

# THE ROLE OF THE NEW SOUTH WALES STATE EMERGENCY SERVICE IN FLOOD MANAGEMENT

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## Introduction

The organisation that has become the New South Wales State Emergency Service (SES) was formed nearly 50 years ago as a direct result of flooding. A number of catastrophic floods in the late 1940s and the 1950s had caused dozens of deaths, massive damage to public and private property, and severe and repeated disruptions to community life. In response, the State Government decided that an agency was needed to coordinate community reactions to the flood threat and to protect and sustain communities during and after flood events.

However, the SES's actual role in flood management was for many years, only vaguely defined, and it was mostly interpreted to mean the management of floods **as they occurred**. That is, the SES's activity was concentrated mostly on emergency response, and on training to support emergency response activities. Those real-time response activities include the:

- provision of flood warnings,
- conduct of evacuations,
- rescue of people from flood waters,
- resupply of people who have been cut off,
- preparatory work to mitigate property damage, and
- provision of information and advice to communities under the threat of flooding.

In recent times, the role of the SES has broadened beyond this to include an even wider range of activities relating to flooding and its management. One of the major motivations for this expansion in role was the passage in 1989 of the State Emergency Service Act, which formally designated the SES as the State's combat agency for flooding. This new status, and a uncomplimentary review of the SES in 1989, forced the Service to think about the ways in which it discharges its duty as a combat agency. Nowadays, while the SES's focus remains squarely on assisting communities **during** floods, the Service is much more active than it used to be in the 'prevention' and 'preparation' phases of emergency management. The SES gets involved in the decision making process regarding the use of flood-labile land and the development of flood mitigation measures, it participates in the development of improved warning systems and it develops, exercises and reviews local flood plans. A lot of work has also been done recently in community flood education.

The principle aim of this paper is to discuss some of the ways that the NSW SES is enhancing its role in relation to the prevention and preparedness phases of flood management. The Service's work on enhancing the quality of its flood warnings, however, is dealt with in another contribution to this conference (Pfister and Rutledge, 2002).

## Developing expertise in flood management

The principal responsibility that comes with combat agency status is that the agency become expert in the management of 'its' hazard. There are many means for a combat agency to develop and enhance its expertise in emergency management, including the experience gained from managing actual events. However, real-time involvement in response activity is

not enough by itself and so SES personnel are encouraged to develop their flood management expertise outside actual flood-time. Participating in the flood planning process and being trained in relevant field skills and emergency management principles help develop this expertise. Forums to provide information and to promote discussion on aspects of flood management are also organised. These take the form of regular regional conferences of SES members and less formal meetings with small, locally based planning teams. Post-flood debriefs are also conducted and public meetings are held to capture lessons and to learn from mistakes.

One of the key tasks of a combat agency is to provide leadership in defining 'best practice' in the management of its designated threat and to provide resources to encourage its achievement. Some time ago, the New South Wales SES took the lead in developing a set of national guides on various aspects of flood management (Emergency Management Australia, 1999a, 1999b, 1999c). The SES has sought to ensure that the contents of these guides are promulgated and used. The SES takes the view that, as the flood combat agency, it must be an effective custodian of the knowledge applied to the emergency management aspects of the hazard. Furthermore, it must ensure that it keeps abreast of, and contributes to, developing practice in this field. This extends to carrying out research on particular problems as they arise. A recent example in New South Wales related to the problems of motivating and organising a large-scale evacuation of the levee-protected town of Grafton in March 2001 when, for a time, the overtopping of the levees looked likely (Pfister, 2002). Other work of this kind has included:

- Assessing the merits of new technologies which may be used to warn of developing floods (Molino et al, 2001);
- Promulgating improved warning procedures (Keys, 1997; Opper and Rutledge, 1999); and
- Defining an appropriate means of incorporating emergency management considerations into consent authorities' decisions relating to the development of flood liable land (Keys and Opper, 2001).

