

HOW DO YOU IMPROVE COMMUNITY RESPONSE TO WARNINGS?

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ABSTRACT

Surveys were undertaken of residents and businesses in the Hunter Valley following major floods in June 2007. The purpose of the surveys was to determine whether official flood warning messages were being heard and heeded. The questions were used to determine how people were getting flood warnings, how they were understanding them and what actions they were taking in response to the messages. The paper looks at some of the barriers to flood warning communication and ideas on how flood warnings can be enhanced to improve community response.

BACKGROUND

Between Friday June 8th 2007 and Monday June 11th 2007, the New South Wales Hunter and Central Coast regions experienced severe weather conditions resulting in substantial flooding in some areas.

Flooding occurred in the Maitland area (Hunter River and its tributaries) and in some Newcastle communities (flash flooding). Flood warnings and evacuation notices were issued for communities adjacent to the Hunter River and its tributaries and Severe Weather Warnings were issued in the Hunter and Central Coast areas. Over 4,000 people were evacuated in the Maitland area and other evacuations were made in the Newcastle and Lake Macquarie areas.

The NSW State Emergency Service (NSW SES) is responsible for the establishment of flood warning systems and the co-ordination of evacuations during floods. The NSW SES is also committed to educating the community about floods and storms to enable the community to become better prepared, more responsive and better able to make informed decisions before, during and after an emergency.

The primary aims of this project were to:

1. Evaluate the effectiveness of communication methods used for flood and evacuation warnings and notifications; and
2. Assess the community's actions and attitudes in response to flood and evacuation warnings (including their awareness and preparedness).

It is intended that this will allow the NSW SES to improve the communications methods used for flood and evacuation warnings and better meet the needs of these communities in the future.

METHODOLOGY

The surveys were conducted by door-knocking residences and businesses in flood-affected areas of Maitland and Newcastle between July and September 2007. During this time, 168 surveys were completed in Maitland (41 businesses and 127 residences). In Newcastle, 318 surveys were completed (25 businesses and 293 residences). Of the Newcastle surveys, 59% were received in the post and 41% were completed in person.

Two slightly different surveys were developed for Maitland and Newcastle due to the differences in the nature of the flooding and warnings. In Maitland, flood warnings for the Hunter River and evacuation notifications were issued but the forecast flood heights were not realised and no properties within the Maitland levees actually flooded. In contrast, the Newcastle communities experienced urban flash flooding, they were covered by flash flood warnings and there were no evacuation notifications.

Another important difference between the communities was the amount of community education which had preceded the floods. Although both Maitland and Newcastle are in the Hunter Valley which commemorated the 50th anniversary of the 1955 flood in 2005, Maitland was more of a focal point for those commemorations, is adjacent to the river and has been the subject of other community education activities by NSW SES, Maitland Council and Hunter and Central Rivers CMA before and after that time.

Overall, survey questions dealt with the awareness and preparedness of respondents to the flood risk, sources of information for flood and evacuation warnings, understanding of, and responses to the warnings and satisfaction with the warning service.

Maitland

A 43 question survey was developed to address the principal questions outlined above.

Surveys were conducted in Lorn (Sectors A and B), Central Maitland (Sectors C and D) and South Maitland (Sector D). The area was divided into four sectors (A-D) because not all areas were likely to experience flooding and therefore experienced different warnings and notifications during the flooding period. Sectors A and C were likely to experience isolation and potential loss of services, and Sectors B and D were likely to experience inundation. Surveys were conducted in all streets located within these sectors.

Surveys were conducted face to face through doorknocking by Molino Stewart staff between July 16, 2007 and July 20, 2007. Residences were doorknocked at various times of the day, in the evenings and on weekends to maximise the number and variation of survey recipients.

Newcastle

A 34 question survey was developed for the Newcastle area to address the principal questions outlined above.

Surveys were conducted in specific flood-affected streets in the Styx Creek Catchment area. Surveys were conducted face to face through doorknocking by Molino Stewart staff or, if occupants were not home or too busy to complete the survey at that time, a survey form, introductory letter and a reply paid envelope were left in the letterbox. This occurred between the dates of July 23, 2007 and July 24, 2007 and September 5, 2007 and September 8, 2007. It was necessary to return to Newcastle in September as most of the flooded houses were still unoccupied in July due to extensive flood damages.

RESULTS

This study aimed to evaluate the effectiveness of communication methods used for flood and evacuation warnings and notifications, and assess the community's actions and attitudes in response to flood and evacuation warnings (including their awareness and preparedness).

Awareness of the flood risk

(i) Chance of Flooding

Before June, 60% of people in Maitland thought that they could be flooded compared to 36% in Newcastle. Since the floods 81% of Maitland people think they have a chance of flooding in the future with 94% in Newcastle. This shows that flood experience increases belief in flood risk but the fact that the Maitland levees did not overtop appears to have dampened that expectation there.

