Australian Government

National Emergency Management Agency

D2024/9107

After Action Review of Australian Warning System implementation in Queensland

Report

Acknowledgement of Country

In the spirit of reconciliation NEMA acknowledges the Traditional Custodians of Country throughout Australia and their connections to land, sea and the community. We pay our respects to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

Table of Contents

Introduction

This report was developed in response to a request by Senator the Hon Murray Watt, Minister for Emergency Management, who tasked the National Emergency Management Agency (NEMA) with conducting an After Action Review (AAR). This review was facilitated by NEMA and included a broad range of stakeholders such as the Bureau of Meteorology (the Bureau), Queensland government emergency management agencies and local governments who came together to identify continuous improvement opportunities following implementation of the Australian Warning System (AWS).

This report presents insights on weather warnings based on observations collected during and after the AAR. Additionally, this report includes factual information on warnings issued by the Bureau and Queensland state and local government agencies.

The scope of this report is limited to warnings that occurred before and during Tropical Cyclone Jasper and the severe weather that followed (13 – 28 December 2023); and the South East Queensland Severe Storms (25 December 2023 – 4 January 2024).

Accountability and responsibility for weather warnings

Provision of weather and emergency management warnings, and related information, is an integral part of state and territory emergency management arrangements. Weather warnings assist the public to make informed actions to safeguard life, property and the environment. Any weather warning issued must be timely, tailored and relevant to the public.

Weather warnings are issued by the Bureau, as part of their legislated responsibilities, and by state and local governments as part of their responsibilities issuing AWS notifications.

Warnings issued by the Bureau

The Bureau has a range of functions such as weather forecasting, collection of weather observations, and the issuing of warnings for severe weather likely to endanger life or property, including weather conditions likely to give rise to floods or bush fires. This information is shared with the public, state and territory emergency management agencies as well as Australian Government (among other stakeholders).

State and territory emergency agencies then use this weather information, along with other factors, to inform their emergency alerts and warnings that are distributed to the public.

The functions of the Bureau are prescribed by the *Meteorology Act 1955* and *Water Act 2007.* The Australian Government Crisis Management Framework (AGCMF), defines the Bureau's role within the wider Australian Government context. The *Intergovernmental Agreement on Provisions of Bureau of Meteorology Hazard Services to the States and Territories* (IGA) defines the range of standards and supplementary services provided by the Bureau to emergency management agencies for fire weather, flood, and extreme weather and hazard impact events.

Australian Warning System

The AWS is a new national approach to information and weather warnings during emergencies like bushfire, flood, storm, extreme heat and severe weather. Up until recently there has been different warning systems for different hazard types across Australia. The AWS aims to provide consistent warnings to Australian communities so that people know what to do when they see a warning level. States and territories are responsible for issuing AWS warnings.

The AWS was implemented in Queensland on 1 November 2023 for the nationally agreed hazards of severe weather (storm), flood, and cyclone. Other nationally agreed hazards (bushfire and extreme heat) were

implemented earlier. Tropical Cyclone Jasper was the first time the AWS has been used in Australia for a cyclone event.

Australian warnings communication channels

Once a state emergency management agency has decided to issue a weather warning they will determine the method to disseminate information to the community, and may include:

- Emergency Alert (voice messages to landlines and text messages to mobile phones)
- Radio
- Web
- Bureau of Meteorology weather applications
- TV, and/or
- Social media.