The SES does not stand alone in discharging its role as the combat agency for flooding. It is integrated into a larger multi-agency emergency management system. Also, given that the SES's role is not confined to just the response to a particular event, it has to be networked into the wider management of the hazard. This is the case even when other agencies have the lead role for some elements of that management. Accordingly, the SES believes it must be able to advise agencies with responsibilities in floodplain management. In so doing, it needs to deal with local government, the Department of Land and Water Conservation, PlanningNSW and the Land and Environment Court. Likewise, the SES must be able to communicate with and advise the Bureau of Meteorology and the Flood Warning Consultative Committee on matters relating to flood prediction and the warning process. It also liaises with dam owners and the Dams Safety Committee on issues relating to potential dam failure and it must be able to deal with the Department of Community Services as the deliverer of welfare services during flooding. The SES also interacts closely with relevant consultancy and research organisations and with other emergency services; the latter in the context of regular meetings of emergency management committees at the local, district and state levels. The flood combat agency has a high degree of common cause and shared interest with all of these organisations.

To enable the SES to provide the leadership and participation described above, it requires policy, information systems and a program of strategic management. The following paragraphs highlight some of the SES's activity in these areas.

## **Flood intelligence**

Section 12 of the State Emergency Service Act 1989 states that "The Director-General is to arrange for the collation, assessment and public dissemination of information relating to floods, storms and tempests." To comply with this direction, the SES has developed an information system that stores information on the effects of flooding in NSW; this is called flood intelligence.

Flood intelligence is the product of a process of gathering and assessing flood related data to enable emergency managers to determine the extent of actual or likely effects of flooding on a community. It assists flood response managers to determine (from predicted flood heights and an understanding of community needs and characteristics) the actions to be taken by emergency response agencies. Flood intelligence also provides the basis for the information and advice to be provided to an 'at risk' community to stimulate actions which individuals need to take to protect their own property and personal safety.

The intelligence process consists of the collection, collation, interpretation and dissemination of flood related information. Material of every description that is associated with past and potential floods is collected, collated and assessed for accuracy and reliability. It is then interpreted to produce useful information (flood intelligence) which is disseminated to flood planners and response managers. Because of the vital role of flood intelligence, the SES has placed considerable emphasis on augmenting its flood intelligence system in recent times.

Flood intelligence resides in two main forms. Intelligence that is related to heights on a river gauge - that is information that relates gauge heights to known effects within a gauge's reference area - is stored in the form of flood intelligence cards in the SES's flood intelligence database. General information about the historical and potential effects of flooding over a wider area is recorded in a textual form in annexes to the Local Flood Plans.

Flood studies and floodplain management studies are good sources of flood intelligence and information gleaned from them will often form a basis for an appreciation of the flood threat. However, a thorough appreciation of the flood threat also depends crucially on the experience and knowledge of local people. Many of the SES volunteers have lived in their local communities for decades and have directly experienced flooding. This first hand knowledge is often very detailed and contextualised in the interaction of the community with the flood threat. An unfortunate constraint of local, first hand knowledge, however, is its limitation to a relatively short-time frame and often, as the result, the experience of frequently occurring low-level floods rather than the more severe but infrequently experienced ones.

The SES has also recently been investing in integrating flood intelligence with Geographic Information Systems. It has been building up historical and modelled flood inundation layers, when and where the necessary data is available, and using them to examine and display the interaction of flood waters with urban development and infrastructure.

The SES Flood Intelligence System is currently being ported to the Internet as a component of SES Online. The utilisation of Internet technology enables registered SES users at the local level to interrogate the centrally held flood intelligence and to suggest enhancements and amendments to the intelligence on-line. Web-enabling the GIS component of the flood intelligence system is also being actively pursued.

Flood intelligence forms the basis for decision making during flood responses by the SES. It is applied to decisions relating to warning, evacuation, property protection, resupply and the

provision of information and advice to community members. The central role of intelligence in the decision-making process is incorporated into the flood plans, making the plans themselves into 'records of intended proceedings' which should prompt previously considered actions when floods are rising. A thorough appreciation of the local flood threat underpins the entire flood planning process.

### **Local flood plans**

Another legislative requirement for the NSW SES relates to planning. Section 12 of the State Emergency Service Act 1989 also states that "The Director-General is required to undertake such planning and make such preparations as the Director-General thinks fit for the purpose of enabling the Director-General's functions under this act to be exercised in the most effective manner."

Over the last 13 years, the SES has been heavily involved in the development of plans to deal with the effects of flooding. There is now a Local Flood Plan for each local government area in the State that has an appreciable flood threat. In effect, this means the vast majority of council areas in the State (the SES currently maintains 153 local flood plans in NSW). Each local flood plan addresses all flood threats relevant to the local area. This includes floods from rivers, creeks and lakes. Where appropriate, they also cover flooding caused or exacerbated by dam failure. In coastal areas, the plans also cover flooding from storm surges, as well the threat of erosion from surges.

