between States and areas within a State, includes:

- An Alert, Watch or Advice of possible flooding, if flood producing rain is expected to happen in the near future. The general weather forecasts can also refer to flood producing rain.

- A Generalised Flood Warning that flooding is occurring or is expected to occur in a particular region. No information on the severity of flooding or the particular location of the flooding is provided. These types of warnings are issued for areas where no specialised warning systems have been installed. As part of its Severe Weather Warning Service, the Bureau also provides warnings for severe storm situations that may cause flash flooding. In some areas, the Bureau is working with local councils to install systems to provide improved warnings for flash flood situations.

- Warnings of ‘Minor’, ‘Moderate’ or ‘Major’ flooding in areas where the Bureau has installed specialised warning systems. In these areas, the flood warning message will identify the river valley, the locations expected to be flooded, the likely severity of the flooding and when it is likely to occur.

Message construction, communication, response and review of these warnings are the responsibility of the State/Territory emergency services, and local government authorities. They are discussed and reviewed in detail in the companion report on Flood Warning Systems produced by Molino Stewart.

BoM uses its website at www.bom.gov.au to not only issue flood warnings but to provide detailed community information on meteorology and flooding. The flooding information includes:

- Poster titled ‘Floods-Warning, Prepar edness and Safety’ produced with the EMA

- Fact sheets on Flood Warning Services and Flood Watch (for Victoria)

- Booklet titled ‘Preventing and Mitigating the Impact of Natural Disasters’ (including a section on reducing the impact of floods)
4.1.3 Other national education providers

There are other national organisations that have produced documents related to flood education. For example, the Insurance Council of Australia has produced a brochure titled ‘Flood Insurance – Are You Covered?’ to help landowners find out whether they live in a flood prone area and find out if flood insurance is available to them.

There is also evidence of a national push to incorporate flood education into school curricula. For example, in June 2006, the Curriculum Corporation completed an audit of hazard and emergency preparedness education in Australian schools. The audit aimed to discover how primary and secondary schools could better integrate this subject matter into the curriculum.

The audit focused on bushfire education, and looked at other hazards in general. The audit found that, in general bushfire education was well resourced, and a significant amount of education material already existed. It was also found that natural hazards are well-entrenched and made explicit in the curriculum. However, there is an emphasis on “where, what, how and why” of disasters, and very little on issues such as planning, prevention, preparedness, and recovery. The audit also found that there was a general trend towards a post-disaster approach.

The audit recommended that the curriculum be altered to ensure resources were relevant to children through real life case studies, and an increase in real life response scenarios. The audit also recommended that schools used practical action-research activities within communities, and the increased use of multimedia and interactive educational resources.

4.2 New South Wales

The NSW SES is ‘a volunteer organisation that exists to protect lives and property, particularly during storms, floods and other natural disasters’. To support this role, NSW SES has developed and uses a range of community education programs and products including:

- FloodSafe program (described below)
- Volunteer engagement with community both formally (e.g. at events such as shows) or informally
- Website at www.ses.nsw.gov.au
- Media releases particularly related to flood events
- Flood warning service
- Profiling products such as fridge magnets and book marks that highlight the role of the NSW SES, the 132 500 emergency number and website
- School resources for teachers and students located at the website
- Formal presentations about SES and flood preparedness to stakeholders e.g. business breakfasts

FloodSafe is a brand name for a suite of engagement tools that help flood-affected residents and businesses learn about their flood risk and know what to do before, during and after a flood in their area. The tools show people and businesses how to prepare a flood action plan.

The FloodSafe program includes generic and site-specific tools for both riverine and flash flooding scenarios. The tools include:

- FloodSafe Guides for numerous flood-affected communities and businesses (some of these have been translated into languages other than in English).
The Guides highlight the flood risks in that floodplain, warning systems available, how to prepare, respond and recover from a flood and provide emergency contact details.

- A Business FloodSafe Toolkit. This is a generic manual that provides a template for businesses to plan for flooding as part of their business continuity planning
- A Home FloodSafe Toolkit (being developed) that includes a flip chart (magnetised for affixing to a fridge) for householders to refer to and plan for flooding
- Information on preparing a Home Emergency Kit

The NSW SES has also promoted and been involved with the development of flood education plans in NSW communities including at:

- Maitland (riverine)
- Lismore (riverine)
- Newport (flash flood)
- Rockdale (flash flood)

The plans have been developed by local committees consisting of NSW SES, local councils, resident, business and other government representatives. In some cases these were existing flood management committees, and, in others, they were formed for this purpose. The plans have been initiated by local councils and other organisations e.g. the Hunter-Central Rivers CMA for Maitland.

These plans allow communities to decide on the most appropriate education activities for them to prepare for flooding to minimise risk to people and property. They also ensure ongoing education activities through community ‘ownership’ of the plans.

4.3 South Australia

South Australia has a general lack of information on flooding that is available through the internet. No information was discovered which related to specific community education programs on the SA Government website, the State SES website or the Security and Emergency Management in South Australia website. These websites did have some basic information on flooding which related to simple definitions, a small amount of flood history, and some basic information on how to act before, during and after a flood event.

The South Australian SES website contains some information and templates on how to prepare an emergency flood plan and how to prepare an emergency flood kit.

Information sheets have been developed for the Verdun community, which provide information on how to interpret a flood marker in the context of the Verdun area. However, there is no indication of how or where this information was disseminated.

Last year was the fiftieth anniversary of the 1956 Murray River flood. Commemorative events and exhibitions were planned throughout the State, and a website was set up especially for the event. This event may have proved to have been a good educational tool for flood awareness.

Due to time constraints, all of the local government websites could not be consulted, however, six council websites were searched, and there was no reference to any education programs or flood warning systems that were currently being used in the
LGA. Only one of the council websites that were reviewed had basic information on flooding.\(^1\)

The South Australia Government has recognised the importance of community involvement in emergency management and have implemented a program called SafeSA. The purpose of the program is to provide a way in which councils and communities can identify local emergency concerns, manage emergency risks and integrate actions and responsibilities with those of others. This program does not require communities to be part of SafeSA, instead it allows communities and local authorities to be voluntarily involved. The aim is to address all types of emergencies and the program allows the definition of emergency be as broad as the stakeholders want or require it to be. Guidelines are provided which seem to be relatively easy to follow, and local councils need to endorse the objectives of the project, so as if community members are the main representatives of the group there is some support from a local authority.

### 4.4 Western Australia

As regards flood education, the Fire and Emergency Services Authority (FESA) of Western Australia is the equivalent of the State Emergency Service in the other Australian States. The FESA website provides basic information on flooding such as definitions and information on what to do before, during and after a flood. Much of this information is derived from the EMA’s Emergency Management Manuals. The FESA website also provides historic records and flood evacuation routes and centres. Nowhere on the website does it indicate however, that FESA facilitates a flood education program to make the community more aware and resilient.

Western Australia, Northern Territory and Queensland were the only States in Australia that provided any information on storm surge flooding. The FESA website provided the storm surge information, which comes in a one page evacuation guide. The majority of information concerns the actions individuals need to take if storm surge flooding is imminent. A small amount of awareness information is present, however, in terms of educating the community this guide is limited.

### 4.5 Northern Territory

The Northern Territory Emergency Service has produced educational brochures for ‘Flooding in Katherine’, ‘Flooding in Alice Springs’, and ‘Darwin Storm Surge’. Both the Katherine and Alice Springs brochures provide historical information of flooding in the towns, actions to take before, during and after floods, and warning information such as where flood water will reach under different warning categories so as residents can directly relate to the information. Both of these brochures also provide locality flood maps, so residents can determine their flood risk for a range of flood water depths.

The storm surge brochure provides information about what storm surge is and how it occurs, and whether Darwin could be affected. A small amount of information is supplied about how to act if a storm surge affects Darwin.

The NT Emergency Service’s webpage did not provide information about an education program concerning these brochures.

No other information was readily available through the NT Emergency Services webpage or through the Northern Territory Government webpage.

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\(^1\) The council websites that were reviewed were: Alexandrina Council; Renmark Paringa Council; Adelaide City Council; Adelaide Hills Council; City of Holdfast Bay; Barossa Council and Mid-Murray Local Council.
4.6 Queensland

Queensland’s Department of Emergency Services provides services covering all phases of emergency and disaster management – prevention, preparedness, response and recovery – delivered by fire, ambulance and Emergency Management Queensland. This structure enables cross-hazard coordination of emergency operations and programs including education. An example of this broad multi-hazard approach to emergency programs such as education is the publication, ‘A Guide to Effective Community Engagement’. This guide outlines practical ways to engage communities in emergency preparedness planning including for flooding.

Emergency Management Queensland is the arm of the department that is responsible for community preparedness and response to flooding. It provides preparedness information at its website: www.emergency.qld.gov.au. Through its State Emergency Service and Volunteer Marine Rescue unit it provides community flood education through SES volunteers including at events.

The Queensland Government has realised the potential difficulty for its emergency services to reach many Aboriginal and Torres Strait Islander communities in the event of a disaster. Thus, it has produced a guide to disaster risk management in Queensland Aboriginal and Torres Strait Islander communities. One of the main features of the guide is the inclusion of community involvement in developing a risk management plan. The guide also acknowledges that every community is different, and therefore may have different values and give different levels of importance to things. Education about hazards, hazard risk and preparation and response to these risks is mentioned, however, it is not a main focus of these guidelines. It should be noted that the EMA has also published the Remote Indigenous Communities Strategy entitled ‘Keeping Our Mob Safe’.

