

## The 2017 Lismore Flood – Insights from the field

*Andrew Gissing, Katharine Haynes and James O'Brien*

Floodwaters arising from the rainfall of Ex-Tropical Cyclone Debbie impacted North, South and Central Lismore from Thursday, March 30, 2017. Hundreds of residential and commercial buildings were flooded; several thousand residents and business operators were evacuated. Central and South Lismore are protected by levees but both of these were overtopped.

The Lismore Rowing Club Gauge measured a flood peak of 11.6 metres AHD, the highest recorded since 1974 (12.2 metres AHD). North Lismore was flooded late on the evening of the 30<sup>th</sup> of March, whilst South and Central Lismore were flooded in the early morning hours of the 31<sup>st</sup> of March.

Risk Frontiers visited Lismore on the 3<sup>rd</sup> of April to undertake unstructured interviews with residents and business operators in order to gain preliminary insights into impacts; responses to warnings; sheltering behaviours; how levees may have influenced risk perceptions; and the initial recovery. Our team was integrated with emergency service Rapid Impact Assessment teams to avoid duplication and burden on those impacted. In total we spoke with 22 residents and 23 business operators. In what follows, we highlight key learnings from these early investigations.

### Impacts

Residential flood damages in the main appear to have been restricted to the ground storey areas of raised dwellings, with peak flood heights reaching just inches below second storey living areas. In many cases it would appear that these ground story spaces were likely occupied at the time of the flood and in some cases rented out. The majority were certainly used for extensive storage. There were a smaller number of lower set dwellings in which flooding impacted main living areas.

Almost every home and business on the floodplain had a large muddy pile of possessions stacked on the roadside awaiting council pick-up (Figure 1). In some areas possessions had floated away and were now scattered across open areas. Common household items damaged were carpets; household appliances – fridges; washing machines; dryers; cupboards and drawers; fabric lounge chairs; tables and chairs; hardware; bedding; doors and outdoor furniture. Some people stacked goods on tables or shelves within the ground storey only for tables to float and shelving to fail. Pets were also lost with one family losing some sixty guinea pigs.



Figure 1 – Pile of flood damaged possession typical of flood-damaged homes.

Damage to commercial operations varied widely depending upon the type of business. A large number of businesses had suffered significant losses, such as a Hotel, which estimated its damages at \$600,000; a hire-car business in which all vehicles were flooded; a whole foods store that lost most stock; a bakery that had lost its ovens and mixing equipment; and a large clothing retailer that was disposing of all of its stock and fittings. Some reported that they were unable to move large pieces of equipment in time. Most reported that they were uninsured or were hopeful that some losses may be claimed through severe storm coverage.

Most flood-affected businesses were closed at the time of our reconnaissance mission for clean-up and restoration. A small number, however, had recommenced trading, albeit on a reduced scale. In a higher area that hadn't been flooded, a café operator reported that they had run out of food to serve two days running due to increased customer demand.

One business owner expressed frustration concerning the closed access to the CBD, suggesting that allowing earlier access on presenting identification would help. Concern was also expressed about bow waves, arising from motorists and boats driving through floodwaters, causing further flood damage to homes and businesses.

Significant flood velocities occurred through Browns Creek and the adjacent car park causing substantial erosion in the lower area of the car park, and structural damage to the roller doors of a nearby business. Figure 2 shows two trucks washed from an adjacent business into Browns Creek.



Figure 2 – Two small trucks swept into Browns Creek

Recent commercial developments, with floor levels set above the 1-in-100 year flood level avoided flooding. These businesses included Hungry Jacks, Woolworths, Aldi, Bunnings and Toyota, who were all able to trade directly after floodwaters subsided. Figure 3 shows the raised floor level of the Aldi Supermarket. The operation of supermarkets in Central Lismore during the initial recovery phase likely helped reduce the scale of emergency relief required.



Figure 3 – Raised floor level of Aldi Supermarket

Given that we saw many dwellings where the floodwaters had come only inches from second storey levels, a flood of 1974 or 1954 proportions would certainly have resulted in significantly higher damages, community panic and displacement. Roche et al. (2013) estimated that the total normalised economic cost of the 1954 floods in 2011 dollars throughout the region would have been of the order of \$7.5 billion, although the uncertainty in that figure is high. The 1954 flood affected many more catchments in the Northern Rivers region of NSW and occurred prior to reliable insurance statistics and the recent escalation in property values. 28 lives were lost in that event (Roche et al. 2013).

