

Flood evacuation: never fun, sometimes necessary, always problematic

by Chas Keys, Associate of Risk Frontiers

This note was prompted by Andrew Gissing's recent piece on human behaviour during emergency evacuations (Gissing, 2015). The most radical request that the emergency services can seek of people is evacuation, but as Andrew points out the proportion of those at risk who respond by actually leaving their homes is often low. We examine this with reference to floods in the history of NSW.



In the last quarter of a century, people in substantial numbers have been asked to evacuate from Nyngan and Warren (in 1990), Windsor and nearby areas (1990), Bathurst (1990 and 1998), Forbes (1990 and 2012), Coffs Harbour (1996), Grafton (2001, 2009, 2011 and 2013), Maitland (2007), Coonamble (2009 and 2010) and Wagga Wagga and Hay (2012). This list is far from exhaustive. Indeed in a five-month period in late 2011 and early 2012 people from 36 NSW towns and localities had to evacuate because of flooding. There have been many other cases of evacuation in Queensland and Victoria too over recent years, especially during the dreadful summer flood of 2010-11.

Many other places in NSW have seen flood evacuations in the more distant past. In the Sydney Basin, floods on the Hawkesbury River have caused repeated evacuation since the earliest European settlement, and suburbs along the Georges River and its tributaries saw substantial numbers of people leave their homes in 1956, 1986 and 1988. Most river towns in the state's interior have witnessed evacuations during floods. In some towns, when big floods have struck, virtually everybody has had to leave.

People are always unwilling to go and often they resist - sometimes angrily. Evacuation is no fun and nobody's hobby: at the very best it is stressful and worrying. What will the scene be when we return if water has got into the house? Will there be looters? Is the evacuation advice credible? Can they make us go?

These questions reinforce the innate preference to stay. And to buttress their decisions people rely on fragments of information about long-ago floods- "the big flood of 1950 didn't affect my place, so why would this one?" Most lack knowledge



of flood behaviour, or of the deficiencies or limits of mitigation works like levees. Levees are almost never built to keep out very big floods, and they are periodically breached or overtopped. Yet people have great confidence in them, especially if they have withstood floods for years. Here we think in terms of our own life spans, whereas something more akin to a geological sense of time would be more appropriate. This is especially so given that the biggest floods in many locations occurred decades ago and beyond current memories. Big floods in a given location are rarely frequent, which means that experience of them is usually limited.

For many people, the hope that a coming flood will not be severe seems to engender a conviction that it will be benign. Mentally, people minimise the potential for harm. There is a misconception here in which hope is transformed to expectation and works to discourage evacuation. Many other myths exist in flood prone areas - for example the notion that big floods of the past will not be matched in the future and the idea that levees will not fail or be overtopped. These perceptions need to be consciously addressed in community engagement initiatives.

Some Cases

In NSW since 1990, SES operational records and observations from personnel involved in managing evacuations suggest that those complying with requests or orders to evacuate have varied between about 15 and 95 per cent in individual flood events. The circumstances underlying the variations are informative.

The 95% figure applied at Nyngan in 1990, after almost all the town's 950 houses had been flooded as a result of levee overtopping. The 2500 residents, exhausted by a heroic but ultimately futile effort to save their town by piling sandbags on the levee, had little option when the water punched through the wall of bags. Without power, clean water and an operating sewerage system and with water in their homes, their town had become unviable. A mass evacuation by helicopter and bus resulted, but it was initiated only after the town had been inundated.

Perhaps a hundred people, or a few more, initially refused to leave. Some, living in unpleasant conditions, changed their minds over the following few days. But the high compliance with the requirement to evacuate does not, in this case, demonstrate success given that the flood had removed residents' freedom of choice about it.

In 2007, the Hunter River was predicted by the Bureau of Meteorology to reach a height at which parts of levee-protected Maitland, South Maitland, Horseshoe Bend, East Maitland and Lorn could have experienced inundation along with nearby unprotected rural areas. About 4000 people were asked to evacuate, and about three quarters of them complied - though many were unhappy. "It's crap!" one woman shouted at a television camera as she left her Lorn home. Others refused to



go, some hiding from doorknockers advising of the evacuation order and seeking to determine who needed help.

Some veterans of previous floods decried the evacuation call. As long-term residents with knowledge of past flooding, they had local credibility. No doubt they discouraged some from leaving.

In the end the flood peaked lower than predicted and the urban areas behind the levees were spared. Many residents concluded that the evacuation of the built-up areas had been unnecessary. Those who had refused to go seemed to have been right in their assessments, though it might equally have been said that they were lucky and in some cases their reasoning about the flood predictions made by the Bureau of Meteorology was flimsy.

History is littered with cases of people decrying evacuation advice and seeking to discourage others from leaving: in one instance, as the great Hunter River flood of 1955 approached Singleton, an elderly man who had experienced the flood of 1893 ridiculed those who were making preparations to leave (Hawke, 1958, 21). Nothing could be worse than 1893, he proclaimed. As it happens, the 1955 flood peaked higher than that of 1893 and was much more severe in its consequences. Such dissent is common and needs to be expected.