4.7 Australian Capital Territory

The Australian Capital Territory (ACT) has very little specific flood education resources available over the internet. The ACT Emergency Services Agency has basic information on what to before, during and after a flood which is based on the EMA guidelines. There are also direct links to the EMA website, and this information has been addressed above.

The ACT Emergency Services Agency has produced an all hazards emergency guide. The guide provides templates for preparing for a flood. It also provides information on how to act before, during and after floods and also for storms, bushfires, and home fire safety.

The ACT has implemented an all hazard warning system, which is designed to provide clear and timely advice about the potential hazard to impact of life, property and the environment, and how individuals should prepare, and respond to such an event.

4.8 Tasmania

Tasmania SES is the lead management authority for flood response in Tasmania. There is little flood education information at the TasSES website with only a flood action guide to assist the community in preparedness.

The Tasmanian Flood Warning Consultative Committee has initiated a community education project titled ‘Floods and You’. Partners in the project are:

- Bureau of Meteorology
- Department of Primary Industries, Water and Environment
The project helps the community:

1. Understand the level of flood risk to the community
2. Know what to do in relation to flood warning

The ‘Floods and You’ project encourages people to fill in a community survey about flooding and other information is located at the website: www.floodsandyou.org.
5 LITERATURE SEARCH - FLOOD EDUCATION IN OTHER COUNTRIES

The literature search particularly found flood education information and details of education programs in four countries:

1. United Kingdom
2. Canada
3. United States of America
4. New Zealand

5.1 United Kingdom

The Environment Agency UK has a flood warning system called Floodline, which provides flood warnings by telephone, mobile telephone, fax or pager. Residents can call the Floodline and find out whether they are at risk of flooding, and if they are can register, free of charge, to be placed on the Floodline register.

The Environment Agency website also provides information on simple ways to protect your home from flooding, installing own flood defences, what to do during a flood, what to do after a flood, flood guide for older people, and a flood guide for businesses. The website also supplies a flood library resource which includes fact sheets, education material, flood advices, and flood history. There is no indication however, whether any of this information was distributed to residents or businesses or how this information is available other than through the website.

The EA also provide a flood mapping facility on their website, which is useful for self research. The facility allows map searches by either post code or place name and provides a map of the area on a variety of scales, the largest of which is 1:20,000. A map of this scale provides enough detail to show street blocks and major landmarks and the map is colour coded for flood risk. There is then an option to ‘learn more’ about the area. This function supplies written information about the flood risk in the area selected and provides a likelihood of flooding in the area in a percentage and in ARI terms.

The website also provides substantial information on how flooding will effect specific property insurance, which is an important consideration in flood planning.

In addition to the information supplied by the EA, the Met Office also has substantial amount of information on flooding. The information on the Met Office website is focussed on the meteorological research into why different types of floods occur, such as storm surges and rain depressions. This is the only resource that was discovered that provided this type of information.

5.2 Canada

The Public Safety and Emergency Preparedness Canada (PSEPC), administers the Joint Emergency Preparedness Program on behalf of the federal government. In this program, the federal government, to help provinces and territories with emergency preparedness projects, spends approximately $4.5 million annually. Projects can involve establishing emergency plans, setting up more effective communication systems, as well as acquiring rescue equipment, which assists in reducing flood damages and loss of life. The provinces and territories spend about $5.5 million per year on these projects.
The PSEPC also has a college that offers a number of flood education courses aimed primarily at municipal officials, both elected and non-elected. The courses are designed to point out their responsibilities for the development and implementation of plans to meet emergencies.

Flood warning dissemination in Canada begins with a flood forecasting unit. Generally, a forecasting unit is responsible for notifying the emergency measures agencies, senior government officials, and the public through the media. Ordinarily, the responsibility for flood warnings lies with the provinces and the territories.

There are several forms and levels of flood warnings given to the public and emergency agencies to prepare them for flooding. The warning system is usually initiated with a statement or flood alert early in the season. The alert often gives a general indication of the potential threat based on various weather scenarios. The statements are often printed in the local papers or broadcast on the radio or television. This notice serves to remind responsible agencies, such as the emergency measures organizations, that the flood season is approaching, allowing them to prepare themselves. At this point, the floodplain residents should plan how they could protect their property and valuables.

During the course of the spring melt the forecasting unit will issue a flood warning when a flood event is foreseen. The warning triggers municipal and regional contingency plans to be put into effect by police, fire, public works, emergency measures, and other departments. These agencies would assist in the evacuation, sheltering, feeding and clothing of the threatened population; sandbagging operations; ice jam management; and the operation of flood control structures. These warnings also give the public several hours to a couple of days to prepare themselves by moving valuables to higher ground, possibly sealing the home to some extent, and volunteering to aid in the flood fighting.

5.3 United States of America

The National Weather Service (NWS) conducted a national Flood Awareness Week between the 19th and 23rd of March 2007. The awareness week was designed to highlight some of the many ways floods can occur, the hazards associated with floods, and ways in which communities can mitigate the impact of floods to save life and property.

The NWS and the National Oceanic and Atmospheric Administration (NOAA) websites both provide educational material such as fact sheets and historical records. One of the larger educational campaigns that the NWS has run is the ‘Turn Around, Don't Drown’ campaign. This program has incorporated brochures, fact sheets, posters and a promotional song to further promote the message of the campaign. The aim of the program is to make people aware of the danger of driving through flood water especially if the water is flowing.

NOAA has also produced a 16 page colour booklet, which provides a substantial amount of information on the definitions of the different types of flooding, who can be affected by these types of flooding and the way to act before, during and after a flood. There is no information on the website as to how this booklet was distributed.

The Red Cross in the United States also has information regarding how to act before, during and after a flood. A number of brochures and fact sheets have been produced, which are available on the internet, providing basic information on preparing a disaster supplies kit, creating an evacuation plan, ways in which elderly and disabled people can prepare for floods, and general preparedness for floods.

The Red Cross has also published a 60 page booklet that provides information on how to repair your home after a flood event.

Apart from these and other national programs, flood education in the USA is predominantly a state and municipal responsibility. For example, the City of Boulder
(Colorado) has developed a flood education program as part of its flood management program. The education program helps people understand the dangers of flooding and the actions they can carry out before, during and after a flood. It includes a Flood Watch video and website and details can be found at www.BoulderFloodInfo.net.

5.4 New Zealand

Throughout the 1990s in New Zealand, there was a number of reviews conducted examining how Civil Defence Emergency Management (CDEM) was being carried out. This review process led to the Civil Defence Emergency Management Act 2002 (CREM Act) to be passed, thus providing statutory response mechanisms to emergency management.

The CDEM Act aims at creating resilient and self-reliant communities. Self reliance comes from communities aiming to reduce the likely impact of, prepare for, and be able to respond to emergencies effectively. To encourage this, regional cooperation and coordination is a cornerstone of the Act, as well as whole community participation. In addition, it was legislated that all sectors with an interest in civil defence emergency management will be accountable for ensuring that their communities are aware of, and committed to civil defence emergency management.

In addition to the CDEM Act 2002, New Zealand also has a national emergency management strategy called ‘Resilient New Zealand – communities understanding and managing their hazards’. As one of the main goals, New Zealand communities need to understand the wide range of hazards and how they may affect them. However, both the strategy and the Act realise that awareness is only the first step and the need for an understanding of how to respond to these hazards is vital. The strategy also recognises the need for public education in this context.

There are a number of national education resources (Finnis, 2004) that are currently implemented to assist in hazard preparedness, which include:

- A brochure titled “Will You Cope When Disaster Strikes?”
- Public education displays comprising of standalone displays reinforcing the key messages that appear in the brochure
- A national radio program entitled “Know What It takes
- Yellow Pages advertising
- Sponsorship
- A civil defence website

Regional councils and local governments also contribute to the public education in regards to hazard awareness and preparedness. Most local councils prepare school education programs, comprising of posters, brochures and videos. However, some of the councils only provide assistance to implement a school education plan (Finnis, 2004).

Local governments also contribute to community education programs by developing awareness material such as brochures, posters, and videos. Approximately half of the councils advertise on the radio, and approximately a quarter of councils provide some community contact. A high proportion of councils (73 percent) use volunteers for the education process, and most of these councils provide training for these volunteers (Finnis, 2004).

Approximately 68 percent of councils are helping businesses prepare for the hazards, through awareness material (brochures, posters, videos), assistance with planning, provision of planning guides and business training courses (Finnis, 2004).
New Zealand is currently promoting an all-hazards approach to household natural disaster preparedness. For example, cross-hazard preparedness guides issued by the New Zealand Government can be found at www.getthru.govt.nz. Cross-hazard school education materials can be found at www.whatsplanstan.govt.nz.
6 LITERATURE SEARCH - OTHER HAZARD EDUCATION

A search was conducted for education programs and products related to the following other hazards.

1. Tsunamis
2. Cyclones
3. Bushfires
4. Earthquakes

Details of a sample of multi-hazard education programs and products were also obtained.

6.1 Tsunamis

Pacific Islands

The Pacific Disaster Centre has developed a Tsunami Awareness Kit with the unique needs of the Pacific Island in mind. The kit is a collection of resources forming the basis of a public awareness program aimed at strengthening mechanisms for sharing information, knowledge, experiences, and sound practices.