With first generation plans in place for most local areas, the SES is currently reviewing the earlier plans to bring them in line with current 'best practice' planning principles thus making them more useful. The review process is being coordinated by professional planners at SES state headquarters, but most of the substantive work is done at the local level with the input of SES divisional staff and local SES volunteers. This local involvement is vital for two reasons.

The first reason relates to ownership. The first round of plans were not always recognised by volunteer members of the SES as being useful, and as a consequence they were not necessarily **used** effectively when floods occurred. One of the reasons for lack of acceptance may have been that local members were not sufficiently involved in the plan-preparation process. Their limited involvement translated to a lack of commitment to their implementation and use during floods.

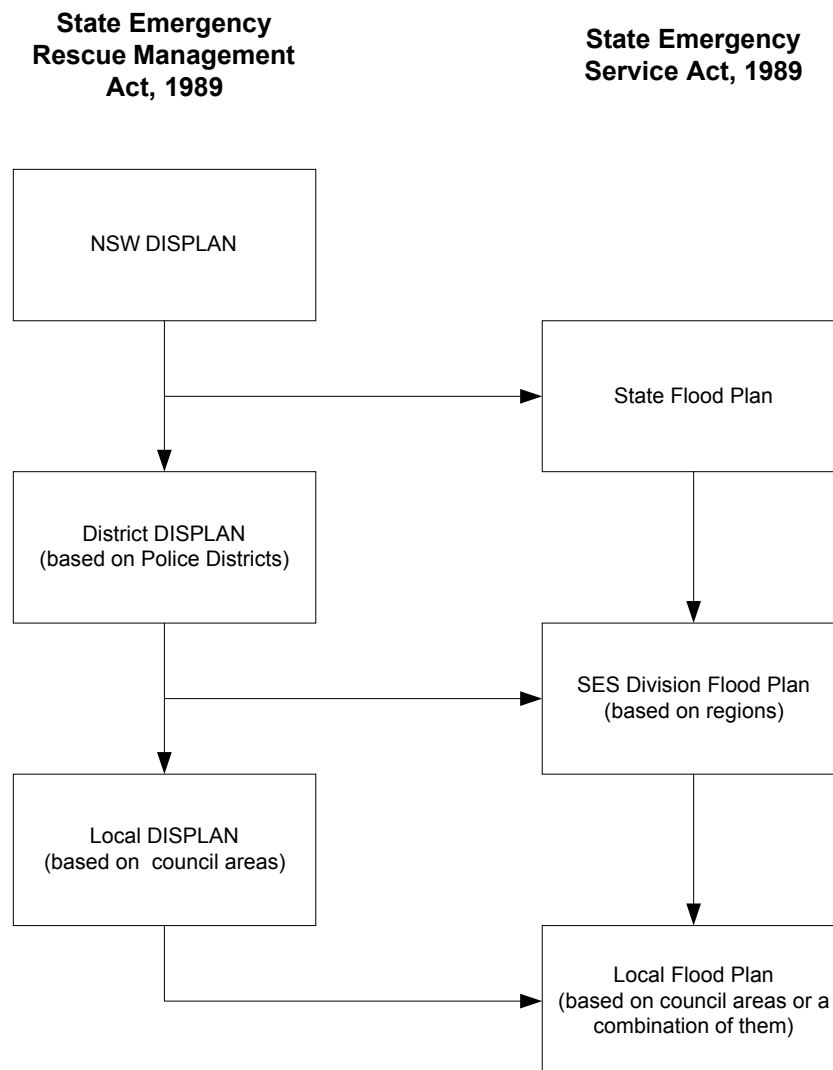
The response to flooding, of course, is not just the responsibility of the SES. Almost all floods will require the support of a number of other emergency service and support agencies. It is during the flood planning process that the roles and responsibilities of the other players at a local level are negotiated. Typically, a local flood plan sets out the responsibilities during floods for the:

- NSW SES;
- NSW Police;
- NSW Fire Brigade;
- NSW Ambulance Service;
- NSW Rural Fire Service;
- Volunteer Rescue Association;
- local council;
- Bureau of Meteorology;
- infrastructure and service providers;

- other NSW government agencies such as the Department of Community Services, the Department of Education and NSW Agriculture; and
- local clubs and service organisations and, in some cases, businesses.

