TOWARDS BEST PRACTICE IN FLOODPLAIN MANAGEMENT: AN EMERGENCY MANAGER'S PERSPECTIVE

INTRODUCTION

Best practice in the field of Floodplain Management in New South Wales is currently recorded in the 1986 Floodplain Development Manual. In many ways this was a document ahead of its time. It is fair to say that floodplain management was initially the preserve of engineers and relied heavily on structural mitigation measures. As it developed, it also took into account planning and zoning measures primarily aimed at mitigation in future developments. By the time the Floodplain Development Manual was produced, its authors quite clearly saw the need for a third group of measures to be brought into play - they were emergency management measures such as warning systems, evacuation arrangements and various forms of contingency planning. At that stage though it was also fair to say that emergency managers were not leading this movement.

Over the last six years the State Emergency Service in New South Wales has developed significant expertise in the field of flood planning. It has also developed a relatively more sophisticated understanding of how it can contribute to an integrated system of floodplain management and what 'best practice' in this field might be. This paper will suggest what best practice might be from an emergency manager's perspective and how it should assist communities prepare for their next flood event.

HOW BEST PRACTICE MIGHT BE RECORDED

It's a pity that neither Jim Bodycott nor Neil Benning are presenting papers at this conference. Both are active in developing best practice in this field and both gave presentations at a day long briefing session/workshop conducted at the SES State Headquarters on 26 March this year for consultants in the field.

Neil Benning is the team leader of a group of fifteen people from all over the country which is looking at the development of national guidelines on best practice in the field of floodplain management. The group met at the Australian Emergency Management Institute at Mount Macedon in Victoria from 26 to 29 February. It's aim was to start the process of developing the guidelines over the next twelve months or so. The group decided that the manual should be both:

- A guide designed to be adapted by each state and territory into floodplain management manuals, and
- A guide to best practice to facilitate the preparation by government and the community, in partnership, of an effective and comprehensive floodplain management plan.

The group decided that the guidelines would not be a prescriptive document, would not incorporate a cook-book approach and would be a national guide rather than being a document designed for NSW to tell the rest of the country that we do it best. In relation to the last point it would be easy for the document to become a lesson on the way in which we do things in NSW - because there is a strong argument indicating that NSW leads the field in this area.

The national guidelines will probably address the following topics:

- What floodplain management is.
- The linkage between floodplain management and emergency management.
- Floodplain management principles or processes.
- Information needed by emergency managers.
- Information which can be provided by the floodplain management process.
- Responsibilities and accountabilities.
- Review and Improvement.

The whole process of developing and recording best practice in this way is an exciting project for anybody involved in the field.

Jim Bodycott also addressed the briefing session/workshop on 26 March on progress towards updating the 1986 Floodplain Management Manual which he hopes to have reissued next year. He expects the revised manual, amongst other things, to:

- Focus more on management.
- Provide greater detail on the principles.
- Focus on the full range of floods.
- Remove the interim focus from the current manual.
- Include local overland flooding.
- Require an expansion of the floodplain management committee membership.
- Include additional information on the linkages with emergency management.
- Modify the glossary of terms.

DEVELOPMENT OF EMERGENCY MANAGEMENT BEST PRACTICE

During the briefing/workshop the author briefed the consultants on an emergency manager's perspective on how we in the State Emergency Service fit into the overall floodplain management process.

Australia is one of the few countries which have actually recorded its philosophical approach to effective emergency management. It has done so in a very simple document called the

Commonwealth Counter Disaster Concepts and Principles. The approach recognises four concepts which then lead on to a number of common principles.

The underlying concepts are:

- The all hazards approach.
- The comprehensive approach.
- The all agencies (or integrated) approach.
- The prepared community.

The first point to be made is that the document relates to how the community as a whole may address the interaction between any type of hazard and any part of that community. It is not, and was never intended to be, how individual agencies might approach the problem of management of risk or emergencies. However, it must be said that much of what is recorded is applicable to individual agencies, corporations and so on.

The second point is that as far as this paper is concerned it will concentrate on the second concept which is the comprehensive approach. It recognises that there are four elements of emergency management, namely prevention/mitigation, preparedness, response and recovery and advocates the development of emergency arrangements to embrace all of them.