The Tsunami Awareness Kit is comprised of technical, visual, and practical awareness materials, including maps, booklets, checklists, brochures, reference materials, visualisation products and movie clips. These materials are offered in a variety of formats to allow for flexibility in the display and dissemination of the products. Most of the materials are not country specific, however, some (maps, event history, emergency response and warning procedure) are. The kit targets the general public, disaster managers and government officials, as well as businesses and schools.

In the development of the kit, a number of aspects of dissemination were considered from the research of other programs. According to Mielbrecht, 2005, some of these dissemination considerations were:

- Provision of simple credible information
- The need for consistent repeated and reinforced information
- To format materials so that receivers of information actually understand the information
- To pursue multiple channels of influence
- To provide support when questions arise
- The need to include the business community
- The need to account for the visiting population, or those that may not have been included in the education process
- To attain stakeholder advocacy

Thailand

The Department of Mineral Resources, Thailand, recently commissioned a study into the risk mitigation of a tsunami in Thailand. The report reviewed the ‘Boxing Day’ tsunami and recommended key risk mitigation measures for the future. The report
states that “in the short term...it is important to take steps to ensure a lasting long
term awareness of the tsunami risk”. It recommended monuments be constructed
along the coast that give a clear warning to future generations about tsunami risk.
The report also suggests that these monuments can be designed to function as part
of the physical protection measures against tsunamis.

The report also suggested that authorities should include tsunami risk in the school
curriculum and in textbooks, as well as showing the inundation zone for the 2004
tsunami in their planning.

The main mitigation recommendation is through engineering solutions. It is suggested
that dwellings be raised from ground level, the elevation of the ground level be
artificially raised through reclamation with landfill, or physical protection barriers be
built to reduce the maximum level of the tsunami or to dissipate the energy of the
tsunami (Norwegian Geotechnical institute, 2006).

United States

The National Oceanic and Atmospheric Administration (NOAA) has a dedicated
tsunami awareness and preparedness program called ‘TsunamiReady’.

TsunamiReady is an offshoot of StormReady, which is a community preparedness
program that uses a grassroots approach to help communities develop plans to
handle all types of severe weather. To be officially StormReady or TsunamiReady a
community must:

- Establish a 24 hour warning point and emergency operation centre
- Have more than one way for alerting the public for severe warnings
- Create a locally based weather monitoring system
- Promote the importance of preparedness through public seminars
- Develop a formal hazardous weather plan for the community.

The program is not funded; therefore the above requirements need to be fulfilled
before a community can be accredited as being Storm/TsunamiReady. The
TsunamiReady webpage provides a number of information brochures about the
science behind tsunamis, how to detect a tsunami and how to act in a tsunami event.

6.2 Cyclones

Australia

Each year, Australia’s Bureau of Meteorology (BoM) conducts cyclone awareness
campaigns before the cyclone season begins. These campaigns are implemented
through public meetings in coastal towns, local government briefings, presentations
to schools, media briefings, press articles and supplementary literature such as
brochures and pamphlets. The BoM ‘Surviving Cyclones’ information booklet
provides information on how individuals should act before, during and after a cyclone
event. It also provides information on how cyclones are formed, what the cyclone
warnings mean and how they can affect communities.

Emergency Management Queensland has also released an information booklet
called ‘Preparing for Cyclones’, which has much of the same information as the
document produced by the Bureau of Meteorology.
Hong Kong

The Hong Kong Observatory (HKO) has developed a long term cyclone education program which runs continuously throughout the year. During the quiet (no cyclone) season the observatory is opened up to the public for tours and for school education days. The HKO also organises an outreach program where Observatory staff visit the homes of the elderly and to schools to further raise awareness, as well as setting up exhibitions in public venues.

Prior to the start of the tropical cyclone season, there are public announcements by the Director of the Observatory to appeal to the public to be prepared for natural hazards. There are also regular announcements on tropical cyclones through both television and radio. The HKO also meets with the recognised stakeholders to refresh their memories and advise them about the HKO service enhancements.

During the cyclone season all of the pre-cyclone season announcements on both television and radio are stepped up. The HKO meets with all those that have the potential to be worst effected by a cyclone, to identify problems with their preparedness and identify quick fix and long-term solutions to these problems.

After the cyclone season, the HKO returns to the stakeholders to discuss the enhancements to the services and how to make them even better.

In 2004, the HKO along with other departments, developed a year long education program called ‘Safer Living – Reducing Natural Disasters’, which ran between May 2005 and May 2006. The program included a four-episode television program on safer living, a meteorological documentary series, a tropical cyclone naming competition, popular science lectures, bookmark design competition, a seminar on natural disaster reduction and a large exhibition which included rescue drill demonstrations (Anderson-Berry, 2006). There is no indication that the program will be repeated in the future.

6.3 Bushfires

Victoria

‘Fire Ready’ - a collaboration between the Country Fire Authority (CFA), the Department of Sustainability and Environment (DSE) and the Melbourne Fire Brigade (MFB) - is a program to increase the awareness of bushfire risk, and preparedness for the Victorian community in times of bushfire. The program is targeted toward those living, working and visiting areas of Victoria with a high bushfire risk.

Fire Ready superseded the Bushfire Blitz program which consisted of awareness-raising through street corner meetings in the summer of 1997/98. The Fire Ready program was devised from key recommendations from the Victorian Bushfire Inquiry in 2003, which identified the need for a joint agency, statewide education campaign to increase personal and household self reliance. The key objectives of Fire Ready are:

- To increase awareness that fire is inevitable and natural process, and of its role in the natural environment
- To raise awareness amongst residents of high bushfire risk, and the importance and benefit of taking action to mitigate the risk of bushfire
- To increase the understanding of how to mitigate against the risk and the adoption of preparedness measures
- To increase the understanding that fuel reduction burning is carried out to mitigate risk and reduce impact of fires
- To promote awareness amongst residents and tourists visiting high risk bushfire areas of available sources of information immediately prior and during the onset of bushfire.
The ways in which these objectives are being achieved include through street corner meetings, community meetings, DSE community information forums and through Community Fireguard.

A media campaign runs throughout the main fire season each year. The campaign has been focussed on a number of key messages to develop realistic community expectations during a fire event. There is also information about prescribed burning programs, the Victorian Bushfire Information Line and how to access up to date information during a fire event. The campaign also includes information for tourists and members of the ethnic community. The campaign utilises press media and radio for the dissemination of the information.

Brochures, fridge magnets and information cards have been distributed to residents, which provide information on the Victorian Bushfire Information Line and general bushfire awareness and survival information. In addition, a survival plan workbook called ‘Living in the Bush’ is distributed to everybody that attends a community meeting, whereby assistance will also be given to complete these plans. A CD ROM version of ‘Living in the Bush’ is also available through the CFA website, which allows residents to create their bushfire survival plans electronically. These plans can be saved on the computer and updated readily.

A number of the brochures are also available for download through the CFA website at www.cfa.vic.gov.au.

‘Community Fireguard’ is a community development program designed to reduce the loss of lives and property during bushfires. There is a realisation that the CFA can’t protect every property during a fire event. Therefore, the Community Fireguard program assists community groups to develop bushfire survival strategies that suit their lifestyle, environment and values, and to work together in achieving these values.

Community Fireguard encourages residents to work together to improve bushfire safety. Community Fireguard groups are formed when residents of a local area choose to participate in the program. By becoming involved in the Community Fireguard groups, residents are able to develop strategies for themselves. “Groups make decisions about the best way to protect themselves in a way that fits their lifestyle, environment, physical capabilities, finances and experience” (CFA Community Safety Directorate, 2004).

The CFA employs facilitators to support and deliver the Community Fireguard program in high risk areas across Victoria. Facilitators help Community Fireguard groups to become established and provide them with support, technical information and resources. They assist groups to gather relevant information and develop survival plans.

**Australian Capital Territory**

The ACT Rural Fire Service (RFS) has developed a community based bushfire awareness program called ‘Bush FireWise’. The program basically encourages residents to prepare their household for high risk bushfire periods and to reduce the fire hazard risk around the residents’ homes and streets.

The program, not unlike Victoria’s Fire Ready program, facilitates street corner meetings where information such as brochures and booklets is distributed. However, according to the website, it seems that the last community street corner meeting that was organised by the RFS was in the 2004-05 fire season.

The ACT Emergency Services Agency webpage provides interactive risk assessment tools for the susceptibility of both a house and a fence in the event of a wildfire. It is a very basic tool and does not provide many options however it highlights the risk and possibility of impact from a fire on a house or a fence. The information provided on the website is also available in several different languages.
New Zealand Fire Service

In the recent past, a number of people have died in the Northland area of New Zealand, which prompted the New Zealand Fire Service to implement a fire emergency management plan in the area called the ‘Te Kotahitanga Project’. The aim of this project was to improve fire safety in remote communities and ultimately reduce fatalities caused by fire.

The project involves ambassadors from these isolated communities visiting households to provide the members of each household with fire safety education and fit smoke detectors if not already present. The ambassadors generally do not have any initial fire knowledge. The success of the project apparently comes from the face-to-face approach from local people, the fact that it provides positive benefits for all involved and the support of broad range of stakeholders (Finnis, 2004).

6.4 Earthquakes

The Kathmandu Earthquake Risk Management Project was developed with the intention of working with the community to improve earthquake safety in the area. Originally the project targeted hospitals, as they are vital to a community, especially during and after a hazard. However, it was found that as hospitals are not a central part of the community, education was ineffective. Schools, on the other hand are central to this and any community, thus the program was continued in schools.

