Planning for the Inevitable – Emergency Planning for Floods in NSW

Andrew Gissing – Manager Planning, NSW State Emergency Service
Andrew.Gissing@ses.nsw.gov.au
Marcus Morgan – Planning and Research Officer, NSW State Emergency Service
Marcus.Morgan@ses.nsw.gov.au
Craig Ronan ESM – Central West Region Controller, NSW State Emergency Service
Craig.Ronan@centralwest.nsw.gov.au

Abstract

The NSW State Emergency Service (SES) is the legislated combat agency for floods in New South Wales (NSW) meaning it is the government agency responsible for controlling the response to flood emergencies within the State. The combat role is comprehensive encompassing emergency risk management, community education, emergency planning and flood response.

Emergency planning refers to the preparation of community based plans of action in accordance with NSW emergency management legislation. SES emergency plans for flooding contain arrangements dealing with the preparation for, response to and the initiation of recovery from floods and their associated hazards. Plans deal with all magnitudes of flooding including riverine flooding, flash flooding, tsunami, coastal erosion / oceanic inundation and flooding resulting as a consequence of dam failure.

This paper discusses the SES emergency planning process and looks at SES experiences in community based emergency planning, reinforcing the important partnership between the SES, local communities and local government in conducting emergency planning.

Introduction

Flooding presents a substantial risk to people and property in New South Wales (NSW), with sections of large cities and many towns located on floodplains. Flooding has resulted in deaths and millions of dollars worth of damage.

In an average year, a small number of deaths occur as a consequence of flooding in NSW and occasionally there have been multiple deaths in a single flood episode. Between 1788 and 1996 at least 2213 people were killed by floods in Australia, making flooding Australia's mostly deadly natural hazard. Almost half of the recorded national flood fatalities have occurred in NSW. Particularly lethal floods in NSW occurred in Gundagai, 1852 (89 deaths); Braidwood and Terara, 1860 (40 deaths); and Maitland, 1955 (14 deaths) (Coates 1999).

Flooding causes extensive property damage in NSW. The Bureau of Transport Economics (2001) ranked flooding as NSW's third most damaging hazard in terms of average annual costs, behind storms and earthquakes. The average annual cost for flooding in NSW between 1967 and 1999 was estimated at $128.4 million. In comparison the average annual cost estimated for bushfire was $16.8 million.

Approximately 55,000 residential properties in NSW are susceptible to riverine flooding within the extent of the 100 year Average Recurrence Interval flood. This is a third of the national total of some 170,000 properties susceptible to riverine flooding within the extent of the 100 year Average Recurrence Interval flood (Leigh and Gissing, 2006). The number of commercial/industrial properties liable to flooding within the extent of the 100 year Average Recurrence Interval flood is not known. Of course, many more properties, including critical infrastructure, would be affected by a Probable Maximum Flood. Such damage has a multiplier effect in that damage to infrastructure typically results in indirect consequences which effect people and property not within flooded areas.

Flooding almost always necessitates emergency actions to be undertaken to lessen impacts upon people and property. The NSW State Emergency Service (SES) is the legislated combat (lead) agency for floods in NSW meaning it is the government agency responsible for controlling the response to floods within the state. Typical flood response functions include warning, evacuation, resupply, property protection and rescue. To ensure effective management of flood response operations the SES leads and conducts emergency planning for flood liable communities and undertakes community education programs to engage with communities about their flood risk and the emergency management strategies that are in place to manage it.

This paper will focus upon the flood emergency planning function of the SES. It discusses the SES planning process and outlines the Service's experiences in community based emergency planning, using a case study of flood emergency planning from the NSW town of Eugowra. The paper outlines current best practice in flood planning and it represents, in some respects, the ideal that the Service is striving to attain. Emergency planning is a very resource-hungry function which consumes much time and energy if it is done properly. In recent years, the SES has been able to gradually increase the resources devoted to emergency planning, and so it has been able to improve the planning function and come closer to reaching best practice standards.

Background to Emergency Planning

An emergency plan is a statement of intent containing an agreed set of arrangements which define the framework for the control and coordination of an emergency. In essence an emergency plan is a script detailing the progression of emergency management functions and what parts each actor must play.

The objective of emergency planning is to reduce continuing risk, which is the risk that cannot be eliminated after floodplain risk management measures, such as works and planning controls, are implemented. Effective emergency planning can result in increased public safety, reduced property damage and faster community recovery.