In 2012 a flood on the Murrumbidgee River saw two quite different responses to calls to evacuate. At Wagga Wagga, more than 80 per cent of those whose properties would have flooded had the levee overtopped evacuated as asked. But at Hay, the level of compliance with the SES's recommendation was low: possibly fewer than 30 per cent of those asked to leave actually did so. The town had levees, but they needed to be raised and strengthened to withstand the coming flood. There was time to augment them as the flood approached, but work done under such circumstances cannot create levees of optimal quality and no engineer present was prepared to certify that the levees would do their job.

But the mayor of Hay disagreed, believing the levees would hold and that evacuation was unnecessary. Almost certainly, his stance discouraged some from following the advice of the emergency services.

As it happened, Hay was lucky: the augmented levees held the water back. But the risk of levee overtopping or failure had been assessed as high and water would have invaded houses, leading to evacuation as the prudent response.

It needs to be understood that calls to evacuate are best made before houses are flooded and before the final peak height of a flood can be known with precision. In some cases this will mean that evacuation might have been unnecessary. This does



not mean that a decision to evacuate was wrong when it was made, given the inherent uncertainties involved and the need to give people time, both to protect belongings and to evacuate safely (and preferably not through floodwaters). Some of the state's levees, old and poorly maintained, have been found in the past to be structurally deficient, and in any case none are built to keep out the very worst floods possible.

Challenges

What can be said about refusal to leave? First, it should be noted that some who refused to evacuate have died as a consequence, as happened in the famous Maitland flood of 1955. In many severe floods this has been so. Second, instances of people refusing to leave and later changing their minds are not uncommon. This places at risk the lives of rescuers from the SES, the fire authorities and other agencies when evacuation becomes rescue - sometimes through fast-flowing, deep floodwaters.

People need to be persuaded in 'quiet time', when there is no flooding, that evacuation will, on occasions, be sensible. As part of this, they need to understand the limitations of levees, that flood prediction is not an exact science, and the inevitability of flooding more severe than what even long-term residents have experienced. The persuasion is best sought via community engagement processes in which people have an opportunity to query and test what they are being told.

When a flood is actually approaching they need clear information, before the water arrives, about where it is likely to go and (if evacuation is necessary) about the appropriate time to leave in order to minimise congestion on the roads and avoid the dangers of having to negotiate floodwaters. Emergency personnel need to prepare evacuation advice messages well ahead of time so as to strike the appropriate psychological notes and avoid the possibility that important matters will be inadvertently missed out.

People also need assurance that their homes will be secure. Every local flood plan in NSW requires the Police Force to patrol evacuated areas to discourage looting. This Police role should be publicised, and it should be visibly put into practice when evacuation is sought. There have been instances in which this has not been done effectively.

More needs to be done to emphasise the dangers of being caught in (or even isolated by or stuck above) floodwaters. People facing floods need to know that snakes, spiders, insects and vermin may seek refuge in their houses, and that the floodwater might contain raw sewage, oils and chemicals. They also need to understand the discomfort they will experience if power supplies fail or are terminated and communication with the outside world is lost - perhaps for days. In



some locations people could become trapped on islands, which eventually become inundated as floodwaters rise. And if fire should break out with floodwater beneath or surrounding dwellings, the consequences could be catastrophic for people inside them.

When floods threaten to enter or damage houses, people should not be in them. Floods are dangerous, and a flooded house is not just uncomfortable: it can be unsafe in terms of injury and later illness. It can even be deadly if the house is washed away, as happened to some in the Lockyer valley flood in south-east Queensland in 2011.

Several hundred thousand people in Australia live in flood-prone areas, some of which (like Queensland's Gold Coast and the Nepean-Hawkesbury valley on Sydney's western edge) will have many thousands at risk in very big floods. It will not be easy to convince these people to leave when floods threaten. The task will be even more difficult if they have received conflicting messages about flooding. A former Hawkesbury City Councillor, for example, is known to have referred to the great Hawkesbury flood of 1867 as the "alleged" 1867 flood. This denial of a well-documented historical reality is not helpful in having people come to grips with the risk which flooding occasionally poses. Such examples need to be explicitly challenged during the community engagement process.

In the Hawkesbury environment, where the roads required for evacuation are cut by flooding in floods far smaller than that of 1867, there would, in a repeat of that event, be more than 50,000 people to evacuate in a challenging time frame. Those who don't go when asked will later find escape impossible and they will be in great peril if the waters engulf them. On the Gold Coast with its several rivers, creeks and canals the flood problem is complex, the warning time available is likely to be limited and the number of elderly people who will need help to evacuate is large. A less-than-effective evacuation operation could cost many lives.

The challenge is to build community confidence in evacuation decisions so the vast majority at risk heeds them. Some, of course, will never be convinced: it is an old saw of evacuation management that "if you ask the people to go some will stay while if you ask them to stay some will go". People must be convinced when evacuation is necessary and shown why not leaving, or leaving late, can be dangerous. There is much to be done here, before flooding occurs, so that appropriately persuasive warning messages can be constructed when big floods actually threaten.

One day, in one of our many flood-labile areas, people will die because a call to evacuate communicates the need poorly or is ignored or undermined.



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