Background

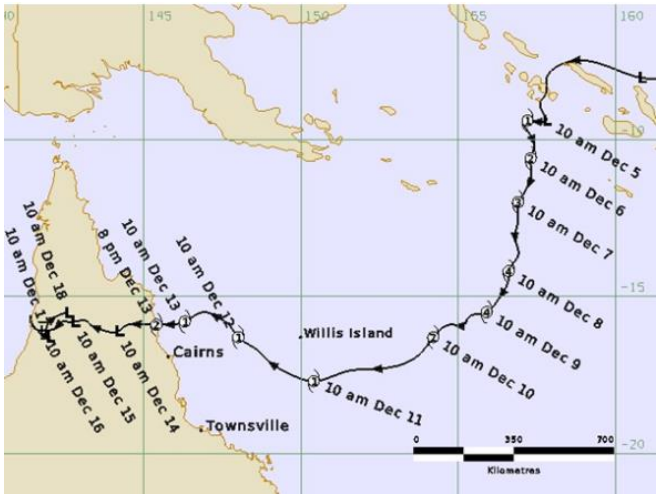
Key dates for Tropical Cyclone Jasper and South East Queensland Severe Storms and Rainfall can be found at **Annex A**.

Additionally, Media Releases issued by the Bureau for Tropical Cyclone Jasper can be found at **Annex B, Annex C, Annex D** and **Annex E.**

Tropical Cyclone Jasper (13-28 December 2023)

Tropical Cyclone (TC) Jasper crossed the Queensland coast as a category 2 system in the vicinity of Wujal Wujal at around 8 pm Australian Eastern Standard Time (AEST) on 13 December. Regions south of the cyclone track, which includes Port Douglas, experienced the strongest winds with gusts estimated to be up to 115 km/h. Once the TC had crossed the coast it weakened fairly quickly as it moved inland, decreasing to below tropical cyclone intensity by 12am AEST 14 December.

Ex-TC Jasper then stalled remaining over Cape York Peninsula for the next several days. A surface trough rapidly developed on 16 December on the eastern flank of Ex-TC Jasper and extended into the Coral Sea.



Moist north-easterly winds from the Coral Sea converged along this near-stationary trough with easterly winds strengthened by a building ridge in the Tasman Sea. The surface trough was located over mountains terrain that enhanced convection. As a result, heavy to intense rainfall fell over the north tropical coast area. This rainfall fell in river catchments that were already saturated due to earlier rainfall from TC Jasper's landfall and produced widespread flooding in the region.

TC Jasper was associated with a significant flooding event causing large-scale isolation, widespread power outages across North Queensland, and significant impacts to agriculture, animal welfare, small business and tourism.

Image one: track map of Tropical Cyclone Jasper issued by the Bureau.

The Bureau warned communities in North and Far North Queensland of the risk of heavy rainfall with the possibility of flooding due to TC Jasper six days in advance of the event. The Bureau forecast heavy to

intense rainfall which could lead to major flooding and life-threatening flash flooding four days in advance. The Bureau's forecasts of heavy to locally intense rainfall for areas in Far North Queensland over many days highlighted the risk of six-hourly rainfall totals between 250 to 300 mm being likely, with 24-hourly totals between 400 to 500 mm possible.

The Bureau issued 29 Severe Weather Warnings for the North Queensland area including Cairns and north to Port Douglas between 8:34am Wednesday 13 December to 1:51pm Monday 18 December. Before 13 December TC Warnings covered flooding impacts for these areas prior to first severe weather warning on 13 December. The Bureau provided 98 briefings to the Queensland Local Disaster Management Group from the commencement of the event on 4 December 2023. These briefings continued for the duration of the TC and tropical low.

From Monday 4 December 2023 the Bureau also issued over 30 social media posts including severe weather videos and media releases to communicate this information to the community. The Bureau also worked with ABC Emergency Broadcasting and conducted hourly radio crosses during the event to advise the community of the latest forecasts and warnings.

In addition to the weather warnings by the Bureau, 120 AWS notifications and 43 Emergency Alerts were issued by Queensland state and local government agencies.

South East Queensland Severe Storms and Rainfall (25 December 2023 – 4 January 2024)

During this event, a series of storms impacted South East Queensland, particularly the Logan, Scenic Rim and Gold Coast regions. The intense rainfall and flash flooding from the storms closed roads and caused landslips, with strong winds causing power lines and tress to fall on homes, vehicles and across roads. Widespread power outages were experienced along with an extensive clean-up effort requiring extraordinary support. Rescue crews responded to more than 140 jobs, including 28 rescues for individuals trapped inside their homes, vehicles or caravans. More than 120,000 people were without power across South East Queensland. Over 4000 requests for assistance were received by the State Emergency Service (SES). A number of fatalities associated with the severe weather were also recorded.

