

Key findings:

The 2008 Floods in Queensland: Charleville and Mackay

The events

In this case study, we compare the impact of flooding, the response at the time and subsequent adaptations in two Queensland towns, Charleville and Mackay. Both towns were flooded in early 2008: Charleville in a widespread and slowly developing event in January; Mackay in a flash flood in February.

In January 2008, flood-producing rains occurred along the Queensland coast between Townsville and Mackay and inland over central and southwestern Queensland. These heavy rains were associated with a low pressure centre tracking southward across the state, the remnant of Tropical Cyclone Helen. Coastal and inland river catchments flooded. The Warrego River, which flows along the northern edge of Charleville, rose by 6m, peaking on 22 January, and Bradley's Gully, which flows through the middle of town, rose by 3m, peaking on the 18 January.

The coastal region of Mackay experienced minor flooding in the January event. However, on 15 February, an intense and localised rainstorm produced a flash flood that damaged 4000 houses, caused schools to close and damaged the local road network. Power was lost to 6200 homes and mobile and land line communications were disrupted.

Scale of the disaster

Charleville

The town of Charleville is located on the flood plain of the Warrego River, with the tributary Bradley's Gully flowing through the centre of the town. Flood events are relatively common: according to the Bureau of Meteorology there were 10 major flood peaks and 10 moderate flood peaks of the Warrego at Charleville between 1924 and 2008.

It is a characteristic of Charleville floods that they are slow to develop, generally giving residents some time to prepare, spatially extensive and slow to retreat, meaning roads and communications may be cut for several days.

The floods in January 2008 were not the worst in Charleville's history, but the Warrego River reached a peak of 6.1m (highest since 1997) and flood waters in Bradley's Gully reached 3.1m, its biggest flood event since 1963. Charleville is protected from the Warrego by a levee, built following the floods of 1990, but currently there is no protection from Bradley's Gully.

Mackay

The Pioneer River runs out to sea through the city of Mackay. Relatively small in area, with steep slopes in parts
National Climate Change Adaptation Research Facility



Flood management, Charleville. Image: Hydro Response

of the upper reaches, the catchment of the Pioneer poses a flood threat to the town. Major flood levels have been reached 20 times since 1884. The rainfall event on 15th February 2008 was extremely intense and rare (100 year average recurrence interval). Flooding was the result of overland flow and levees have been constructed along the banks of the Pioneer in response.

Impacts of the events

Charleville

Some 15 commercial premises and 30 residences had to be evacuated, involving a total of 55 people. Power was cut to some areas. At the time of the flood, Charleville's permanent levee system was still under construction. Emergency Management Queensland coordinated the supply and transport of a flood barrier system into Charleville to plug two gaps in the Warrego levee system. Support personnel from New Zealand and NSW were flown in to assist with the construction of a temporary flood barrier put in place in 21 hours, however there was no protection against flooding of Bradley's Gully.

Following the floods, 920 families were provided assistance through the Natural Disaster Relief and Recovery Arrangements (NDRRA) grants, totalling over \$446,000. The cost of restoration of essential public assets by the State Government totalled \$482,000 and a grant of \$2.5 million was provided by NDRRA to repair the Murweh Shire road network.

The large distances between Charleville and its outlying satellite communities, and between Charleville and the next town of comparable size, affects evacuation planning and implementation. In the 2008 event, acute patients were required to be transferred to Roma, Brisbane and Toowoomba by air, with the potential to compromise patient welfare.

Mackay

Flood damage was caused to around 4000 residences, disrupting power and telecommunications and causing overflow of sewerage stations. People were trapped in their homes and vehicles due to the speed with which

events unfolded and their failure to heed warnings and prepare adequately. Overall the event is estimated to have cost \$410 million in claims for flood damage to private residences and \$9.3 million for reconstruction of roads and infrastructure.

Adaptation during and after the events

Charleville

- The Murweh Shire Council has a flood overlay as part of the Town Plan. New industrial and residential areas are deliberately located outside the flood prone area. New commercial premises are required to have a safe upstairs area or an Evacuation Management Plan.
- Lack of insurance coverage impeded recovery. However flood insurance cover is difficult to obtain in this region (due to the frequency of flooding).
- The Charleville Levee Bank Reconstruction Group has been formed to lobby for protection against flooding of Bradley's Gully.

Mackay

The Mackay Regional Council (MRC) intends to implement mitigation strategies including various engineering solutions to direct floodwaters away from at-risk areas. MRC has also funded art workshops and a documentary to address the psychological rebuilding of the Mackay community.

Vulnerability pre and post the event

Since February 2008, a large proportion of Mackay and Charleville residents and businesses have developed emergency flood plans.

This includes checking electrical appliances for damage prior to use after flooding, and making arrangements to be able to boil tap water before use, in the absence of electric power. Most are keeping drains and ditches free and clear of debris and have identified irreplaceable items and made plans for them to be easily and quickly moved above ground level.

This vigilance is likely to reduce vulnerability during future flood events.

Due to a transient population, some 50% of Mackay residents had not experienced a flood event. Along with flood-free years running up to 2008, this resulted in a lack of disaster preparedness and planning (e.g. planning of evacuation routes, having an emergency plan and kits, etc) among many residents. In comparison the Charleville community has a history of being active in sourcing information on flood risk, and was better prepared for the event.

Lessons Learnt

This case study found that in areas that are vulnerable to regular flooding, it is long-established residents, with strong connections within the community, and possibly prior experience of flood events, who display greater resilience in a flood event.

The Charleville community was found to be staunch in the face of flood, with high levels of sense of belonging and commitment to remain on the part of residents, businesses and institutions, irrespective of future flood events.

In comparison, Mackay had lower levels of coping capacity, indicated by:

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Managing the events: successes and failures

Charleville

Successes: A flood warning was sounded in the early hours of the morning to alert residents. There was high community involvement in the management of the event and post-event cleanup activities.

Well coordinated response by local, state and federal governments to construct the temporary flood barrier.

An evacuation centre was established at the showgrounds, precautionary sandbagging was carried out and several homes were evacuated by emergency services personnel.

Failures: Limited radio channels for accessing information.

Mackay

Successes: Queensland Fire and Rescue Service were well equipped.

Local radio provided a forum for communication to facilitate physical and mental recovery.

Failures: Many emergency management staff were unable to reach their workplaces, which were cut off by flood waters. As a result, untrained personnel were required to implement emergency management plans. Telephone land lines failed and the mobile network was overloaded.

- Low community participation rates, as demonstrated by low formal volunteerism rates
- A belief that individuals have a limited personal responsibility to prepare for floods
- A limited sense of belonging to the Mackay community.

Specific issues identified by this case study include:

- The need to facilitate community involvement in volunteer organisations and identify vulnerable community members. Education, information and communication campaigns are required to address community inexperience and indifference.
- The need to develop Emergency Management Plans that can be implemented by unskilled personnel if key staff are unable to attend.
- The need for flood insurance cover products in areas that are frequently affected by flooding.

About this study

This study is one of a suite of Historical Case Studies of Extreme Events conducted under Phase I of the NCCARF Synthesis and Integrative Research Program. The authors are Armando Apan, Diane Keogh and Shahbaz Mushtaq (University of Southern Queensland), Melanie Thomas and David King (James Cook University) and Peter Baddiley (Bureau of Meteorology).

The study will be available online at www.nccarf.edu.au

National Climate Change Adaptation Research Facility
Griffith University

Gold Coast Qld 4222

P: 07 5552 9333

F: 07 5552 7333

www.nccarf.edu.au