The elements are simply defined as:

- The first element is to **prevent or mitigate** (reduce the severity of) hazard impact.
- The second element is to ensure **preparedness within the community.**
- The third element is to provide an effective **response,** immediately following any hazard impact.
- The fourth element is to provide for **recovery of the community** affected by the hazard impact.

Where does the SES fit in? Under the old State Emergency Services and Civil Defence Organisation Act of 1972 we had a general role of providing for the civil defence of the State and the co-ordination of relief operations in the event of certain emergencies. It must be said that the authors of that act saw considerable strength in vagueness and after a number of years the SES became response orientated to say the least. Some planning was done in relation to the distribution of flood warnings. It is fair to say that the thrust of SES activities was towards jumping into flood rescue boats and rescuing people. It was reactive to say the least.

Two new Acts were passed in 1989. They were the State Emergency and Rescue Management Act 1989 and the State Emergency Service Act, 1989. The first established a new emergency management system in the State and the second made it quite clear where the State Emergency Service fitted within that structure. One way it did so was by making it clear what our functions are. The first of the listed functions is:

> ‘to act as the combat agency for dealing with floods (including the establishment of flood warning systems) and to co-ordinate the evacuation and welfare of affected communities’.

Although being the combat agency is defined in this legislation as meaning that the SES sits fair and square in the response area, the overall function means that the SES must be involved in the preparedness activities and some of the recovery activities.

What is the relationship between what the SES as the flood emergency managers do and what you do as councils in the area of floodplain management?

The answer to this question is driven by the perspective of the person addressing it. Therefore, there are probably a number of answers.

As already suggested, the traditional emergency manager probably classes most of the activities councils are involved in as being part of the ‘prevention’ aspect of emergency management.

Traditionally floodplain management activities have tended to concentrate on prevention or mitigation of the flood threat to a community. To reduce costs, measures have been devised to control floodwaters and to help communities adjust to flooding. These measures were classed as structural or non-structural in nature.

Structural measures are intended to modify the behaviour of flood waters. Examples include the construction of levee banks, mitigation dams and flood retention basins or the conduct of channel improvement works to prevent flooding occurring in particular areas, divert it away from them or reduce its severity. Most such structures are permanent and require the application of engineering expertise from Government departments, Local Government authorities and consultants in the field.

Non-Structural measures have no impact on the floodwaters, but they modify communities to enable them to cope with flooding more effectively. Building restrictions, raising dwellings above the reach of floodwaters, removing buildings from areas of repeated flooding, flood proofing buildings and ensuring that people are aware of the problems which flooding imposes and know what they should do in response are examples. Measures such as these make communities less vulnerable to the effects of flooding rather than reducing the risk of flooding taking place. Most of these measures require the application of town planning expertise from Government departments, Local Government authorities and consultants in the field.

For some time it has been recognised that structural measures will not prevent all flooding in a particular area and that flood liable areas cannot be sterilised by planning controls and restrictions. In many ways the 1986 Floodplain Development Manual was ahead of its time. Although dealing with an evolving high-quality floodplain management process it pointed to the need for a third group of measures to be recognised in the floodplain management process. The author suggests that the **non-structural** measures should now be sub-divided into Planning/Development Control Measures and Emergency Management Measures. This means that a model indicating the floodplain management measures which might be applied might look something like this:

STRUCTURAL

STRUCTURAL	PLANNING/DEVELOPMENT CONTROL	EMERGENCY MANAGEMENT
Flood mitigation dams	Zoning	Preparedness
Levees	Voluntary Purchase	Flood awareness
Bypass floodways	House raising	Predictions
Channel improvements	Flood proofing	Warnings
Detention basins	Building/Development Controls	Control Arrangements
		Expedient mitigation
		Evacuation
		Rescue
		Welfare
		Resupply
		Recovery

This split seems to divide the measures in line with the different types of expertise required. They are Engineering, Town Planning and Emergency Management expertise respectively. It is not suggesting that as councils you need to leave the third area alone. What is being suggested though is a collaborative approach whereby all parties work in parallel to produce floodplain management plans. What that collaborative approach might be and how the plans councils produce might complement the plans we produce is not completely clear in the authors mind.