(ii) Flood Hazards

Only 24% of respondents in Maitland thought that their personal safety was under threat before they were asked to evacuate and only 31% thought so after the evacuation order was given. In Newcastle where 52% considered the flood threat to their personal safety

This compares to 61% in Maitland and 86% in Newcastle who saw the flood as a threat to property and possessions.

These figures show that people see flooding as a much greater threat to their property than their own safety. They also suggest that either because there was ample warning or because the water was not actually about to enter their buildings, or both, the people saw the flooding as less of a threat.

Flood warnings

(i) Hearing Them

In Maitland about 59% of people said they heard the Flood Watch and 71% of those thought it applied to them. This compares to 29% and 22% in Newcastle. These significant differences might be attributable to the community education which had been taking place in Maitland including explanations of Flood Watch.

It might also be because Maitland is next to a river. The minor flood warning was heard by 55% of those in Maitland with this percentage rising to 64% as the warnings escalated to a major flood warning. Of those that heard any of these warnings between 70 and 75% thought that it applied to them.

Only 40% of those in Newcastle said they heard the Severe Weather Warning for Flash Flooding and of those 79% said they thought it applied to them.

The main reasons Newcastle people said that they did not think the warnings applied to them was because they did not think their area would flood or they did not hear their suburb specifically mentioned. Many said they did not hear the warnings because they were at work at the time and did not have access to a radio.

This latter observation is important because the radio was not only nominated as the main source of the initial flood warning but also the most popular source of obtaining more information.

It is instructive to note that almost 75% of people in Maitland said they heard the evacuation notification which was disseminated by doorknocking as well as by radio but of these only 73% thought it applied to them.

The results show that while radio is the most important and effective way of disseminating flood warnings it is not sufficient on its own. Furthermore, unless the community hears their locality mentioned they are unlikely to think a flood warning applies to them. They also suggest that community education aids in people knowing that a flood warning applies to them.

(ii) Understanding Them

For people to know that a flood warning is relevant it helps if they understand the content of the warning. About 8% of people in Maitland found the flood warnings difficult to understand compared to 19% in Newcastle. Around 80% in Maitland found them easy to understand compared to only 54% in Newcastle.

Similar patterns can be observed in people's understanding of the different types of warning products. In Maitland only 10% of people clearly did not understand what a Flood Watch was while 36% in Newcastle did not know or did not answer the question. Of those that did not answer many responded with words to the effect that it didn't matter to them because they weren't living near a river and flooding only happens near rivers/watercourses. It should be remembered that these comments were being made by people who had experienced above flood flooding only a few months before.

With regard to a flood warning only 7% in Maitland did not know what that was. As no specific flood warnings were issued for Newcastle they were not asked its meaning.

The differences were much less when other terms were used. For example those who did not provide a correct response to Severe Weather Warning accounted for 24% in Maitland, and 32% in Newcastle. Similarly, 27% in Maitland and 25% in Newcastle did not know what Flash Flooding was. It should be noted that the community education in Maitland has focussed on riverine flooding, not flash flooding.

Again the results suggest that community education is helping people better comprehend the flood warning messages.

(iii) Believing Them

In Maitland most of the respondents first suspected on the Saturday that they might be flooded, aside from the 36% that didn't think they would flood at all. Given that warnings began to be issued on the Thursday prior, most respondents should have been aware of the risk before Saturday, however only 45% suspected they might flood by this time. Almost half of the respondents first suspected they would flood because of the radio or television. The other half said it was because they saw the flood waters/heavy rain or were door-knocked by the NSW SES.

This shows that not only is radio not sufficient on its own for disseminating warnings but other queues are perhaps considered more credible indicators of a real threat.

Almost all of the respondents in Newcastle did not suspect they would be flooded until the floodwaters had entered their homes. This little warning is understandable given the flash flooding that occurred and the small percentages that heard the warnings and thought they applied to them.

Responses

(i) Sought More Information

Between 70 and 75% of respondents looked for more information after being alerted to the flooding. Of these 24% in Newcastle and 52% in Maitland turned to the radio which was the most popular source of additional information. Between 13 and 20% turned to the television and 10-20% to the internet. It should be noted that while Newcastle is always at the lower end of the range for each of these sources, it did suffer extensive blackouts so some of these sources may not have been available. Between 10 and 20% sought further information from neighbours or friends.

The most significant difference is in those who rang the SES for further information. Only 8% in Newcastle went to this source but 31% in Maitland sought further information from the SES. This may be a reflection of the SES's promotion of its free call number in its community education activities in Maitland.

(ii) Passed the Message On

In Maitland only 34% of people passed the flood warning on to someone else compared to 47% in Newcastle but this may reflect the fact that extensive doorknocking took place in Maitland so people were confident that others were being warned.

(ii) Protected Property

In Maitland 84% of people lifted valuables above the flood waters and 86% did so in Newcastle. In Maitland 67% removed their valuables from the premises which is far more than the 17% in Newcastle but this may be a reflection of the relative amounts of evacuation that went on in advance of the flooding. Only 13% of people in Maitland blocked water entry points compared to 41% in Newcastle. The fact that so many people removed valuables in Maitland may have resulted in fewer having to lift valuables or block entry points. Some people in Maitland also reported that they had been instructed by emergency service personnel to keep doors open to allow the water to flow through the building to reduce structural damage which may also explain where less effort was made to block openings.