As the combat (lead) agency for flooding the SES coordinates multiple agencies which have responsibilities in the emergency management of flooding. Emergency planning aims to define the roles and responsibilities of different agencies and outline the strategies for the performance of key functions such as warning, evacuation, property protection, rescue and resupply. In this context emergency plans consolidate working partnerships between key management agencies by ensuring that each agency listed within a plan agrees to its responsibilities.

Flooding is a manageable hazard where flood risk can be defined and appropriate emergency plans developed. Flood emergency planning allows a proactive response to flooding. Without it, flood response would become primarily reactive, reducing the opportunities to prepare for imminent flooding.

The scope of emergency plans must be holistic, by ensuring arrangements exist for the coordination across the phases of prevention, preparedness, response and recovery. Considering all phases ensures the minimisation of the effects of flooding on the community and enhances the ability of the community to recovery from floods.

NSW Emergency Planning Framework

All plans need to be consistent with relevant legislation and policy to ensure they have authority. The NSW emergency planning framework is established by the State Emergency and Rescue Management (SERM) Act, 1989. This Act provides the legislative basis for the preparation of the State Disaster Plan (Displan), an all hazards plan detailing the emergency preparedness, response and recovery arrangements for NSW to ensure the coordinated response to emergencies by all agencies (NSW Government, 2005).

Part two of the State Disaster Plan outlines the framework for emergency planning in NSW. The framework requires the creation of state level sub-plans for specific hazards including flooding. The framework also requires the creation of all hazards disaster plans at emergency management district and local government levels, known as District Disaster Plans and Local Disaster Plans respectively. The Plan stipulates that the requirement to produce flood sub-plans at emergency management district and local government levels is the decision of the SES. In this regard the State Disaster Plan states:

"Where an agency / organisation is nominated as the combat agency primarily responsible for responding to a particular emergency in Part Four of this plan, it is required to produce a Sub-Plan. Planning requirements below State level will be determined by the particular agency" (State Displan, 2005, pp.4)

Further to the planning framework established under the SERM Act, the State Emergency Service (SES) Act, 1989 provides direction for emergency planning. Specifically, Section 12 of the Act states:

"The Director-General is required to undertake such planning and make such preparations as the Director-General thinks fit for the purpose of enabling Director General's functions under this act to be exercised in the most effective manner" (SES Act, 1989, Section 12)

The SES undertakes flood emergency planning in accordance with the established framework through the development and maintenance of a State Flood Plan, which is a sub-plan to the State Disaster Plan. The State Flood Plan outlines the SES's planning framework at SES Region and Local Government level. The requirements under the State Flood Plan are for a district level plan to be established for each SES Region and for a Local Flood Plan to be developed for each Local Government Area with a flood threat. These plans are sub-plans to their respective District and Local Disaster Plans. In total this amounts to seventeen region plans and 142 Local Flood Plans. In recognition of the serious flood problem which the Hawkesbury Nepean Catchment poses in Western Sydney, the SES has developed and maintains a special hazard sub-plan to the

State Disaster Plan titled the Hawkesbury Nepean Flood Emergency Sub-plan. Figure 1 summarises the NSW Emergency Planning Framework in the context of SES flood emergency planning.