There is another categorisation of floodplain management measures which is based on an understanding that floodprone communities are exposed to three different types of flood problem -the existing problem, the future problem and the residual problem. This approach states that the existing problem refers to existing properties already exposed to flood risk; the future problem refers to those properties yet to be built but which may be exposed to flood risk if and when they are built; the residual problem refers to the residual risk associated with floods that overwhelm mitigation and management measures already in place. A balanced approach to floodplain management must address all three categories of flood problems.

Although the author has no fundamental problem with this simple categorisation, he does have a problem with the way it is sometimes extended and used. He has seen documents which take a further step and link structural measures exclusively to the existing flood problem and planning/development control measures exclusively to the future problem. This appears to be a limited view of the relationships between the types of flooding problem and the measures which can be applied to deal with them. He therefore has difficulty accepting the notion that ‘different management measures are appropriate to the three problems’. This statement assumes that the categorisation by type of flood problem leads automatically to mutually exclusive approaches to managing each type. This argument is not supported by sound logic.

What is supported is the conclusion quoted from the 1993 Draft update of the Floodplain Management Manual which states:

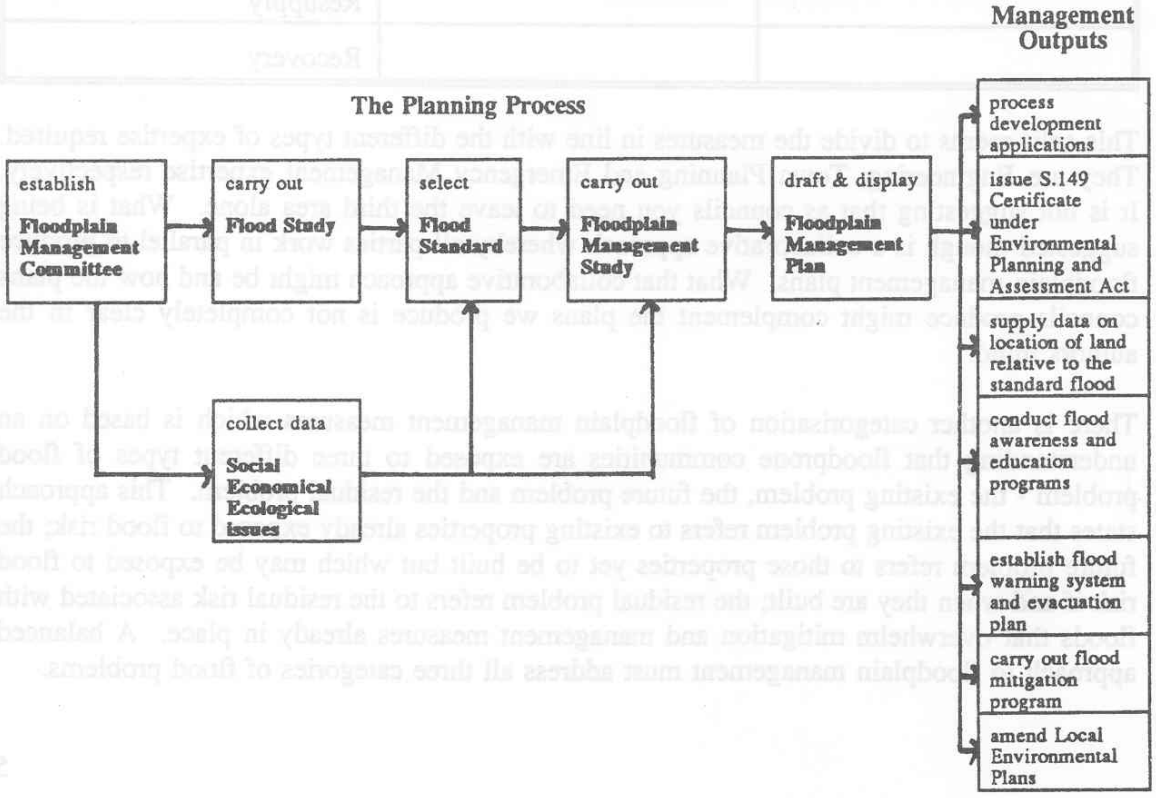
> ‘These days, all three types of flood problems are recognised and need to be addressed individually in floodplain management’.

The relationship between floodplain management plans and the flood plans which the SES develops is not as clear as this implies. What is suggested is that there is a place for two separate documents which complement each other.