Flood plans are sub-plans of the legislatively based hierarchical framework of disaster plans (DISPLAN) at the state, district and local levels (Figure 1).

## HIERARCHY OF PLANS



**Figure 1 - Hierarchy of NSW Emergency Plans**

The major roles of the main NSW government agencies are spelt out in the NSW State Flood Plan. During the local flood planning process, these roles can be and often are expanded upon at the local level.

Another planning-related area is that of flood exercises, whereby the combat and support agencies are able to practise their responsibilities in simulated flood scenarios. Some work has been done here but the task is a large one with so many communities having serious flood problems. Given the lengthy periods that can occur without significant flooding in any river

valley, frequent and thorough exercising should be a high priority to maintain agency readiness.

### **Floodplain Management**

Until the early 1990s, the SES had played little part in floodplain management. The SES was rarely asked about flood prone land development or about the development of mitigation measures. This has changed, however, as agencies have sought input from the SES regarding the emergency management implications of floodplain development and mitigation measures. This has had significant ramifications for the SES, which has to not only react to these demands for input but has also had to provide resources to ensure those demands can be met effectively. In addition, the SES has had to develop a body of principles or doctrine to guide its input. Along the way the SES has sought to have local volunteer input available to council sponsored Floodplain Management Committees and has tried to ensure that public safety and property protection issues are properly dealt with in line with the provisions of the NSW Floodplain Management Manual. All this has been done 'on the run', with cases building up principles and the principles being tested in the Land and Environment Court via the appeals process.

Some specific matters which have arisen as the SES has become more involved in floodplain management issues should be elaborated upon. One relates to the initial tendency for council officers, needing advice on particular Development Applications, to seek it from Local Controllers of the SES. Local Controllers are exclusively volunteer emergency managers whose local expertise does not necessarily encompass the complex specialist field of strategic floodplain management. The SES, recognising the need to protect its volunteers from the likelihood that their advice could draw them into conflict between development interests and/or councils and the equally important need to ensure that councils always receive the best advice, sought to discipline the process. Now, Local Controllers are directed to refer requests for advice relating to developments to their SES Division Headquarters. This ensures access to the necessary expertise, appropriately distanced from particular cases under examination but still in close contact with other relevant government agencies. State Headquarters officers involved in particular cases are required to consult the relevant Division and Local Controller and to incorporate them in the advising process.

The focus of the SES's participation in the process is the public safety dimension of land use management decisions. A particular issue, which has frequently arisen, relates to the loss of roads during floods. Isolation by itself may seem to create only a small danger, but the problem can escalate quickly if people become ill, or if telephone, power and sewerage services fail, or if inundation occurs above the floor levels of dwellings. In such cases there will be increased demands for rescue or requirements for evacuation which have obvious public safety ramifications and which will create difficulties for the SES, which must resource the necessary operations. The severity of these problems is most clearly apparent in the trend for rural residential subdivisions. If left unchallenged, this growth could see significant expansion of populations on floodplains, with egress routes prone to being cut and with a local SES unit facing big increases in demand for rescue services during serious floods. There is generally no guarantee that road access conditions to such areas will be improved (for example, by raising low points at which closure occurs) or that the SES will be able to grow to meet the increased level of demand for it to act to save lives and property.

One key element of debates about whether or not flood prone land should be made available for residential purposes is the notion that people wanting to live on such land should be

allowed to do so provided they have an 'evacuation plan'. The SES has argued against such plans on the grounds that:

- they do not meet the Land and Environment Court's strictures about 'permanent, fail-safe and maintenance-free' threat-minimising measures being applied;
- there is no guarantee that such plans will be fit or will be kept fit for their purpose over the sometimes long periods which elapse between floods; and
- there is every possibility that private evacuation plans will be prepared solely for the cynical purpose of gaining development consent.

Because of these failings, the Floodplain Management Manual discourages the use of such plans in the development application process. However, the SES believes that proper community flood preparedness demands that people living on floodplains should know what steps they need to take to manage the impacts of flooding on them and their property. This includes understanding that evacuation may be one such step and comprehending how and under what circumstances an evacuation should be undertaken. Private flood plans are encouraged but not for supporting Development Applications in areas that are otherwise unsafe to develop due to the flood risk.