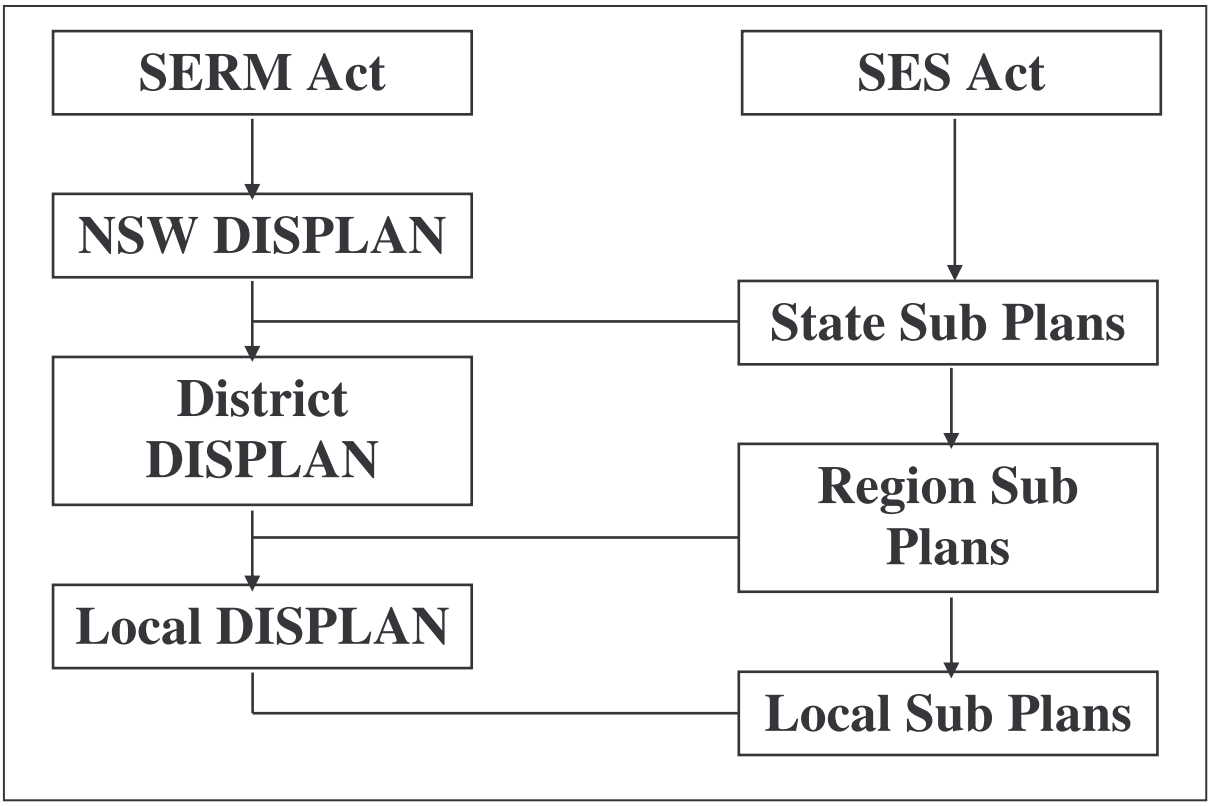

Figure 1 – NSW emergency planning framework for flooding

The SES is responsible for determining the emergency planning priorities for flooding. State wide planning priorities are assessed on the basis of risk. As a general principle, priority is given to plans covering communities that have been assessed as having the greatest risks.

NSW SES Planning Process

The SES has a well developed and practiced process for conducting emergency planning, which the Service is always striving to improve. The planning process aims to produce a shared understanding of agreed arrangements between agencies. It is essential that all key agencies and the community are involved in the planning process.

The process does not just produce an emergency plan; it forms an important learning exercise where participants become familiar with:

- The nature of the hazard in the regional or local area;
- The roles and responsibilities of agencies and organisations within the area covered by the Plan; and
- Key strategies for prevention, preparation, response and recovery.

The planning process is continuous. The key steps in the planning process are shown in Figure 2, with each step explained in the following paragraphs.