THE RELATIONSHIP BETWEEN FLOODPLAIN MANAGEMENT PLANS AND FLOOD PLANS DEVELOPED BY THE SES

The diagram which follows is a slightly simplified version of the one which encapsulates the Floodplain Management System as it has operated in NSW for nearly a decade (NSW Government, 1986). Depicted are the planning process and its outputs, which include the establishment of structural measures, development controls, warning systems and evacuation arrangements and the development of programs to increase flood awareness.

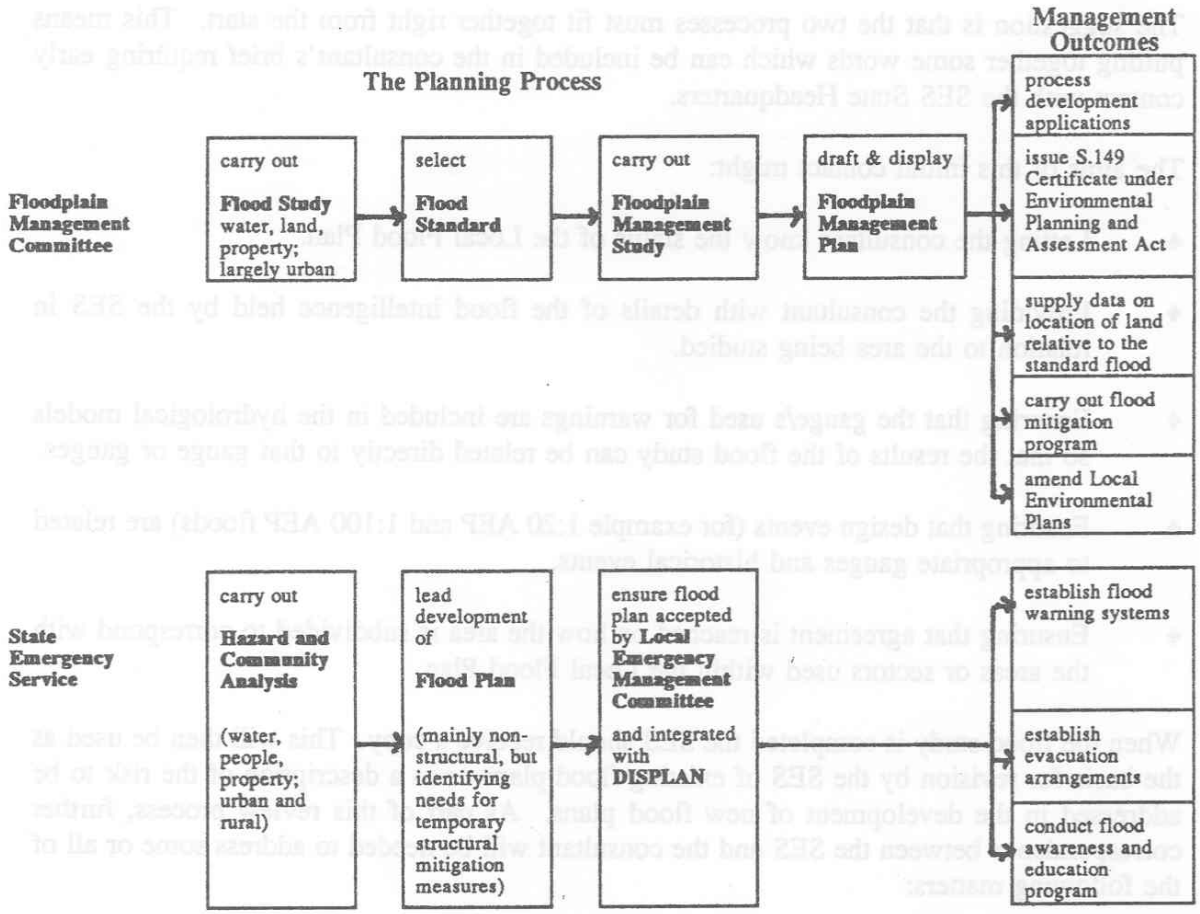
Figure 1: Abridged Version of the Current Floodplain Management System in NSW



With slight changes of emphasis, this diagram could be recast as shown in Figure 2 to provide a more accurate representation of the process as it has recently come to operate. This reformulation suggests that in reality there are two parallel processes. One of these is initiated by a concern with the interaction between land, property and water, for the most pan in flood prone **towns,** and culminates in the carrying out of structural mitigation works and the application of planning (developmental and zoning) tools to guide the future evolution of the urban fabric. This strand incorporates the bulk of the floodplain management task as we have known it in NSW.