### Community response to warnings

The Bureau of Meteorology and the NSW SES provided warnings and information to the community throughout the event via websites, traditional media, door-knocking and social media. The local Council also utilised flood sirens when levees were over-topped.

As reported in the media the majority of residents interviewed did not evacuate instead opting to shelter in a higher story of their home as floodwaters rose. The reasons for doing so varied and included wanting to save possessions, fear of looting, that they had sheltered previously and to enable clean-up to commence earlier.

Many appeared to have been caught off guard by the scale and speed at which the flood occurred and were not able to save many items. Some told us that earlier warnings of a moderate flood gave them a sense of security, false as it turned out, and which was quickly replaced by panic when flood heights exceeding 11 metres were forecast. Others simply thought the warnings were exaggerated and that the flood heights would be less than predicted given that this had been the case in the past. A few of those interviewed, however, thought that a larger flood than that predicted was likely and had taken action in advance.

Overall, people described flood warnings as “OK”. Suggestions for improvement included providing warnings more regularly, perhaps every two hours and providing regular river height readings. One resident expressed concern that residents may still be confused by a river gauge datum change that occurred some fifteen years ago. Another favoured forecasts provided by locals over those derived from automatic gauges and delivered by officials in Sydney.

Pointing to the success of Lismore City Council efforts to provide such information, most residents knew how to interpret gauge levels in terms of the corresponding flood heights in their homes and businesses. The degree to which this knowledge influenced behaviour requires further exploration.

### Sheltering behaviours

Although a frightening experience for some, many, who sheltered in place, said that they would do it again. Some prepared by stocking up on food, however, the majority did not as they considered they would only be isolated for a few hours at most. Most were caught off guard when power was lost resulting in an inability to cook and use lighting or hot water.

This surprised them as the power had remained on during previous floods and although some did expect the power to fail, the length of outage was a challenge for everybody.

One resident described how his medications needed to be kept in the fridge and he had just bought a three-month supply only days before the flood. Although the supply had been ruined because of the power loss he had just managed to keep a small amount cool enough during the flood to keep him healthy.

Another resident discussed how they had not only stocked up on food but had also bought iceboxes and ice in order to keep their food from spoiling in the event of a power outage.

Another resident with a child who requires lung support to sleep evacuated their lower set home and waded, in the dark, through waist high water to a neighbour's house. As the power remained off for a couple of days they could not return to their home. Another mother who sheltered with her four children and two other adults discussed how they didn't know if the tap water had been compromised, and therefore only drank the fluids they had in the home. The family had taken the precaution of filling the bath with water when the flooding began; however, the bath had emptied overnight due to a poorly fitting plug.

Many did not have radios, torches, candles or spare batteries. People talked about the isolation as their phone signals didn't work, laptops ran out of power and they could not access information. Others enjoyed the camaraderie of neighbours who assisted through the sharing and cooking of food for each other (if they had access to gas), and the passing on of information from neighbour to neighbour.

Specifically those interviewed stated:

*We stayed. Not the best idea. We lost power. We couldn't cook. (North Lismore business owner)*

*My daughter stayed. She is pretty freaked out. Still hasn't left the house." (North Lismore Resident)*

*Next door neighbour stayed. Said it was interesting, was blacked out, had no hot water. Lucky water didn't get in the house. (North Lismore Resident)*

*I had food, water and plenty of warm beer. . . I always intended to stay, stayed in 74 . . . its just life . . . (South Lismore resident)*

*Decided to shelter but didn't realise the water would get that high or stay for so long . . . Didn't realise the power would be off for so long . . . just had enough food (South Lismore resident)*

*Still lifting when the water came through, so had to stay, but would have stayed anyway . . . Went out and got extra food. House is built for it so would always stay . . . Could stay a week, had batteries for radio, didn't have a generator but have bought one now (South Lismore resident)*

*Next time I will evacuate as didn't like being without power . . . bought extra food but didn't think about the power going off . . . 1 camp stove and 7 people to feed . . . everything in the fridge went off and I couldn't cook it . . . if it had lasted another 12 hours we would have been in trouble (South Lismore resident)*

*Four-year old daughter had an ear ache and we were seeing how bad it got. She had a mild temperature and we were giving her Panadol, we were considering calling the SES to take her to the doctors but only if it had got really bad (South Lismore resident)*