Schools were used for community meetings and were continually made example of as a model for domestic building construction. Training was provided to local craftsmen so as earthquake safety retrofitting of building could take place. In addition, education that was taking place in the schools, was either taken home by the students or was seen to be achievable by other members of the community, and was therefore more broadly accepted in the wider community.

It was realised that no radical change in building safety could be made due to lack of resources, however this program shows that even with a lack of resources, communities can be made more resilient through the right education mechanism, and in this case it was through schools, which are a central part of the community.

6.5 Multi-hazard education programs

Australia

In 2000, Morrissey and Reser produced a document for EMA and James Cook University entitled ‘Awareness, Endurance and Recovery’. This document addresses methods to psychologically prepare for a natural disaster.

The resultant education program is designed for individuals, families and communities that are hazard prone, and those in the community that are most vulnerable to adverse reactions from hazard stress. The program was written for the delivery by community leaders so as they can disseminate the information to the general community in training sessions. In these sessions, information is provided to the audience and then the audience responds to the information through various activities such as brainstorming, quizzes and games.

The aim of the program was to increase the community’s awareness of psychological processes involved in preparing for possible disaster scenarios to enhance the community’s ability to cope with the psychological effects of a natural disaster and, in doing so, reduce the overall psychological distress and longer-term mental health consequences which may be associated with a natural disaster.

The effectiveness of using psychological preparedness tools in emergency management was analysed in Morrissey and Reser, 2003. The study looked at the
outcome of a naturally occurring hazard on two groups of people; one group having pre-event psychological intervention, while the other did not. The psycho-educational material was derived from ‘Stress Inoculation Theory’, which is a well-researched emotion management strategy and cognitive behavioural procedure. This theory enhances individuals’ ability to anticipate, identify and cope with stressful situations.

The research provided convincing support for the effectiveness of the modified stress inoculation intervention in an actual cyclone event and it was recommended in the article that psychological advice in natural disaster education material should be present.

**United States**

In 1997, the US Federal Emergency Management Agency (FEMA) implemented a program called ‘Project Impact’. Although not primarily an education program, this program introduced the concept of pre-disaster mitigation to reduce the costs of hazards in the United States. The project was designed to give local communities the power to decide what mitigation goals were needed and how these goals would be pursued, instead of being regulatory-based.

Prior to this program, other federal initiatives only provided mitigation funding to regions where disasters had previously occurred. The intent of this program, however, was to establish a wide variety of community-based initiatives, which addressed the concerns of the community, and also to facilitate the development of innovative solutions to hazard-related problems.

Even though the communities were encouraged to develop their own strategies for the reduction of loss in the event of a disaster, FEMA did outline general goals and objectives for the program: which included:

- To build community partnerships
- To identify hazards and community vulnerability
- To prioritise risk reduction actions
- To develop communication strategies and to educate the public about the project and disaster mitigation.

As part of the program, FEMA has promoted the development of Community Emergency Response Teams (CERTs), which train members of neighbourhoods, community organisations or workplaces in basic emergency response skills. A number of progress reports have found that the interest in the courses that the CERTs run exceeds the capacity and once the program was underway there was no problem in maintaining interest in the communities (Finnis, 2004).

However, it has been acknowledged that the actual effectiveness of the program will not be able to be assessed comprehensively until there are emergencies in the areas that have implemented the Project Impact initiatives (Finnis, 2004).

In August of 2005, the U.S. government announced that FEMA would no longer receive individual funding and the agency would be absorbed into the Department of Homeland Security, which was developed after the September 2001 terrorist attacks (Holdeman, 2005).

The U.S. Department of Homeland Security has developed its own education program for the mitigation of emergencies called Ready America. The program includes an information brochure, an emergencies supplies checklist and a Family Emergency Guide template for the development of a family emergency plan.

‘Ready America’ was developed after the September 11 attacks and is largely based on how to prepare and respond to terrorist emergencies. Most of the basic information that the program has produced (brochures, fact sheets etc) is based on terrorist emergencies, with small amounts of information for other emergencies.
The Ready America program also has produced a comprehensive emergency preparedness book called "Are You Ready?" This publication provides information on general emergency preparedness, specific natural hazard preparedness and other hazard preparedness.

Ready America has also produced guides and brochures for businesses. The information provided for businesses is less comprehensive than that of the personal and family information. The brochures provide awareness information and a rationale for business continuity plans. There is a sample plan available for download, which can be filled in, however, there appears to be limited incentives for business owners to produce a plan.

**Bangladesh**

Since 2003, the Government of Bangladesh has given structural and non-structural hazard mitigation measures equal importance. The broad concept of non-structural mitigation measures, such as training and public awareness, institutional arrangements, warning systems, planning, policy and legislative changes, are relatively new in Bangladesh. However, the government believes that with some elementary preparedness and preventative strategies hazards can be mitigated in a relatively cost effective way (Government of Bangladesh, 2003).

As part of the public awareness activities, information about cyclones, floods and earthquakes are regularly printed in a variety of formats (booklets, brochures, posters and calendars) and are distributed to the residents by the Disaster Management Bureau. The Government of Bangladesh has also declared the last working day in March each year the National Disaster Preparedness Day, which has been recognised since 1998.

The National Curriculum, for children aged between eight and seventeen, now includes a chapter on disaster management and natural hazards affecting Bangladesh to raise awareness among students on hazards and disaster management issues (Government of Bangladesh, 2003).
7 LEADING PRACTICE IN FLOOD EDUCATION

Leading practice in flood education is examined in this report through:
1. Analysis of psychological research related to hazards (Sections 7.
2. Evaluation of flood and other hazard education programs (Sections

7.1 Psychological research

7.1.1 Resilience

As stated in Section 2.1, ‘flood education’ is defined as any learning process or activity that builds community resilience to flooding. It is therefore important to understand the nature of ‘resilience’ and how it is achieved by both individuals and communities to determine leading practice in flood education.

The ability of a community (or individual) to prepare, respond and recover is part of its ‘resilience’ to a hazard. According to Paton and Smith (2001), resilience “describes the capacity of systems to maintain their integrity and the relationships and balance between elements in the presence of significant disturbances by drawing upon internal resources and competencies to manage the demands, challenges and changes encountered.”

The opposite of resilience is generally viewed to be ‘vulnerability’. Whilst resilience refers to the ability to resist and/or recover from damage, vulnerability refers to the tendency of something to be damaged (SOPAC, 2004). Vulnerable community groups can be defined with respect to demographic (e.g. age, ethnic minority status, educational level) and socio-economic (e.g. family dynamics, economic resource limitations, limited social network access) characteristics.

Yet, according to Paton (2006) and other researchers, the complementary relationship between resilience and vulnerability cannot be assumed. In fact, vulnerability factors may co-exist with factors that facilitate a capacity to adapt to adverse circumstances i.e. assist resilience (Caddell et al, 2003). Paton (2006) cites the example of some groups that would be seen as vulnerable (e.g. ethnic minority status, age and poor educational status) but have demonstrated better than anticipated levels of community participation and empowerment.

Furthermore, factors that determine community resilience are not necessarily the same as those indicating individual resilience. This is demonstrated by Paton and Smith (2001) in Tables 1 and 2.

Table 1 Examples of appropriate indicators for individual resilience

<table>
<thead>
<tr>
<th>THEME</th>
<th>INDICATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personality</td>
<td>Hardiness/vulnerability (intelligence, locus of control, neuroticism)</td>
</tr>
<tr>
<td>Behaviour</td>
<td>Information seeking, networking, coping strategies</td>
</tr>
<tr>
<td>Beliefs</td>
<td>Risk perception, self efficacy, sense of community, behavioural intentions</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Factual risk assessments – resource availability, appropriate behaviours</td>
</tr>
<tr>
<td>THEME</td>
<td>INDICATORS</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Experience</td>
<td>Skills training, past hazard experience, interpretation of experience</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Changes in beliefs and knowledge, adjustment adoption</td>
</tr>
</tbody>
</table>

Source: Paton and Smith (2001) page 50

Table 2 Examples of appropriate indicators for community resilience

<table>
<thead>
<tr>
<th>THEME</th>
<th>INDICATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
<td>Aggregate sense of community, community competence</td>
</tr>
<tr>
<td>Geographical</td>
<td>Hazard, risk, response constraints</td>
</tr>
<tr>
<td>Economic</td>
<td>Income levels, industrialisation, public facilities</td>
</tr>
<tr>
<td>Capacity</td>
<td>Social institutions, emergency services, training resources</td>
</tr>
<tr>
<td>Resource</td>
<td>Public information (availability, access rates)</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Plans, knowledge, skills</td>
</tr>
</tbody>
</table>

Source: Paton and Smith (2001) page 50

Embedded in these resilience indicators are some critical psychological processes. These processes include ‘self-efficacy’ and ‘problem-focused coping’.

According to Bandura (1994), self-efficacy is defined as “people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives.” It influences people’s receptivity to information and the likelihood of their adopting risk reduction behaviours.

Problem–focused coping involves confronting the hazard problem and represents a mechanism for facilitating resilience (Yates et al. 1999).