The other strand begins with an examination of the flood hazard in the context of the community (including people and their property in towns **and** in surrounding rural areas) and proceeds to the production of a flood plan which deals mainly though not exclusively with non-structural measures - especially the development of warning systems and evacuation procedures and the creation of a community which has a heightened awareness of the flood threat which it faces. This strand focuses primarily on the maintenance of public safety and on helping people to mitigate property damage during actual periods of flooding. Structural works which may need to be constructed as temporary measures when floods are rising are dealt with as part of this strand.

Figure 2: A Modified Version of the Floodplain Management System



This second conceptualisation, it is argued, adds the emergency manager's perspective on floodplain management to those of the engineer and town planner. **It** is driven as much by safety-based intangibles as by property-related matters of tangible damage.

It is important to note that this conceptualisation does not lead to the development of two **independent** strands. Rather, it allows for the strengthening of one of the strands in a way which leads to a stronger process overall. This strengthening comes from an **integration of** the two strands at various stages in their development, beginning with the flood study. While the first five management outcomes listed in Figure 2 will be derived largely from the first strand and the latter three mainly from the second, there will be links which will reinforce this interdependence between them. An example is the need to have a warning system (Strand 2 outcome) which will allow decisions to be made to 'operate' a levee system (Strand 1 outcome) -either by closing gates at appropriate times or by determining when and to what degree a levee might require upgrading to hold out a coming flood. A further example is the need for councils and the SES to conduct flood awareness and education programs on a co- operative basis. Other similar linkages can be imagined.

HOW DO THE PARALLEL PLANNING PROCESSES FIT TOGETHER

The suggestion is that the two processes must fit together right from the start. This means putting together some words which can be included in the consultant's brief requiring early contact with the SES State Headquarters.

The aims of this initial contact might:

- Letting the consultant know the status of the Local Flood Plan.
- Providing the consultant with details of the flood intelligence held by the SES in relation to the area being studied.
- Ensuring that the gauge/s used for warnings are included in the hydrological models so that the results of the flood study can be related directly to that gauge or gauges.
- Ensuring that design events (for example 1:20 AEP and 1:100 AEP floods) are related to appropriate gauges and historical events.
- Ensuring that agreement is reached on how the area is subdivided to correspond with the areas or sectors used within the Local Flood Plan.

When the flood study is completed the SES should receive a copy. This will then be used as the basis for revision by the SES of existing flood plans or as a description of the risk to be addressed in the development of new flood plans. As part of this review process, further correspondence between the SES and the consultant will be needed to address some or all of the following matters:

- Requirements for additional data (for example additional gauge heights).
- Further detail on the flood hazard. An example might be conditions which could prevent or hinder evacuation from particular areas.

- Development of flood contour maps for increments in gauge heights.
- Gauge heights at which access to key facilities might be cut.
- The number of residences and business premises which may need to be evacuated.
- Possible future development areas which might need to be assessed in terms of impact on emergency management measures.
- Definition of which emergency management measures might need to be addressed in the floodplain management plan.

This suggested parallel process should ensure that consultants are not asked to 'review the existing flood plan'. The fact that the consultants do not have this capability is obvious from a review of the floodplain management studies and plans completed over the last couple of years. The end products of these parallel processes should be two documents which tie in together -a Local Floodplain Management Plan and a Local Flood Plan.

REFERENCE TO THE LOCAL FLOOD PLAN IN THE FLOODPLAIN MANAGEMENT PLAN

The following is included in this paper purely as an example of what may be included in a Floodplain Management Plan.

STRATEGY

Improving community preparedness for flooding by:

a. Developing and maintaining a Local Flood Plan.

b. Improving flood awareness.

The primary objective of the Government's Flood Policy is to reduce the impact of flooding and flood liability on individual owners and occupiers, and to reduce private and public losses resulting from flooding. The impact of flooding on existing developed areas can be reduced by flood mitigation works and measures, variation of development and building controls consistent with minimising the impact of flooding, and voluntary purchase of property. The potential for flood losses in new developing areas can be contained by the application of effective planning and development controls. These aspects are addressed in the other strategies contained in this plan.