SES involvement in floodplain management matters also includes officers participating in discussions, including public meetings, in which councillors are briefed and educated about the principles of floodplain management in the context of their legal responsibilities as decision makers. In these discussions the SES is duty bound to note that it is not a rescue service devised for the purpose of covering up for inappropriate developments and somehow making them sound. A site which flooding makes dangerous for a particular kind of land use, even only occasionally, is dangerous with or without an SES unit whose presence and actions must not be seen as a palliative for poor decisions. Likewise a privately-written, property-specific flood evacuation plan does not alter the facts about a dangerous site.

None of this should be taken to mean, incidentally, that the New South Wales SES is opposed to development on floodplains or that it wishes to sterilise land simply because it could be flooded. What the SES seeks is development which is **appropriate** in public safety terms and permitted only after a process that has consciously considered the risks to that safety. This is surely preferable to allowing floods well below those of probable maximum flood (PMF) proportions to prove the folly of ill-advised developments – perhaps by resulting in the deaths of people who thought they were safe. People living in newly developed areas should be able to know that they are residing in a safe environment.

Paid SES flood planning staff have increasingly been involved in floodplain management matters including those related to consent decisions. Volunteer SES members have also had an enlarged role and are now regularly invited to sit on council-sponsored Floodplain Management Committees. In this context, the SES also seeks to steer floodplain management consultancies into providing data that is relevant to flood plans. In the same forums the SES raises issues relating to the provision of warning systems and services and to the difficulties posed by the need to mount evacuations when floods occur. A particular case in point relates to the valley of the Hawkesbury-Nepean River where thousands of people could be trapped and their homes inundated by flood waters after the evacuation routes have been cut. This is in floods with return periods of only a few decades. In this case, a multi-million dollar government program has been established to raise evacuation routes, improve warning processes, facilitate the development of flood plans, raise the level of operational capability of the SES and ensure that community members are aware of the need for periodic large-scale evacuations and ready to take part in them.

## **Educating community members about flooding**

It is probably self-evident that people who understand the environmental threats they face and have considered how they will manage them when they arise will cope better than those who lack such comprehension. It is, perhaps, not so well appreciated that many people who live and work in flood liable areas have little idea of what flooding could mean to them. This is especially the case with large floods that are beyond the experience of most locals, or if a long period has elapsed since flooding last occurred.

The SES, as the combat agency for floods, has a responsibility to raise the level of flood consciousness and to ensure that people are prepared for flooding. In other words, flood-ready communities must be purposefully **created**. Furthermore, their flood-readiness has to be maintained and enhanced. Local government councils also have a responsibility to assist the SES in this task and this is reflected in SES Local Flood Plans.

Flood-ready communities are communities whose people will be capable of responding appropriately and in timely fashion to warnings – which might include stocking up on food and other essentials, raising or transporting commercial stock and household belongings out of harm's way, or evacuating by safe routes. Timeliness of actions must be stressed here, which in many situations means that people need to be carrying out their harm-reducing responses well before floods have begun to arrive in their vicinities. For this to be possible, people must be able to have trust in the warning services being provided and in the competence of the SES to lead their responses. The goal, incidentally, is not simply one of raised awareness of people but rather the achievement of commitment to actions appropriate to the nature and severity of a coming flood.

None of this is easy to achieve, and it has probably not been fully achieved in any flood liable community in Australia. Public education about environmental threats, about how agencies deal with them and about how people should act before, during and after the impact of these threats, is for most hazards still in its infancy in this country. This is but one more legacy of the response bias in traditional Australian emergency management.

Things are changing, however. The New South Wales SES has employed specialists in social marketing to develop and deliver flood education campaigns, and there has been considerable work done to develop appropriate conceptual frameworks (Young and O'Neill, 1999). Community education campaigns have been timed to coincide with the anniversaries of severe floods. Some examples include the forty-year anniversary of the devastating Hunter Valley flood of 1955, the fifty-year anniversary of the 1949 Macleay River flood and the ten-year anniversary of the 1991 flood in Inverell. Most recently, the SES has been involved in 'flood awareness weeks' to capitalise on the first anniversary of last year's floods in the Tweed Shire, in Lismore, Grafton, Maclean and the other Clarence River communities and in the Bellinger and Kempsey areas.