7.1.2 Preparedness

The resilience, or ‘adaptive capacity’, of a community comprises two elements (Paton, 2006):

1. Preparedness – the process by which behaviours and resources (e.g. emergency plans) that facilitate coping with the hazard event are developed and maintained
2. Systems and competencies required by people and communities to coordinate and utilise these behaviours and resources to confront and adapt or adjust to the hazard event

Researchers have developed theoretical models to help understand why people take up preparedness behaviours. For example, Paton et al. (2003) developed and tested a social-cognitive model of preparedness to assist both research and the formulation of practical risk communication strategies.

As shown in Figure 2, Paton’s model consists of three stages:

STAGE 1 - Precursors. The motivation to prepare for a hazard is determined by ‘critical awareness’ (the extent to which people see the hazard issues as important to think about and discuss on a regular basis), ‘risk perception’ (the level of perceived threat or risk posed by a hazard) and ‘anxiety’ related to the potential hazard.
STAGE 2 - *Intention formation*. Outcome expectancy, self-efficacy and problem-focused coping are all predictors of the intention to prepare.

STAGE 3 - *Conversion to preparedness*. Prominent moderators for the conversion of intention to actions include the ‘time frame’ within which people estimate or assume that the next hazard will occur and their levels of trust in the sources of information.

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**Figure 2: A socio-cognitive model of preparedness**

Rohrmann (2002) developed a socio-psychological model for analysing risk communication processes that lead to appropriate preparedness and response behaviours. He identified factors such as ‘risk perception’ and ‘belief in the measures taken’ as prior motivators for action. He felt that people, on receiving risk communication messages, would appraise the potential hazard using the messages, make the decision (or not) to act and then carry out the risk-reducing behaviour. Determinants for deciding to act include risk specific beliefs, people’s own characteristics and exposure to the hazard.

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### 7.1.3 Barriers to preparedness

Several researchers have used social research and other studies to identify barriers to the uptake of preparedness behaviours. Through a comprehensive literature review, Finnis (2004) identified the following barriers to the uptake of these behaviours:

- Risk perception - where people do not internalise the risk of a hazard (“That event is never going to happen”)
- Unrealistic optimism – the illusion of personal invulnerability that can cause a denial of risk (“It’s never going to happen to me”)
- Response efficacy – see definition of ‘self-efficacy’ in Section 7.1.1 (“I don’t have the time/money/skill to prepare”, “There are more important things to think about”, “I can’t be bothered”)
Outcome expectancy – the perception of whether personal action will effectively mitigate or reduce a problem or threat (Bennett and Murphy, 1997) (“No amount of preparedness will help”)

Normalisation bias – Viewing a hazard as a common event that will not vary in impact (“Kempsey has floods all the time, and I survived those”)

External locus of control – people believe that forces outside of their control are the ruling forces (“Disasters are an Act of God”, “If it is meant to happen…..”) 

Transfer of responsibility – believing that others are responsible for preparedness and response (“The SES will be there to help me”)

Several of these barriers relate to the processes in Paton’s preparedness development model in Figure 2. It shows that if there are attitudinal impediments to the processes in the model, the appropriate behaviours will probably not be carried out.

Gissing et al. (2005) identified four barriers to the uptake of a toolkit that helps businesses plan for flood preparedness and response. There barriers were:

1. Scepticism. Many businesses surveyed felt there was a low risk of flooding and that losses would not be great if a flood eventuated.
2. Trust. There was a high level of trust in the emergency combat agency (NSW SES) in a community (Wagga Wagga) that had not experienced a significant flood for a relatively long period of time.
3. Self-confidence. Some businesses believed they knew what to do to prepare and respond to a flood (and therefore did not require guidance). Other businesses had a fatalistic view, demonstrating a lack of confidence in being able to do anything to mitigate flood impacts.
4. Priority. Lack of time was cited as a reason for not carrying out flood planning.

Other researchers have located similar barriers to response behaviours. For example, Molino Stewart (2006) identified some barriers to resident and business responses to flood warnings in Northern NSW. Barriers included:

- Lack of awareness of flood threat to personal safety
- Poor understanding of responses to different types of warnings
- Perception that you do not have to evacuate until floodwaters are seen after receiving a flood notification
- Inertia. Most respondents did not want to improve their flood response behaviours

Rohrmann (2002) outlined potential barriers to risk communication. “Difficulties can be technical or socio-psychological in nature, ranging from information distribution and storage problems to lack of involvement and inertia. Many people’s overconfidence in safety matters, unrealistic optimism and cognitive biases add to the problem.”

### 7.1.4 Implications of psychological research for flood education

The psychological research summarised in Section 7, shows that to build resilience hazard (including flood) education should focus on two elements:

1. The process by which behaviours and resources (e.g. emergency plans) that facilitate coping with the hazard event are developed and maintained (i.e. Preparedness)
2. Systems and competencies required by people and communities to coordinate and utilise these behaviours and resources to confront and adapt or adjust to the hazard event (i.e. Response and Recovery)

The challenge for hazard education is to be effective in promoting preparedness, response and recovery behaviours, systems and competencies in an environment characterised by infrequent hazard activity, and to maintain this state of readiness over time (Paton et al., 2003). This challenge is exacerbated for flooding which several communities view as being of comparatively low risk in their complex hazardscape (Molino Stewart 2003, Molino Stewart 2005a, Molino Stewart 2005b).

Furthermore, the challenge for flood and other hazard education is arguably much more difficult than for many other education programs designed to change and maintain environmental behaviours. For example, waste education and stormwater education encourage people to carry out regular activities (e.g. recycling, not littering, minimising phosphorus use) that can easily become part of everyday lifestyle. On the other hand, flood education has to encourage the initiation and maintenance of preparedness activities for which there can be numerous psychological barriers (see Section 7.1.3) to uptake. It also has to guide people to act appropriately during and after the flood event.

The models described in Section 7.1.2 highlight the complex psychological processes that need to be addressed by education (and other measures) just for people to start to carry out preparedness behaviours.

The traditional approach to flood education now appears to be relatively ineffective in initiating and maintaining preparedness and response behaviours. The traditional approach informed the community about floods and their risks through the dissemination of prepared material emphasising actions people can undertake to protect themselves and their property. According to O'Neill (2004), this approach “was often one-off and one-way, and assumed that the audience was an undistinguishable group of individuals who had the same needs and values.”

The traditional approach is based on the premise that raising individual awareness will lead to preparedness and response behaviours. According to Paton et al. (2003), “It is frequently assumed that providing the public with information on hazards and their mitigation will encourage preparation. This assumption is unfounded.” Several researchers, such as Boura (1998), have demonstrated that there is not a strong and causal link between receiving information and acting appropriately for hazards.

A more participatory approach to community flood and other hazard education is now being promoted. According to Paton (2006), “Participation in identifying shared problems and collaborating with others to develop and implement solutions to resolve them engenders the development of competencies (e.g. self-efficacy, action coping, community competence) that enhance community resilience to adversity.” In this approach, emergency management agencies act more as facilitators to communities rather than directing change in a top-down manner. They also can help the community build capacity (e.g. networks, leadership, competencies) for preparedness, response and recovery.

More specifically, flood and other hazard education should involve communities and individuals in the development of their own education strategies that relate to the psychological research and models such as those outlined in Section 7.1.2. For example, following Paton’s model, according to Finnis (2004) education should be designed to “motivate people to prepare, encourage the formation of intentions to prepare and ensure the conversion of intentions to preparedness while addressing the influencing variables (e.g. self-efficacy, problem-focused coping).” It should also help them overcome the barriers identified in Section 7.1.3.

According to Paton (2006), “participation in identifying shared problems and collaborating with others to develop and implement solutions to deal them facilitates the development of efficacy, sense of community, and commitment to action. That is, it engenders the development of competencies that enhance community resilience to adversity”. To put this idea into action, Paton suggests that “hazard education could
be facilitated by inviting representatives of community groups to review hazard scenarios in regard to potential challenges, opportunities and threats they could pose for the community. They would then propose strategies to capitalise on them, or to manage or contain them”.

In the participatory approach, the emergency management agencies (such as VICSES) assimilate and support the needs and directions of the community. They thus act as consultants to communities (e.g. facilitators, resource providers, change agents, coordinators) rather than directing the change process in a top down manner.

Based on this preferred participatory approach, there are implications for the type of community education resources produced by emergency management agencies. The research favours those education resources that help people actively develop their own plans for flooding rather than ones that simply provide awareness information. These education resources should be tools for the engagement of people, families, businesses and communities in deciding on their own way to prepare for, respond to and recover from a flood.

Some researchers (e.g. Finnis, 2004) support a cross-hazard approach to community education where appropriate. This would mean that flood education would be part of general hazard education programs if there is a complex hazardscape (i.e. range of hazard risks). The benefits of this approach include:

- Economies of scale for managers from integrating education programs across hazards
- Reinforcement of preparedness behaviours where there are similar behaviours required across hazards
- Use of single community preparedness groups for all hazards
- Building other community capacity (e.g. competencies, leadership) across hazards

### 7.2 Evaluation of hazard education programs

#### 7.2.1 Program evaluation

Evaluation is a practical management tool for understanding and improving the performance of projects/programs, and demonstrating the impact of these projects/programs. More specifically, evaluation can be expressed as “an objective and considered assessment of the efficiency, effectiveness and appropriateness of a project or program” (Sharp, 1994).

There are two categories of program evaluation.

1. **Summative evaluation** which measures the program’s success or failure by comparing outcomes with original goals
2. **Formative evaluation** which measures program progress against ongoing benchmarks and allows the manager to make course corrections.