It would appear that lifting valuables is an intuitive response to a flood threat as it does not seem to have been influenced by education.

(iii) Protected People

About 76% of Maitland respondents evacuated during the flood. However, 42% of these did so because they thought they had no choice to stay. The others said they did so to look after family, the elderly or pets.

In Newcastle, 63% of respondents did not evacuate during the storm, primarily because it was already too dangerous outside by the time they realised, but only 77% took some actions to ensure the safety and comfort of themselves and/or family members during the storm.

Although few evacuated, 67% of respondents walked or drove through the floodwaters at some stage for a variety of reasons. Nearly 40% said they did it to get to safety, 20% to get home, 15% to assist others and 10% to protect property or possessions including cars.

(iv) If it Happened Again

In Maitland only 31% of the total respondents said they would do something differently if a similar flood occurred again, most of these said they would prepare earlier, but few made specific suggestions of how they would do this.

Of those that did evacuate during the June storm, only 52% said they would evacuate in the future if they were asked. Of those that did not evacuate, only 7% said they would evacuate again in the future if asked.

A majority of the people who said they wouldn't evacuate said they did not believe their building would flood, a belief which has probably been strengthened by the fact that they didn't flood this time. A similar amount said there was not a big enough threat to their safety, highlighting that many are still not concerned about the risk, though most are aware of it.

In Newcastle many respondents commented on things they would do differently if a similar storm occurred again. Most said they would take more/earlier precautions to protect their property/possessions, followed closely by 32% of people who said they would evacuate earlier.

Flood education activities and products

Although the vast majority of people in Maitland recalled one or more flood education activity, nearly 80% said that these did not influence what they did in the flood.

The commemoration of the 1955 flood was recalled by nearly 80% of the population, more than 60% said they recalled newspaper articles, 33% flood brochures and more than 20% information displays. Nine percent of respondents mentioned other ways they have learnt about flooding, including having spoken to people who had lived in the area a long time and had experienced flooding. In correlation with this, many residents were upset that local residents had not been consulted during the floods as their experience and knowledge is widely respected amongst the community.

While the Maitland community has said that flood education activities have not influenced their response to the floods, warnings and evacuations notifications, the data would suggest otherwise. They certainly have a strong recollection of the education initiatives and their responses in many ways show a marked contrast to those in Newcastle where similar initiatives have not occurred.

This suggests that people are unaware that their knowledge, attitudes and actions are changing as a result of the flood education activities.

Possible Improvements in Flood Warning

About one third of respondents in Maitland made suggestions for how the warnings could be improved. The most common responses were that information should be consistent across all media outlets and that more frequent updates would be helpful to stay abreast of developments and warnings/bulletins should contain reference to specific localities.

When those in Newcastle were asked how the warnings could be improved, 24% of respondents said that other forms of communication would be beneficial in addition to the radio and television. Forty-one percent said that they would like to have a door-knock by the NSW SES warning of flooding. Sixteen percent suggested SMS and 9% suggested email for those at work. Other suggestions included having a siren, contacting people by

phone and encouraging residents to spread the word amongst their community to help warn people who may not be watching television or listening to the radio.

About 20% said that they would like more warning next time to give them the option to evacuate should they wish too. A similar amount would like the warnings to be more geographically specific so that it is easier to understand how they will be affected. Eight percent would like the warnings to be more frequent and a similar amount would like them to use less technical jargon and be clearer. Finally, 4% would like more attention to be directed to helping the elderly or physically/mentally impaired residents who cannot help themselves so easily.

Those in Newcastle were also asked if they were satisfied with the warning. Only 34% said they were satisfied or extremely satisfied with the flood warning service that was provided during the storm.

CONCLUSIONS

It would appear that community flood education in Maitland has had a strong influence on the community's understanding of their flood risks, comprehension of flood warnings and response to flood warnings and evacuation notifications. Despite this there is still significant room for improvement in all of these areas.

The Newcastle results not only highlight the importance of concerted community education but highlight the practical difficulties of providing effective flash flood warnings to urban communities.

While radio broadcasts remain the most effective means of disseminating flood warnings, there needs to be a suite of communication mediums used to reach the total population at risk.

It is also clear that many of the actions to protect property and possessions are intuitive but not so those to manage personal safety and comfort in a flood. In fact most people do not see flooding as a safety risk and will enter flood waters for any number of reasons including protection of assets which they see the flood posing a greater risk to.

TAKE-HOME MESSAGES

- Flood education of at risk communities needs to be sustained and expanded
- While radio broadcasts of flood warnings need to be continued, other means of warning dissemination need to be provided
- It cannot be assumed that people will make wise decisions about their personal safety in a flood

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Can't think of any we need to put in