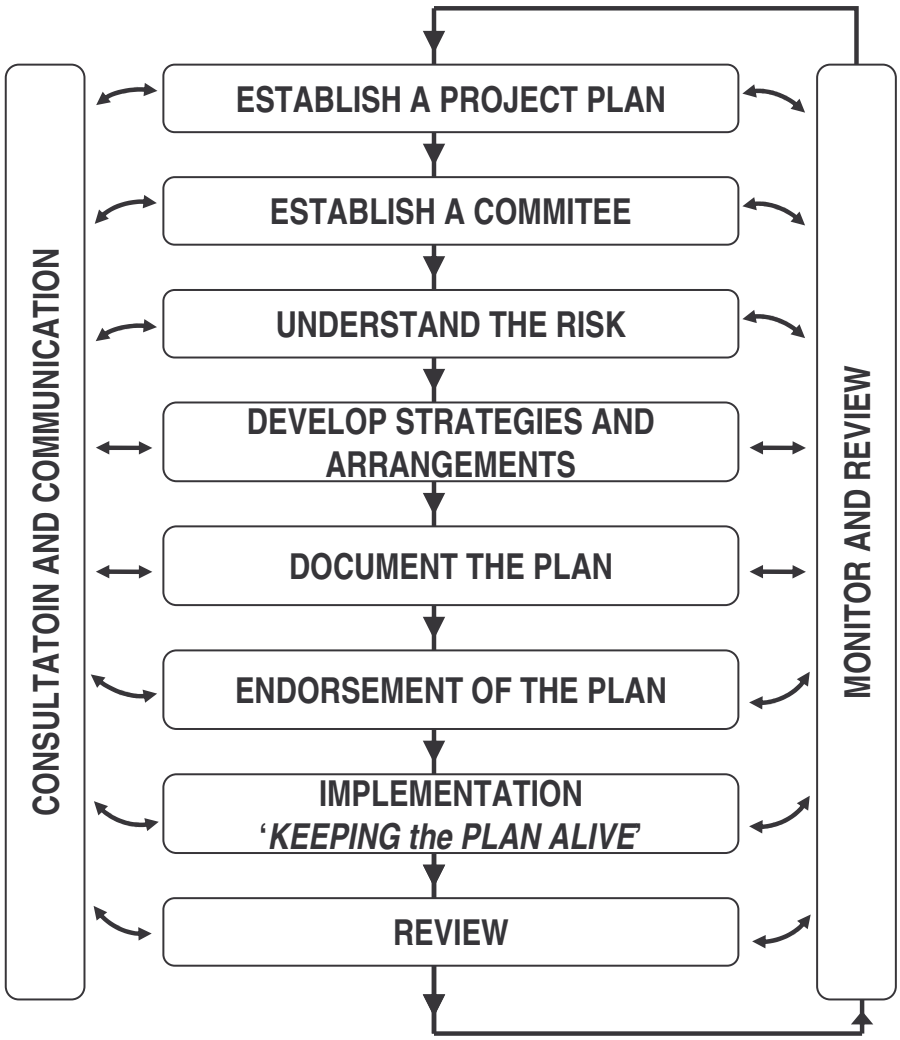

Figure 2 – SES Planning Process

Establish a project plan

Developing an emergency plan is a project and a project plan should be established to guide the planning process. Project planning allows planners to scope the entire planning process, so they have an understanding of what key stages are involved. It has been the experience of the SES that without proper project scoping, planning projects often stumble or stagnate, as planners consider what step to take next or become side tracked by other priorities.

Establish a Flood Emergency Planning Committee

People who are involved in the planning process are more likely to understand, accept and use an emergency plan. Therefore, it is important that key stakeholders are involved in the planning process. The SES involves important stakeholders by forming Flood Emergency Planning Committees. These committees are typically a sub group of the relevant Emergency Management Committee and led by the SES. For Local Flood Plans, committee representation might include: SES; Local Government; Department of Natural Resources; Local Emergency Management Officer; other emergency services; community members; and the Local Emergency Operations Controller. It is essential that committee members are sufficiently senior and knowledgeable to contribute to the

committee. In cases where a plan covers more than one community it may be necessary to establish separate committees for each community.

Local Government participation in the Flood Emergency Planning Committee is essential as councils can provide large amounts of information regarding flood risk and council policies. Involvement also ensures that council officers are aware of the flood emergency management arrangements within their Local Government Area.

The participation of community representatives with an interest in the emergency management of flooding on Flood Emergency Planning Committees is encouraged. This improves community consultation and ownership of planning outcomes.

It is essential that terms of reference be established for the committee to outline the aim and scope of the planning committee's functions. In combination with the agreed project plan the terms of reference provides guidance to the committee in undertaking the planning process.

Understand the Risk

Flood risk is generated by the potential for flooding to interact with elements of the community and/or the physical environment. The flood risk must be thoroughly understood before any strategies can be developed.

SES plans account for all magnitudes of flooding including the most severe and so it is essential to develop an understanding of the risk posed by all magnitudes of flooding, including that generated as a result of dam failure.

To understand the flood risk, planners should conduct a risk analysis. A risk analysis is a systematic process of identifying sources of risk, estimating their likelihood and evaluating potential consequences. The three primary sources of risk in the context of flooding are inundation, isolation and indirect affects as a consequence of infrastructure damage or interruption. The emergency risk management process is used to conduct risk analysis (Standards Australia, 2004).

Numerous sources of information are used to complete risk analysis, including: flood studies, floodplain risk management studies, levee studies, historical records and dam break studies. The SES relies on Local Government to undertake studies, in accordance with the NSW Floodplain Development Manual and to provide these to the SES. The SES has recently worked with the Department of Natural Resources to produce a guideline for local government, which outlines emergency management requirements as a result of the floodplain risk management process. The guideline specifically refers to outputs required by the SES from the production of flood and floodplain risk management studies. The aim of this guideline is to ensure that the studies produce information relevant to flood emergency planning and that the information is subsequently provided to the SES, for the eventual benefit of local communities.