According to Hernandez (2000), “Formative evaluation is more useful to a program manager, because it provides information that helps the program succeed. Summative evaluation, coming after the program is over, gives a verdict about whether the program achieved its goals, but is of no help to the manager in achieving those goals (of course, the results of summative evaluation can be useful for people designing new programs).”

There is a range of qualitative (e.g. focus groups, reflections) and quantitative (e.g. social research surveying, cost-benefit analysis) tools that can be used to obtain information for both formative and summative evaluations.
7.2.2 Evaluation of flood education programs

Evaluation of flood education programs can help ascertain leading practices by identifying critical success factors and processes.

Unfortunately, one of the weaknesses of many flood education programs is the lack of program evaluation. This was demonstrated in the comprehensive literature search of flood and other hazard education programs for this project (see Sections 3, 4, 5 and 6) where there was little evidence of any program evaluation found. This is consistent with the acknowledged dearth of evaluations for the suite of 'environmental' education programs (McDuff, 2002).

Furthermore, the flood education evaluations located in the literature search tended to be summative and not the more favoured formative type (see Section 7.2.1). McDuff (2002) notes that lack of ongoing evaluation in these types of education programs stems from multiple factors including:

- Lack of staff time
- Perception of evaluation as a complex process requiring outside expertise
- Lack of knowledge and skills by staff
- Lack of funding

In addition, there was no evidence in the literature search that any of the flood education evaluation was participatory. Participatory evaluation involves local stakeholders in problem identification, evaluation design, data collection, analysis and use of results. Stakeholders include those who affect or are affected by the policies, decisions and actions of a program. Participatory evaluation has already shown to be effective in several fields including sustainable development, health and agriculture (McDuff, 2002).

Three types of evaluations were found in the literature search that can provide an insight into leading practices in flood education.

1. Evaluation of flood education projects that were, in some cases, part of an ongoing flood education program
2. Reviews of flood warning systems with community education as part of the total warning system
3. Social research into local flooding with implications for flood education programs

Gissing et. al. (2005) carried out an evaluation of a pilot Business FloodSafe toolkit project for NSW SES in Kempsey and Wagga Wagga. The evaluation involved a pre-test of a sample of businesses in both communities as a baseline, the toolkit launch through business breakfasts and a post-test to compare with the baseline and determine toolkit uptake. The evaluation found that the toolkit:

- Increased the profile of the SES with businesses as a source of reliable information
- Raised the level of flooding awareness in Wagga Wagga businesses (this was already high in Kempsey)
- Increased levels of preparedness with businesses in Kempsey where flooding was recent and seen as a high risk but not in Wagga Wagga where flooding is not viewed as a major risk
- Demonstrated the need for the SES to follow up a launch of the toolkit, as although it was well-received, most businesses did not use the toolkit to write a preparedness plan

Molino Stewart (2004) evaluated the impact of a flood preparedness education strategy implemented on the Woronora River floodplain (NSW). Although a flood did not occur to allow review of response in a flood event, the uptake and impact of the
strategy components pre-flood were evaluated. The impact of the components (such as public meetings, printed stickers, householder kits) implemented included an increase in:

- Percentage of respondents who accept the flood risk
- Levels of preparedness including willingness to self-evacuate and to develop an emergency kit
- The understanding of the role of the NSW SES in flood events
- Percentage of people that acknowledge that they have received information about local flooding

There is some evaluation of the flood education plans recently developed in NSW (see Section 4.2 for details). The Maitland flood education was launched on 15 February 2007 and early indications are that it has raised awareness and preparedness through a range of actions (Amanda Hyde pers comm.). It has also galvanised and directed agency, council and community education actions. It should be noted that the Maitland plan outlines evaluation processes to gauge its delivery and impact (it may be too soon after its launch to assess its impact on the 2007 Hunter River floods).

Community education in relation to warning systems is discussed in detail in the companion interim report on warning systems compiled by Molino Stewart. Most evaluations of warning systems stress the role of education in alerting the community about the role of the warning systems in a flood event and the need for people to develop preparedness plans with actions triggered by warnings.

Effective community education linked to warning systems appears to be particularly needed in flash flooding environments where people have to act quickly and appropriately to warnings. For example, a detailed evaluation of the flash flooding warning systems in the Boulder Creek floodplain (Colorado, USA) recommended an increase in public education activities and expenditure as result of extensive resident surveying (Gruntfest et.al., 2002).

Social research can give an insight into the requirements and possible nature of flood education programs. Some examples are described below.

A survey of community attitudes, awareness and preparedness was undertaken in the Maitland area of NSW in 2005 as baseline data to direct the development of a local flood education plan. In this riverine flooding scenario, survey results included:

- 71 percent of residents were ‘not very concerned’ or ‘not at all concerned’ about flooding. Although living in a flood prone area, those not concerned believed they were not in a flood-liable area, lived on high ground or were protected by levee banks (a priority action for the flood education plan was to show community the extent of a large flood and to dispel the myth that they are protected by the levee)
- 81 percent would call the SES (9 percent would call the police) if they required emergency assistance (action is to further promote the SES emergency response number 132 500)
- 37 percent believe they were covered by insurance and 37 percent didn’t know if their policy included flooding (action was to help the community access details on house and contents insurance for riverine flooding)
- Television and radio advertising and information were identified by respondents as the best way to receive flood safety messages
- 80 percent of survey respondents had seen or heard information about the 50th anniversary of the 1955 Maitland Flood that was held earlier in the year of surveying (demonstrating the significant impact of this type of event)

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1 Amanda Hyde is the Flood Education Officer for the Hunter-Central Rivers CMA
The Victorian Department of Justice conducted a qualitative study of residents' views from the Maribyrnong River floodplain (Betts, 2007). The study used face-to-face interviews to explore community connections, community communication and networking, experiences of an emergency event and experiences and expectations of the emergency services.

Findings of the study included:

- Importance of neighbours and agency support in an emergency event
- Resident mobility was an issue in preparedness
- The River was viewed as part of a recreational lifestyle -- and not necessarily a threat
- Few people had a preparedness plan
- The warning system was critical as it triggered action
- Local knowledge is an important basis for preparedness and response
- Role of VICSES and Police as emergency services was acknowledged
- Council was seen as the main source of flood information and played a strong role in recovery

Betts concludes the findings report with, “It would seem that due to the new residents who have come into the area and the length of time since the last major flood, a well-planned community education campaign would have enormous benefits toward flood mitigation and preparedness”.

7.2.3 Evaluation of bushfire education programs

There have been numerous evaluations of bushfire education programs and social research studies into community preparedness in Australia. The results of some of these evaluations and studies are described below, especially where they have transference to flood education.

From the literature search for this report there seems to be much more evaluation of bushfire education programs than flood education programs in Australia. The Bushfire Cooperative Research Centre (CRC) is a major contributor to these bushfire education evaluations (evaluation summaries can be found at the Bushfire CRC’s website: www.bushfirecrc.com)

Rhodes (2005), as part of a Bushfire CRC project, surveyed residents in high bushfire risk areas to evaluate aspects of the Victorian CFA’s education programs (see Section 6.3 for details). He particularly examined the association between attendance at the CFA’s community education programs and household preparation and intended response to a bushfire. “Preliminary analysis shows a statistically significant association between the participation in the education programs and higher levels of household preparation and higher levels of adoption of more appropriate protective action intentions”.

In another Bushfire CRC project, Gilbert (2005) reports on the use of a program logic approach for evaluating the Street FireWise (SFW) education program in the Blue Mountains, NSW. The program logic approach involves the development of a hierarchy of intended outcomes as the foundation for a program logic matrix that identified the causal factors that contributed to the attainment of each of these outcomes. “The approach helped identify the importance of the context that SFW was used in, and the mechanisms that were most likely to lead to the successful attainment of the intended outcomes. It has provided the Blue Mountains RFS with a clearer understanding of the capacity and limitations of the SFW program”.

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Gawen (2004) reported on evaluation of the SA Country Fire Service education programs (Community FireSafe and Bushfire Blitz). The evaluation of these programs found that:

- They had more success in initiating and maintaining community groups in semi-rural communities compared to those in high population areas
- A pre-existing knowledge base about bushfires was identified as important in forming and maintaining the community group
- Establishing a team of facilitators has provided the CFS with the flexibility to develop bushfire education programs with the community groups that are appropriate and effective in that area.

### 7.2.4 Evaluation of other hazard education programs

There has been considerable evaluation of education programs for hazards other than bushfire and flood. For example, Morrissey and Reser (2003) evaluated the effectiveness of community preparedness education materials for tropical cyclones in northern Australia. They found that education materials should not only assist residents with physical preparedness but also with psychological preparedness including addressing chronic anxiety, avoidance coping and prior traumatic experiences. The research also found that the pre-cyclone period is a critically important time to prevent and mitigate psychological impacts on preparedness.

Finnis (2004) conducted a review of a range of hazard-related education programs that contribute to a ‘resilient New Zealand’. As a result of the review, she identified the following as requirements for effective hazard education programs:

- Identify and address psychological barriers to preparedness
- Identify predictors of preparedness and develop program in relation to psychological models e.g. Paton et.al. (2003)
- Community development programs effectively increase preparedness and foster a sense of community through empowerment
- Psychological preparedness should be addressed as well as physical preparedness

Studies of adaptation to hazard effects by Bishop et.al.(2000) and Paton et.al.(2001) revealed links between individual resilience predictors and involvement in community activities and functions (e.g. membership of clubs, social action groups). Note that these observations support the participatory approach to hazard education (see Section 7.1.4) as it suggests that resilience is enhanced through engagement in activities concerned with identifying and dealing with local issues in ways consistent with the needs, systems and values of a specific community.