These commemorative activities have been multi-media events in the true sense of the term and they have featured:

- public meetings to discuss floods, flood plans and flood management strategies;
- large numbers of radio interviews and newspaper articles on similar themes;
- the production of flood videos;
- the displaying of flood photographs and other flood memorabilia;
- guided tours to inspect and explain local flood mitigation systems and other initiatives;



- street parades featuring flood response agency personnel; and
- school projects with flood themes.

A central element of the SES's flood education work has been the production of 'FloodSafe guides', which are customised brochures addressing flooding in a local context. The FloodSafe guides are a natural outgrowth of the flood planning process, which produces much of the content and ensures that it is locally relevant. The FloodSafe guides, shown in Figure 2, give a brief outline of the nature of the flood problem in the area. They include, where appropriate, key gauge heights at which, for example, levees are overtopped or evacuation routes are cut. They also incorporate information on flood warnings and their meaning locally, describe methods of protecting belongings, identify evacuation routes and centres, provide important phone contact numbers and indicate where people can obtain additional, more detailed information. Within the obvious space limitations, the guides also contain relevant maps and local photos (where possible incorporating local landmarks). Most of the guides are double-sided A4 in size, folded down to a standard DL format for delivery. However, the SES has produced some detailed A3 guides for areas with particularly acute flood problems which will necessitate large-scale evacuations.

What should we do if we have to evacuate?

- Place moveable belongings on tables, beds and benches, with electrical items on top
- Gather up medicines, financial documents and personal items (including mementoes and photo albums) and take them with you
- If possible, check to see if your neighbours need help
- Listen to a local radio station for information
- Take three days' supply of clothes for each person
- Take your pets with you. AgricultureNSW will arrange for their care if necessary
- Turn off the electricity and gas
- Make your way to the evacuation centre: the SES will advise where this is
- Contact the SES on 132 500 if you need transport or other help
- When evacuating, avoid entering flood waters if possible. Driving and walking into floods are major causes of death during times of flooding



Keep this guide handy and refer to it when you hear a flood warning for the Macleay River

Where can I get more information?

The Kempsey Shire Local Flood Plan is available in all council libraries. It describes the arrangements that guide responses to flood emergencies in Kempsey.

The SES and Kempsey Shire Council can provide information on how to protect yourself and your property from floods.

FOR EMERGENCY HELP IN FLOODS AND STORMS, CALL THE SES ON

132 500

Kempsey SES	6562 2228
Kempsey Shire Council (office hours)	6562 6077
Police	000
Ambulance	000

Better FloodSafe than Sorry!

This brochure has been prepared for your protection by the State Emergency Service and Kempsey Shire Council.

FloodSafe in Central and West Kempsey







### What is the flood problem here?

- Unfortunately, much of Kempsey is built on a floodplain and severe flooding is possible despite the levees
- A flood of 6.15 metres at the Kempsey Traffic Bridge gauge will cause water to flow over the Eden St levee and cause the CBD to fill rapidly
- Properties south of Eden St are threatened before water flows over the Eden St levee
- The 1949 flood, which reached 7.92 metres at the Traffic Bridge gauge, flooded all of central Kempsey and the much smaller 2001 flood almost did the same thing
- Low-lying parts of West Kempsey begin to be flooded at about 7.0 metres, which is about the peak height reached in March 2001
- More severe floods than the 1949 one are possible

### How will we know when a flood is coming?

- Bureau of Meteorology flood warnings will be broadcast over ABC Mid North Coast Radio, 2MC/ROX FM and TANK FM
- Listen to one of these stations for information. It is wise to have a battery powered radio and fresh batteries in case the power fails
- Flood warnings will give actual current heights at various upstream gauges and predicted heights at the Kempsey Traffic Bridge gauge. The SES will indicate the likely consequences at the predicted heights and advise appropriate actions for residents and business people



Map showing the estimated extent of the 1% flood (similar to the 1949 Flood)

### What can we do to be ready?

- Prepare a family or business flood plan. This plan should indicate which items need to be raised or relocated and what you will need to do if you have to evacuate. The SES can provide information to help you prepare your plan
- Put your plan where you can be sure to find it when a flood is approaching

The key to being ready is recognising the danger and knowing what you can do to manage it. This includes realising that evacuation may be necessary in the more severe floods.