Develop strategies and arrangements

This phase forms the final stage of the emergency risk management process. For each source of risk identified, emergency management functions are determined. Function options available for sources of risk are listed in Table 1:

	Source of Risk		
	Inundation	Isolation	Indirect Effects
Community Education	✓	✓	✓
Warning	✓	✓	✓
Property Protection	✓		
Evacuation	✓	✓	✓
Rescue	✓		
Resupply		✓	✓
Restoration of Infrastructure			✓

Table 1: Functions available to treat sources of risk

For each identified emergency management function it is necessary to develop strategies and arrangements. Once these have been developed responsibilities should be identified and assigned for functions, including tasks which allow functions to be undertaken. There are numerous key considerations in developing strategies and arrangements for key functions, which are listed in attachment A. Exercises and questionnaires can be used to assist in the development of strategies and arrangements.

It is essential that strategies and arrangements are based upon valid assumptions regarding how the community is likely to react during a flood. This is an important reason for consulting with the community regarding a Plan and allowing community involvement in the planning process.

Document the Plan

Plans need to clearly communicate to their audience; hence it is essential that they be documented. To assist in this process and to ensure consistency in format and generic arrangements across plans the SES uses a standard template to document plans.

Endorsement of the Plan

Plans are endorsed by Emergency Management Committees which are established under the SERM Act, 1989. Once consultation regarding a Plan has been completed, and the Plan has been documented, the Plan can be tabled at a relevant Emergency Management Committee meeting for endorsement. Once endorsed, copies of the Plan must be distributed to all stakeholders.

Implementation - Keeping Plans Alive

Unless a Plan is implemented regularly it is likely that the Plan will be ineffective. Plans need to be kept alive to ensure they remain effective and this can be done through exercising, training and community education.

Exercises provide an opportunity to ensure plans are workable and effective. They also help to educate other emergency services, functional areas, Local Government and the community about emergency management arrangements. Exercises can also be used as a tool to assist in the revision of plans, by identifying required strategies and responsibilities.

Training helps emergency personnel to become familiar with their responsibilities and to acquire the skills necessary to undertake their assigned responsibilities (FEMA, 1996). A

simple way of ensuring emergency personnel are familiar with their responsibilities is to run briefings detailing arrangements contained within a Plan.

Community education can be used to promote emergency plans. Programs should educate the community about the contents of emergency plans especially regarding what actions community members should take that are consistent with strategies outlined in the Plan. It is important that emergency plans are completed prior to the establishment of community education programs to ensure they are consistent with strategies outlined within plans. A Plan can also be used as an instrument to educate communities through providing it in public libraries and websites.

Review

To ensure Plans remain relevant and accurate it is essential that they are regularly reviewed. The arrangements in SES plans are reviewed:

- After each flood operation;
- When significant changes in land use or community characteristics occur;
- When new information from studies regarding flooding becomes available;
- When flood control or mitigation works are implemented or altered; and
- When there are changes which alter agreed plan arrangements.

In any case, the SES aims to review its flood emergency plans at least every five years.

Consultation and Communication

Communication and consultation are important considerations in each step of the planning process. Communication and consultation with the community and other emergency services and government agencies builds ownership of the plans' provisions, creating commitment and enhancing the effectiveness of plans. It is essential that project planning includes strategies for communication and consultation.

Case Study: Creating a community based plan, Eugowra NSW

The SES flood emergency planning process was applied over a period of twelve months in the town of Eugowra, NSW. Eugowra is a small town with approximately 600 people (ABS Census, 2001), located in Cabonne Shire, about 350 kilometres west of Sydney in the Central West of NSW.

Eugowra, is at risk of flooding from Mandagery Creek, which flows through the centre of town. Flooding has occurred on numerous occasions including a severe flood in 1990, when some sixty properties were inundated and the town was split in two, causing the isolation of the eastern section of Eugowra.

Most recently major flooding occurred on the 8th and 9th of November 2005, peaking at 9.45 metres on the Eugowra Town Bridge gauge. Though not as severe as the 1990 flood, approximately a dozen properties were flooded and again, the eastern section of the town was isolated.

A Flood Emergency Plan for the town had been developed as part of the Cabonne Shire Local Flood Plan in 1994. A review of the Plan had recently been initiated, but,

unfortunately emergency services personnel and the general community were not familiar with the current Plan.