### 7.2.5 Implications of education program evaluation

The findings of the evaluations of flood and other hazard education programs strongly support the research implications discussed in Section 7.1.4. Significantly, they supported the participatory approach where community flood education is delivered through local groups that are empowered to plan, implement and evaluate their own activities. The local groups could include a flood education committee, formed for this purpose and consisting of resident, business, rural landholder representatives as well as staff from local councils and State emergency agencies. On the other hand the local group could be a pre-existing group such as a floodplain management committee.

In particular, the early evaluation of flood education plans in NSW demonstrates that these local groups could be important mechanisms for the participatory approach. It
should be noted that local groups should participate in program evaluation as part of this approach.

The role of emergency agencies, in line with the psychological research, appears to be best located as facilitator and supporter of participatory community education programs. This is supported by evaluations of programs such as the Maitland Flood Education Strategy and bushfire education programs.

The literature search for this report also demonstrated the dearth of readily accessed evaluations of flood education programs, particularly in comparison to the number of bushfire education program evaluations found. There was also little evidence of formative evaluation for flood education programs suggesting that this maybe lacking in these programs.

The use of social research in guiding flood education should be stressed. Social research can help in the planning, implementation and evaluation of flood education programs.

7.3 Leading practices in flood education

Ten leading practices for flood education were gleaned from the discussion in this section. They are:

1. Flood education programs should be delivered through community groups where communities are empowered to research, plan, implement and evaluate their own activities

2. Community flood education plans should be developed to help communities maintain and improve their flood education activities

3. Emergency agencies such as VICSES should act as consultants to communities (e.g. facilitators, resource providers, change agents, coordinators) rather than directing the change process in a top down manner

4. Flood education programs should address the psychological aspects of preparedness, response and recovery, including their psychological barriers

5. The emphasis of flood education programs should be on developing preparedness plans (e.g. through personal or organisational preparedness plans) and building community resilience (e.g. capacity building) rather than just awareness raising

6. Opportunities for cross-hazard (and cross-agency) programs should be identified and implemented where possible

7. Flood education planning should be part of floodplain and emergency planning processes (a recommendation from the companion Molino Stewart interim report)

8. Flood education programs should be evaluated as they proceed to ensure continual improvement

9. Social research should be used in the planning, implementation and evaluation of flood education programs

10. Flood education programs should be strongly linked into the total warning systems e.g. warnings should trigger appropriate response behaviours and this relationship should be clearly communicated through education programs

During this and subsequent research for VICSES, some fringe practices were identified. These are practices that although untested, could easily become future leading practices in flood education. These fringe practices will be outlined in detail in the VICSES FloodSmart/StormSmart evaluation report to be written in the near future.
8 FLOOD EDUCATION, RESILIENCE AND SUSTAINABILITY

8.1 Sustainability

‘Sustainability’\(^1\), although being a goal of many societies throughout history, was only placed formally on political agendas in 1987 and accepted as a widespread international policy agenda in 1992 at the Rio Summit. At a national scale, Australia was an early leader in translating sustainability into policy and law, and state/territory (including Victoria), regional and local bodies have also pursued it actively.

Although the Victorian Government has demonstrated a strong commitment to environmental sustainability (e.g. through legislation, Department of Sustainability and Environment, Sustainability Victoria), it has also shown a commitment to community and economic sustainability through planning and policy.

8.2 Resilience and Sustainability

The importance of ‘resilience’ to sustainability has been well documented. Critical to sustainability (both social and environmental) is the ability for systems to be ongoing and resilience (see Section 7.1) helps to ensure this. According to Folke (2002), “more resilient social-economic systems are able to absorb larger shocks without changing in fundamental ways”. He adds that “management that builds resilience can sustain social-economic systems in the face of surprise, unpredictability and complexity. Resilience-building management is flexible and open to learning”.

Tompkins and Adger (2004) stress the importance of community resilience-building in addressing the uncertain, yet inevitable, impacts of climate change. “Communities need to enhance their capacity to adapt to the impacts of future climate change, particularly when such impacts could lie outside their experienced coping range”.

Governments are now starting to actively support this linkage between resilience building and the broader goal of sustainability. For example, the US Federal Emergency Management Agency (2000) produced ‘Planning for a Sustainable Future’, linking hazard mitigation and disaster management with resilience building to achieve sustainable communities.

Dovers (2004) further strengthens these linkages by finding that “sustainability and disaster management are closely connected in terms of substantive issues and of underlying research on policy challenges”.

8.3 Implications for flood education

As discussed in Section 7, flood and other hazard education is one method of disaster management to build resilience to hazards. Given this, it is therefore one way to help move towards sustainability (see Section 8.2). This relationship is shown in Figure 3.

Also in Figure 3, it is argued that flood education should be viewed as a subset of education for sustainability by virtue of its role in building resilience, an important component of moving towards sustainability. It should also be able to lever sustainability funding due to this relationship.

\(^1\) There are numerous definitions of ‘sustainability’ but essentially it means that decisions made by the present generation will not reduce the options of future generations, but will pass on to them a natural, economic and social environment that will provide a high quality of life.
Although this author has no precedents of this being used by other emergency combat agencies, there are therefore opportunities for VICSES to explore opportunities through education for sustainability networks and funding in Victoria. This is further discussed in Section 9.4.

![Figure 3 Relationship between flood education and sustainability](image-url)
9 ASSESSMENT OF VICSES PROGRAMS

9.1 Leading practices

The flood education programs of VICSES are described in Section 3.1. These are assessed against the leading practices in flood education developed through Section 7 and summarised in Section 7.3. Table 3 provides this assessment.

Table 3 Assessment of VICSES programs and products against leading practices

<table>
<thead>
<tr>
<th>Leading practices4</th>
<th>FloodSmart Program</th>
<th>Other SES products and services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Delivery through community groups</td>
<td>Use of community working group to plan and prepare activities</td>
<td>No evidence</td>
</tr>
<tr>
<td>2. Community flood education plans</td>
<td>No formal plan developed</td>
<td>No evidence</td>
</tr>
<tr>
<td>3. Act as consultants to communities</td>
<td>VICSES part of community working group and assists in making decisions</td>
<td>Use of volunteers both formally and informally</td>
</tr>
<tr>
<td>4. Preparedness and barriers</td>
<td>Evidence of Benalla pilot looking at preparedness and barriers in decisions related to education method</td>
<td>Preparedness content at SES website</td>
</tr>
<tr>
<td>5. Personal preparedness plans</td>
<td>Benalla FloodSmart Guide helps people plan for a flood. No plan for businesses or other sectors e.g. caravan parks</td>
<td>General guidelines to develop a plan on website. No plan for businesses or other businesses e.g. caravan parks</td>
</tr>
<tr>
<td>6. Cross-hazard programs and links</td>
<td>No evidence</td>
<td>No evidence</td>
</tr>
<tr>
<td>7. Part of floodplain and emergency planning</td>
<td>No evidence</td>
<td>No evidence</td>
</tr>
<tr>
<td>8. Program evaluation</td>
<td>No evidence</td>
<td>No evidence</td>
</tr>
<tr>
<td>9. Use of social research in planning and evaluation</td>
<td>No evidence</td>
<td>No evidence</td>
</tr>
<tr>
<td>10. Linked with total warning systems</td>
<td>Well-linked in Benalla Pilot through classification into three risk zones and activities (e.g. stickers) to communicate this</td>
<td>Links to BoM for warning system information on website</td>
</tr>
</tbody>
</table>

4 See Section 7.3 for full explanation of the ten leading practices for flood education
As demonstrated in Table 3, without FloodSmart program the VICSES services and products would poorly address the leading practices in flood education. As shown, FloodSmart uses at least half of the leading practices identified in this report. Suggested improvements to the FloodSmart program related to gaps in Table 3 are:

1. Develop a community flood education plan to empower the community in decision-making and to maintain community ownership of education activities after VICSES focus has to move elsewhere. Use leading practices and lessons from the effectiveness of other programs in decision-making.

2. Ensure that psychological aspects of preparedness (including barriers) are related to the local context

3. Ensure that all sectors (e.g. businesses, caravan parks, hospitals) of the community have the opportunity to prepare their own flood preparedness plans

4. Link FloodSmart into broader floodplain and emergency planning (e.g. development of local council flood plans)

5. Identify and utilise cross-agency and cross-hazard synergies where possible (e.g. linkages with CFA’s bushfire education programs)

6. Use social research to guide planning and evaluation e.g. build social research such as community surveying into community flood education plans

7. Build formative and summative evaluation into the FloodSmart program and flood education plans to enable continual improvement and improve reporting.

9.2 Lessons from other education programs

Two Australian hazard education programs that address most or all of the leading practices listed in Section 7.3 are those of the NSW SES and the Victorian CFA.

The NSW SES’s FloodSafe Program, described in Section 4.2, has some engagement tools that could assist FloodSmart. The Business FloodSafe Toolkit (or derivation) would help in providing preparedness plan guidance to Victorian businesses. The soon to be released, Home FloodSafe Toolkit would also be a useful generic engagement tool to help families prepare plans for flooding.