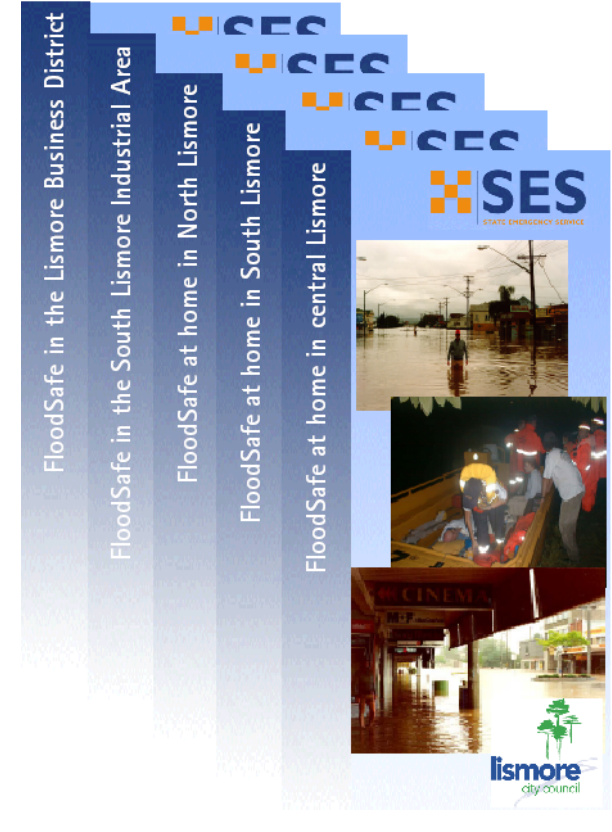
Figure 2 - An A4 FloodSafe guide

To make sure that relevance for the local community is maximised, the guides are tailored to relatively small areas. In Lismore, for example, five separate brochures were produced - one each for the North, South and central Lismore residential areas; one for the South Lismore industrial area and one targeted at the CBD businesses. In the Macleay River valley, six separate brochures have been produced (Figure 3). Several different means of distributing the guides have been trialed across the state. To date FloodSafe brochures have been published for several dozen different communities in NSW. This number will increase in the future as flood plan reviews are completed; it is the flood planning which produces much of the information which is contained in the brochures.



Figure 3 - FloodSafe brochures for the Macleay Valley

Recently, the SES has been trying to ensure that the brochures have reached every household for which they are relevant. They are distributed directly to households, sometimes as an enclosure with free local newspapers and sometimes as direct letterbox drops. On several occasions, as part of an integrated flood education campaign, the SES has taken out press advertisements to alert the public to their impending distribution. The aim is to make sure that the recipients do not perceive the guides as junk mail and discard them without reading them or realising their significance (Figure 4). Due to financial and resource constraints, the SES has not yet been able to conduct formal audits to assess the effectiveness of these guides and of other public education initiatives. Outside of the strategically framed Hawkesbury-Nepean public education campaign, community education efforts have so far been on an opportunistic basis. The SES has concentrated its efforts and funds on getting the messages out rather than assessing the effectiveness of that work, though this will change when the appropriate funding is achieved.



### SES FloodSafe guides on their way

The State Emergency Service has prepared a series of FloodSafe guides for Lismore.

The brochures are targeted to specific areas. They have information on the nature of the flood threat and advice on what residents, business people and workers can do to protect themselves, their families and their property against floods.

The FloodSafe guides will be distributed to each property in the flood-liable parts of Lismore during Flood Awareness Week. You should read yours carefully and keep it handy for the next time that flood waters are heading our way.

**Figure 4 - Advertising FloodSafe guides**

### Future directions

Except for real-time response activities, the role of the New South Wales SES is quite different today from what it was a decade ago. The SES now seeks to play a larger part, particularly in relation to the prevention and preparedness functions, than previously. To do this it has become much more engaged with the efforts of other agencies than it once was. This work has helped greatly in increasing the expertise of SES members in flood management and must improve the quality of the work done during actual flood operations.

Much progress has been made over the last ten years in flood planning and floodplain management endeavours and some gains have also been achieved in the field of flood education. However, there is still a lot more work remaining. Flooding is Australia's most costly, but at the same time most manageable, environmental threat (Bureau of Transport Economics, 2001). It is important that we invest heavily in the mitigation of the damage which flooding does, not only by building structures like levees but also by building knowledge that helps people to combat the threat and agencies which can plan and exercise effectively to ensure that the costs which floods wreak can be better contained.

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