During the November 2005 flood, the original prediction provided by the Bureau of Meteorology was for the river to peak near 10.5 metres on the Eugowra Town Bridge gauge. A flood of this magnitude would be a severe major flood, with consequences that had not been previously experienced. The only information available regarding likely consequences was from previous flood modelling, which indicated that much of the flood liable sections of town would be inundated. The entire town was warned to evacuate to Parkes, including the small area located on the hillside above the floodplain. The main reasons for the decision were the likely extent of inundation at the predicted flood level and concerns about the ability to maintain essential services such as water and electricity.

Broadcast radio and doorknocking were used as the primary means of disseminating the evacuation warning. Doorknocking of the area was not well planned and as a consequence, doorknocking teams initially focused their efforts on the higher sections of the town rather than areas immediately under threat. This combined with the heavy handed approach of some doorknocking teams caused a lot of community resentment towards emergency services.

The majority of residents did not respond to evacuation warnings and remained in the town, even watching the flood waters rising from the bridge. They stated that they knew the river situation better than the Bureau of Meteorology and the SES, and proclaimed the creek would never reach the predicted height. Residents did not understand why the SES attempted to evacuate the town, with only some twenty residents eventually evacuating to Parkes. Residents clearly had little understanding and no ownership of their community's flood emergency plan.

A community meeting was held three weeks after the flood, led by the SES. At the meeting, some fifty residents voiced concerns about the lack of consultation with the community regarding the decision to evacuate, the lack of consistency of warning and evacuation messages, the paucity of existing flood information available to the community and the manner in which evacuations were conducted. As a solution to these problems the SES resolved to establish a working group of community members to review the Local Flood Plan and to develop flood education material specific to Eugowra. It was also made clear that the community genuinely wanted increased ownership of the management of their flood problem by being involved in the planning process.

The Planning Process

Shortly after the public meeting a project plan to begin the review of the flood emergency planning for Eugowra was outlined, with input from key SES personnel. It was essential that the process engaged with the community. A communication and consultation strategy was devised in a process that reflects an 'hourglass' type model. At the top of the hourglass feedback was sought from the community on a broad scale (i.e. through the initial public meeting) on how the flood emergency plan review could incorporate their concerns and represent their needs in a flood. In the middle, or the narrow part of the hourglass, this information from the community was taken onboard and addressed in a smaller setting through the establishment of a community-based

Flood Emergency Planning Committee which included seven community representatives. The Flood Emergency Planning Committee was responsible for developing the draft plan through undertaking the planning process. At the end or at the bottom of the hour glass the draft plan was presented back to the community at a public meeting for consultation and agreement. The planning timeline is outlined in Figure 3. In total two community meetings and four meetings of the Flood Emergency Planning Committee were held. Consultation also took place within the frameworks of the Local Emergency Management Committee, at which all key emergency management agencies are represented and the Floodplain Risk Management Committee.