The experience of the NSW SES would be invaluable to improve FloodSmart in other areas such as the development of flood education plans, use of social research and evaluation

The CFA through its Community Firequard Program experience can also assist particularly in the development of community groups and facilitation. There may be opportunities to provide cross-agency training of volunteers in education and develop multi-hazard programs and products where appropriate.

9.3 Other gaps

9.3.1 Provision

Given that VICSES is only now taking up the role of flood education leader or ‘champion’ in Victoria, there was no requirement to address the provision of education to all Victorians, especially those living in flood prone areas. From the literature search for this report, the provision of flood education by other organisations was patchy at best (see Section 3).

Although FloodSmart has most of the hallmarks of leading practices in flood education it is in pilot stage. Its roll out is dependent on financial and stakeholder support and is time and resource intensive for VICSES. It is also most important to
target FloodSmart into areas where it is most needed i.e. the most vulnerable/least resilient communities or where ‘quick’ wins can be achieved e.g. through leveraging funding. As shown in Table 3, other VIC SES products and services do not well address leading practices.

The following suggestions are made to improve the non-FloodSmart products and services:

1. Develop a Victorian web portal as a one-stop-shop for flood awareness and preparedness information (this is being conducted through CMA funding). Link this to the VICSES website
2. Train SES volunteers as educators and encourage them to run both formal and informal local events and programs to improve preparedness
3. Run cross-agency network or committee to better coordinate flood education planning, implementation and evaluation across the State.
4. Provide on-ground community education support for flood-affected communities during (if possible) and immediately after a flood. These educators would help people understand the possible ‘course’ of the flood event and help them carry out appropriate actions. The educators would be in addition to media staff who would ensure effective communications to the communities. The educators would ideally be at a head office, regional and local level. This would involve further recruitment of educators at these levels including training of volunteers (see point 2 above).

9.3.2 Profiling

The role of VICSES in flood emergency planning should be well-communicated to the public. Although there was evidence of this being done, VICSES could investigate more effective ways to profile the organisation and the emergency 132 500 number, especially in the context of its flood education programs. The experience of NSW SES in profiling itself would be helpful in this endeavour.

9.3.3 Types of flooding

Both flash flooding and riverine flooding appeared to be covered (see Section 3) in flood education programs and products in Victoria. No education material about storm surge was located and this may be a gap that needs to be covered in future VICSES education planning.

9.3.4 Cultural diversity

There was no evidence of indigenous perspectives on water and flooding found in VICSES programs or services or that indigenous communities were part of the decision-making for education programs.

There were no materials found that were translated in languages other than English e.g. at the VICSES website

Both these issues should be addressed by VICSES in consultation with indigenous and ethnic organisations.

9.4 Strategic opportunities

As outlined in Section 8.3, there are strategic opportunities with the broader governance related to sustainability that VICSES may not have explored, at least with respect to its education programs.
As shown in Table 3, there are opportunities to position flood education as an important disaster management process in building community resilience as part of the Victorian Government’s strong commitment to sustainability. As also shown in Table 3, this may also enable VICSES to position its flood education programs as a component of the Government’s commitment to Education for Sustainability and funding for sustainability programs.

VICSES also has the opportunity to address issues raised by Melbourne Water in its recently released Flood Management and Drainage Strategy Discussion Paper for the Port Phillip and Westernport Region. The Discussion Paper identifies “enhanced community education, awareness and preparation” as an issue that needs to be addressed by the Strategy. VICSES, through this report and further review, should be able to position itself as lead agency for flood education and coordinate flood education planning with other organisations such as Melbourne Water. Through further evaluation of FloodSmart and StormSmart programs it can recommend these programs as ones that address leading practices. There also may be opportunities to co-fund and resource these programs with Melbourne Water.

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5 As evidenced by documents such as from Commissioner for Environmental Sustainability Victoria (2007)
10 ROLES AND RESPONSIBILITIES FOR VICSES

10.1 Roles and responsibilities defined

This report recommends that VICSES leads flood education in Victoria by:

1. Coordinating and guiding the provision of flood education across the State with other agencies and stakeholders

2. Implementing the FloodSmart program, as a leading practice flood education program, in the most vulnerable and least resilient communities

3. Providing flood preparedness support to all flood prone and affected communities

10.2 Future strategies

Based on 10.1, the following strategies are recommended:

1. Coordinate and guide the provision of flood education across the State with other agencies
   – Develop and support a Victorian Flood Education Committee comprised of agency and other stakeholders (e.g. indigenous, ethnic group, business representatives) that coordinates and guides flood education across Victoria
   - Investigate opportunities (e.g. as part of education for sustainability) to position flood education as an important way for the Victorian government to build resilient communities for sustainability

2. Implement the FloodSmart program, as a leading practice flood education program, in the most vulnerable and least resilient communities or where there are greatest opportunities for implementation
   – Amend future FloodSmart programs in line with improvements recommended in 9.1
   - Seek funding and local support to implement the program particularly in the most vulnerable and least resilient communities

3. Provide flood preparedness support to all flood prone and affected communities
   – Train and support volunteers to educate their communities about flooding and preparedness in formal and informal situations
   - Provide preparedness guidance through the VICSES website, including in non-English languages
   - Further profile the VICSES, especially in relation to the 132 500 number.
11 SUMMARY OF RECOMMENDATIONS

11.1 Specific recommendations

Based on the analysis of the literature research, evaluations and psychological research the following specific recommendations are made for VICSES in conjunction with the strategies outlined in Section 10.

1. Develop community flood education plans to empower the community in decision-making and to maintain community ownership of education activities after VICSES focus has to move elsewhere. Use leading practices and lessons from the effectiveness of other programs in decision-making.

2. Ensure that psychological aspects of preparedness (including barriers) are related to the local context

3. Ensure that all sectors (e.g. residents, businesses, caravan parks, hospitals) of the community have the opportunity to prepare their own flood preparedness plans

4. Link FloodSmart into broader floodplain and emergency planning (e.g. development of local council flood plans)

5. Identify and utilise cross-agency and cross-hazard synergies where possible (e.g. linkages with CFA’s bushfire education programs)

6. Use social research to guide planning and evaluation e.g. build social research such as community surveying into community flood education plans

7. Build formative and summative evaluation into the FloodSmart program and flood education plans to enable continual improvement and improve reporting.

8. Develop a Victorian web portal as a one-stop-shop for flood awareness and preparedness information (this is being conducted through CMA funding). Link this to the VICSES website

9. Train SES volunteers as educators and encourage them to run both formal and informal local events and programs to improve preparedness

10. Run cross-agency network or committee to better coordinate flood education planning, implementation and evaluation across the State.

11. Provide on-ground community education support for flood-affected communities during (if possible) and immediately after a flood. These educators would help people understand the possible ‘course’ of the flood event and help them carry out appropriate actions. The educators would be in addition to media staff who would ensure effective communications to the communities. The educators would ideally be at a head office, regional and local level. This would involve further recruitment of educators at these levels including training of volunteers (see point 9 above).

12. Investigate more effective ways to profile VICSES and the emergency 132 500 number, especially in the context of its flood education programs

13. Develop with their communities, flood education materials and programs for indigenous and NESB people.

14. Develop education programs and materials for those communities affected by storm surge.

15. Explore governance opportunities (e.g. with networks and funding for education for sustainability) with the importance of flood education in building community resilience and moving Victoria towards sustainability.
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Appendix A

Glossary of Terms
GLOSSARY

**Capacity building:** the process for enhancing the effectiveness of individuals, organisations and systems to achieve or define outcomes, by strengthening their knowledge base, competence, resources, networks, infrastructure and other forms of support.

**Community:** includes all spheres of government, business and industry and the general public

**Critical Awareness:** extent to which people think and talk about hazards

**Empowerment:** multi-dimensional social process that helps people gain control over their own lives. It is a process that fosters power (that is, the capacity to implement) in people, for use in their own lives, their communities, and in their society, by acting on issues that they define as important.

**Evaluation:** an objective and considered assessment of the efficiency, effectiveness and appropriateness of a project or program

**Flood education:** is any learning process or activity that builds community resilience to flooding.

**Hazardscape:** the landscape of many hazards. The interaction among nature, society, and technology at a variety of spatial scales creates a mosaic of risks that affect places and the people who live there. The term is normally used in reference to a specific place or region.

**Participation:** the active and constructive engagement of people. It is a bottom-up process within which enter (and often help create) spaces for interaction and influencing of decision-making mechanisms.

**Preparedness:** the process by which behaviours and resources (e.g. emergency plans) that facilitate coping with the hazard event are developed and maintained

**Problem-focused coping:** involves confronting the hazard problem and represents a mechanism for facilitating resilience

**Recovery:** the process of returning to "normality" after an emergency occurred. The post-disaster phase that is also used to increase safety and preparedness

**Resilience:** describes the capacity of systems to maintain their integrity and the relationships and balance between elements in the presence of significant disturbances by drawing upon internal resources and competencies to manage the demands, challenges and changes encountered

**Risk perception:** the level of perceived threat or risk posed by a hazard

**Self-efficacy:** people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. It influences people’s receptivity to information and the likelihood of their adopting risk reduction behaviours

**Sustainability:** means that decisions made by the present generation will not reduce the options of future generations, but will pass on to them a natural, economic and social environment that will provide a high quality of life

**Vulnerability:** refers to the inability of people, organizations, and societies to withstand adverse impacts from multiple stressors to which they are exposed. These impacts are due in part to characteristics inherent in social interactions, institutions, and systems of cultural values.