However, only under extremely rare circumstances would these measures completely remove the flood threat. Therefore, wherever a flood threat exists, arrangements need to be made to prepare the community to respond effectively to flooding. This is done by developing and maintaining a Local Flood Plan for each Local Government Area which faces a flood threat.

The State Emergency Service Act 1989 defines one of the functions of the Service as follows:

‘To act as the combat agency for dealing with floods (including the establishment of flood warning systems) and to co-ordinate the evacuation and welfare of affected communities.’

The State Flood Plan recognises this function and directs that ‘each SES Local Controller in whose area there is a flood threat is to develop a ‘Local Flood Plan’. In doing so, SES Local Controllers act as agents for their communities in developing what are essentially community plans.

With the full support of the xxx Shire Council, the xxx SES Local Controller has begun the process of developing a xxx Local Flood Plan. This plan will:

- cover preparedness measures, the conduct of response operations and the co-ordination of immediate recovery measures for flooding within the Local Council area;

- use the work done for this Floodplain Management Study as the basis of understanding of the flood threat;

- record the agreed responsibilities of agencies and individuals during flood response operations;

- record arrangements for activation, collection of flood intelligence, development and distribution of effective warnings to the community, operational control, communications and liaison;

- indicate how the recovery process might be initiated.

The plan will be developed in conjunction with the xxx Local Emergency Management Committee and be formally presented to that committee for acceptance as a sub-plan of the xxxx Shire Local Disaster Plan. The Plan will then be printed and distributed as an ‘interim’ document.

The xxx Shire Council will ensure that copies of the Local Flood Plan are made available through the Council Information Centre, Schools and Libraries. Comment and suggestions for improvement will be welcomed from members of the community and the plan will be regularly reviewed. ‘

One aspects of a community’s preparedness for flooding is the ‘flood awareness’ of individuals. This includes awareness of the flood threat in their area and how to protect themselves against it. It is fair to assume that the level of awareness drops as individuals’ memories of previous experience dim with time.

It is also fair to assume that many individuals will not have experienced floods and none will have experienced the full range of floods which might be possible in the area.

Therefore, the Council and the SES in partnership will establish and maintain an active education campaign to provide a substitute for recent experience. Some of the ways in which flood awareness may be increased are:

- permanent marks showing the levels reached by previous floods; teaching about floods in schools;
- sending out regular information with rates notices; SES displays;
- educational videos;
- talks by SES Officers;

- wide distribution of the Local Flood Plan.

The benefits of a regular flood education campaign will enable residents to save a great many of their personal possessions, and in some cases reduce damage to their property as well as risk to life. The campaign will also improve people's feeling of control, since they will be in a position to take positive action to mitigate the impacts of the flood. This improved sense of control will reduce the adverse social impacts of flooding, as people who can take positive action will no longer feel like helpless victims.

The education campaign may need to be designed by professionals skills in motivation on public health and safety issues and based on market research. It will be repeated at regular intervals to enable adjustment to be made for demographic changes within the community. It will make best use of the printed and electronic public awareness material produced by Emergency Management Australia and available through the SES.

One aim will be to enhance the pool of local knowledge concerning:

- what steps to take well in advance, e.g., develop a procedure for collecting important documents, memorabilia, pets and treasured items for rapid evacuation;

- precautions to take in light of an early, indefinite warning;

- developing procedures for lifting and evacuation of property;

- understanding the potential and limitations of the warning system.

The campaign will need to be maintained on a regular basis, because community flood awareness is decreased over time by people moving out of the area and by people forgetting. Innovative ideas for the campaign will be required to maintain the interest of the community, and some type of incentive schemes might be considered.

CONCLUSION

The aim of this paper was to indicate how best practice might be recorded in the field of floodplain management from an emergency manager's perspective. What it has suggested is that a new national guide to best practice in the field is being developed and that the 1986 Floodplain Management Manual is being reviewed. The Manual should be ready for reissue next year.

At the same time as the above is happening, the SES is coming to grips with where it fits into the new system and has been developing its thinking which is now to the stage where that thinking is in line with that of the Department of Land and Water Conservation. Some further discussion is still required on the details of how we tie the two parallel processes together.

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