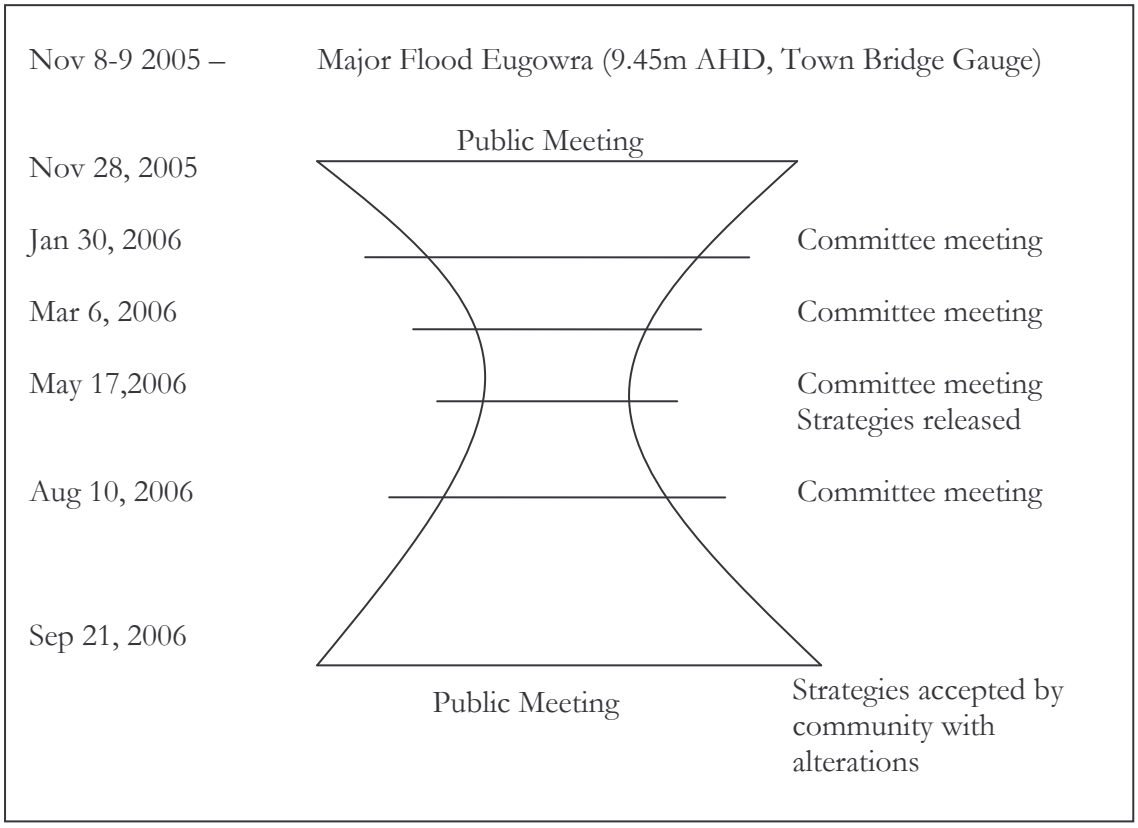

Figure 3 Hour glass model of Community Consultation in Emergency Planning

The first two meetings of the Flood Emergency Planning Committee focused on project planning, understanding the risk and developing strategies and arrangements. Outcomes of these meetings led to the development of a draft plan, which was presented to the committee at its third meeting for discussion. As a consequence of the meeting some alterations were required and a fourth meeting was held to gain acceptance by the committee before consulting with the wider community at the final public meeting. The final public meeting altered strategies slightly to incorporate some of the issues that the broader community wanted and how they were likely to behave. Even though the strategies changed from what the Flood Emergency Planning Committee presented at the meeting, the altered strategies were accepted by the community and adopted at the meeting. The Plan was then tabled at the Local Emergency Management Committee for endorsement as a Sub-plan to the Cabonne Shire Local Disaster Plan.

To ensure that the Plan is workable, Standard Operating Procedures were developed by the SES to articulate, emergency services' procedures for how specific tasks outlined in the Plan should be undertaken. Pre-written flood bulletins used by the SES to

communicate locally based flood safety advice and warnings were also reviewed to account for the updated arrangements contained within the Plan. An exercise will soon be conducted to test the Plan and to ensure that all stakeholders are aware of their roles and responsibilities. Furthermore, a locally-based flood education program is being developed, with brochures detailing Local Flood Plan information to ensure that the entire community is aware of the flood risk and the Plan's arrangements.

Additional Benefits

The process to review the Local Flood Plan also generated interest in the floodplain risk management process specifically with regard to reforming the Cabonne Shire Floodplain Risk Management Committee and revising the flood study and floodplain risk management study and plan for Eugowra. This in turn will assist the SES and other emergency services in managing future operations.

Lessons learnt

A transparent planning process that is essentially driven by the community ensures that community members are well aware of the risks of an emergency (flood) and what the arrangements are in times of this emergency. Involving key community members in planning committees shapes the strategies to deal with risks and tailors these strategies to the community's needs and wants. By going through this process, an emergency plan becomes truly owned by the community at risk and the Plan reflects the likely behaviour of the community. By being proactive and ensuring holistic planning is undertaken should improve flood response for future events.

Conclusion

Emergency planning for flooding is crucial to ensuring an effective proactive emergency response to flooding when it occurs. It is important to ensure that planning is conducted within the legislated framework as well as having a process that is established and well understood by all stakeholders. Communication and consultation are essential in achieving ownership of flood emergency plans by all stakeholders especially the community. Ownership of flood emergency plans ensures that stakeholders are more likely to respond to floods in accordance with strategies and arrangements detailed within the Plan.

Acknowledgements

The authors wish to thank Philip McNamara, Greg Slater, Angela Toniato, Belinda Davies and Neil Pfister of the SES for their comments regarding this paper.