*We have a gas stove and we even cooked for our next door neighbour . . . we have been in floods too many times to not be prepared . . . bought eskies and ice to make sure were ok with food (South Lismore resident)*

*Didn't expect the power to go off for so long, only expected it to go off for an hour or two (South Lismore resident)*

*Didn't want to evacuate, we had enough food and lived on sandwiches. We were due to do a shop on Wednesday as we only get paid fortnightly so we just ate what we had . . . could only have lasted another day. We didn't want to evacuate because of looters, if we lost our contents that would be it . . . I'm on medications that need to be in the fridge and had just picked up a three month supply and they are all spoiled . . . I had just enough to get me through. Such a disappointment that the electricity went out for so long. Because the TV went out we weren't able to get any information, take that out and we have nothing. Don't have a radio, have a mobile but it ran out. (South Lismore resident)*

*Stoked up on food and water but then the power went off and it all went off . . . a bloody waste of time . . . if I'd known the power was going to go off I would have bought a generator in to save the food... we choose to live here and I wouldn't want to live anywhere else (South Lismore resident)*

*Didn't have time to get food and didn't think it was going to be this bad. Had some food but had to throw it away. Fridge off for a day and a half and it just goes off so quickly (South Lismore resident)*

## Perception of Flood Levees

Businesses in the CBD thought some may have put too much faith in the Central Lismore levee and got caught out. Some were said not to have packed up to the amazement of other businesses.

Some perceived the Central Lismore Levee as being both a blessing and a curse: it had kept water out previously in 2005 and 2009, however, once overtopped kept water in.

In North Lismore one resident expressed concern that flood behaviour had changed since the CBD levee had been built believing flood levels were now much higher as a result. In

other places residents showed us that flood levels were lower than those experienced in 1974.

## Initial Recovery

We observed both formal and informal mechanisms to assist recovery efforts. Emergency services and council staff were assisting with the clean-up, with local volunteer groups such as Rotary provided catering for residents on the street. On an informal level we observed people bringing hot meals for those impacted, and family and friends assisting in the clean-up.

A Facebook Page called *Lismore Helping Hands* was cited as a fantastic resource, where community members were helping to coordinate the provision of support for others. As at April 7 the page had 6450 members.

Business owners expressed dismay and anger about looting and theft from their clean up piles in the street and were verbally challenging people who were stealing items from shopfronts.

## Discussion and conclusions

Though a significant and very damaging event, we were left with a sense that the community was functioning and resilient, getting on with the job of cleaning up.

Much bigger floods are possible in Lismore and there is much to be learned from this event. The physical and social impacts would have been far greater had the floods been only a little higher.

As well as providing more evidence as to the effectiveness of flood mitigation and flood warning systems, the event offers significant opportunities to better understand community risk perceptions, responses to warnings, sheltering behaviours and flood damages.

Several policy and communication issues already apparent include the following:

What should be done to reduce flood damages in enclosed ground floor areas of high set dwellings? These areas should not be rented as habitable space.

Despite evacuation orders being mandatory many residents chose not to leave. This is consistent with other NSW flood events and experience internationally. In larger floods these people could face significant risks. This issue may be difficult to solve: current messages in evacuation warnings mention the possibility of rescue and this in turn implies the availability of rescue resources. This messaging should be reviewed.

The culture of sheltering-in-place during floods requires further in-depth research in order to determine perceptions and beliefs, and, by documenting the experiences in events like this, the risks and challenges. Emergency services must inform people of what they can expect when they shelter-in-place during floods, particularly the likely lack of power and the

number of days of isolation. There is a need to ensure people fully understand the possible consequences both physically and emotionally and that it will always be safer to evacuate. The experiences documented to date outline the many risks involved in sheltering and appear to support existing arguments against the adoption of shelter-in-place strategies within green field developments with similar flood risks.

Can levees be raised to reduce the flood risk? Community members are already pushing for increased flood levee protection. However, the original decision to construct the levee to provide protection with a 10% annual chance of over-topping was made based on a study that found larger structural measures were 'uneconomical, impractical and socially unacceptable' (Lismore City Council, 2002). In the absence of levee raising or new engineering works, Lismore would be largely reliant on existing non-structural measures including house raising, education, flood warnings and evacuation, and perhaps the voluntary buy back of flood prone properties by the government.

## References

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