References

Australian Bureau of Statistics (2001) Census of population and housing. Australian Government, Canberra.

Bureau of Transport Economics (2001) Economic Costs of Natural Disasters in Australia. Bureau of Transport Economics, Report 103.

Coates, L. (1999) Flood Fatalities in Australia 1788 -1996. Australian Geographer, Vol. 70, No. 3, pp 391-408.

Federal Emergency Management Agency (1996) Guide to All-Hazard Emergency Operations Planning. Available online at: http://www.fema.gov/plan/gaheop.shtm.

Leigh, R. and Gissing, A. (2006) How many flood prone properties are there in Australia? Paper presented at: 46th Annual Floodplain Management Conference, Lismore.

New South Wales Government (2005) State Disaster Plan. New South Wales State Emergency Management Committee, Sydney. Available online at: www.emergency.gov.au.

New South Wales Government (2001) State Flood Plan. New South Wales State Emergency Service, Wollongong. Available online at: www.ses.nsw.gov.au.

Standards Australia (2004) AS/NZS 4360:2004 Risk management. Sai Global, Sydney.

Attachment A

Considerations when planning for specific functions

Property Protection	Rescue	Resupply
○ Identification of property requiring protection, including the identification of critical infrastructure which may require protection ○ Identification of triggers for property protection ○ Identification of resources available to conduct property protection ○ Identification of timeframes available for conducting property protection ○ Identification of strategy for conducting property protection (Barrier (eg sandbagging) and/or lifting or removal of goods) ○ Identification of logistics support for property protection. Barrier method – sources of sandbags, sandbagging machines and sand. Removal method - identification of transport, storage facilities, management of storage facilities and security of storage facilities	○ Identification of command and control arrangements ○ Identification of areas likely to require rescue (note: high risk will apply to low flood islands) ○ Identification of the potential number of people likely to require rescue, including any special needs groups ○ Establishment of rescue sectors (likely to be based on evacuation sectors) ○ Identification of triggers for the pre-deployment of flood rescue resources ○ Identification of shelters of last resort capable of acting as assembly points for rescue operations ○ Identification of accredited rescue units and resources available ○ Identification of areas suitable as staging areas, including areas suitable for the landing of aircraft ○ Identification of likely drop-off points where rescued persons can be transferred to evacuation centres or hospitals ○ Likely resources required at drop off points eg. transportation, registration and ambulatory care ○ Identify logistics support requirements for rescue resources ○ Identification of arrangements for the registration of rescued persons	○ Identification of command and control arrangements ○ Identification of areas likely to require resupply ○ Identification of the number of properties and people likely to require resupply ○ Identification of any special needs groups requiring resupply ○ Identification of resources available to conduct resupply ○ Identification of key access routes ○ Identification of when areas are likely to become isolated and require resupply ○ Identification of the likely duration of isolation ○ Identification of where the community and/or properties normally purchase supplies ○ Identification of the most suitable method of transport to deliver resupply items ○ Identification of loading points for resupply items ○ Identification of distribution points for resupply items

Considerations when planning for specific functions

Evacuation	Warning
o Identification of command and control arrangements o Identification of areas requiring evacuation o Classify floodplain using floodplain classification descriptions o Identification of the number of people needing evacuation o Identification of any special needs groups o Consider risks of evacuating. Is evacuation the best option. o Identification of resources available to conduct evacuations o Establishment of evacuation sectors o Identification of sector control arrangements o Estimation of time available to conduct evacuations o Estimation of time likely to be needed to complete evacuations o Identification of evacuation triggers and completion restrictions, including the closure of evacuation routes o Establishment of evacuation priorities o Identification of warning strategies o Identification of transport strategies o Identification of suitable evacuation routes and traffic control arrangements o Identification of suitable evacuation shelters outside the PMF boundary o Identification of arrangements for registration of evacuees o Identification of arrangements for security of evacuated areas o Identification of considerations for the return of evacuees	o Identification of command and control arrangements o Identification of existing warning systems o Identification of warning timeframes o Identification of warning clients for varying magnitudes of flooding, including the number of properties and people o Identification of any special needs groups o Identification of resources available to conduct warning o Establishment of warning priorities o Identification of arrangements for the interpretation of warnings o Identification of arrangements for message construction o Identification of arrangements for warning communication including identifying potential methods of communication o Establishment of warning sectors for the communication of warnings (likely to be based on evacuation sectors) o Considerations for doorknocking