The Bureau warned communities of the risk of severe thunderstorms many days in advance of the thunderstorm outbreak event that took place in South East Queensland on 25 and 26 December 2023.The Bureau first communicated the likelihood of an outbreak of severe thunderstorms on Christmas and Boxing Day on Friday 22 December. These messages highlighted the risk of damaging winds, large hail, intense rainfall and flash flooding and were repeated every day from Sunday 24 December through to Tuesday 26 December.

The Bureau provided 12 formal briefings to emergency management agencies between 22 December and 25 December. The Bureau also issued a 'Weekend Weather Outlook' video on Friday 22 December and a Severe Weather video and Video News Release on Sunday 24 December. The Bureau worked closely with emergency management agencies prior to and during the period of severe weather to keep the community informed and extensively communicated its warnings and forecasts via the Bureau's website, BOM Weather app, through print, broadcast and social media. The Bureau continued to update its forecasts, warnings and advice to communities and emergency services agencies as new information became available.

In addition to the weather warnings by the Bureau, a total of 24 Emergency Alert warnings were issued for this event by Queensland state and local government agencies.

Queensland engagement

On Tuesday, 2 January 2024 the Public Information and Warnings Unit (PIWU) of QPS were tasked to conduct a Listening Tour (the Tour) over one month with a focus on weather warnings. The Tour included conducting a review with Local Government, QFES, Maritime Safety Queensland, LGAQ and internal stakeholders. The tour had a focus on:

- Recent disaster events
- Future state, and
- National and International best practice.

The Tour identified the following insights into weather warnings for Queensland:

- An increased expectation from the community for direct level warning communication.
- A review of the end-to-end EA request and processes to reduce issuing delays.
- Refresher pack on how to issue an EA.
- Refresher training for QPS Authorising Officers when approving an EA.
- Ongoing face-to-face debriefs to be conducted with local groups.
- Lessons to inform further warning improvements.
- Ongoing State AWS skilled personnel to support locally led warnings model.
- Further research and strategy development to enable the build/purchase of a multi-hazard warnings platform and complementary Mobile App.

Methodology

An After Action Review (AAR) was held in person at the Queensland State Disaster Coordination Centre and virtually via Microsoft Teams on Thursday 8 February 2024. The purpose of the AAR was to identify opportunities for continuous improvement. NEMA utilised the OILL Methodology (Observation, Insights, Lessons Identified, and Lessons Learned) see **Image two: Lessons Management Analysis** for an illustrative example.

Insights occur when there are multiple observations and pieces of evidence, which have a similar root cause. Typically, a minimum of three observations or pieces of evidence (across multiple sources) were utilised to inform each insight made, but often this is significantly higher.

This process is effective in identifying opportunities for continuous improvement as it encourages:

- Transparency in how lessons are identified
- Utilises an extensive evidence base to support lessons
- Allows a wide variety of perspectives and contributions to be included and considered.

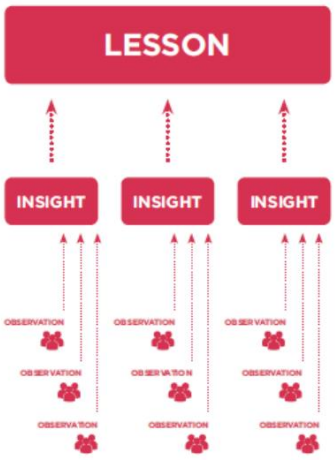


Image two: Lessons Management Analysis

Participants

The following agencies were invited to participate in the AAR and submit observations:

- NEMA
- the Bureau of Meteorology
- Queensland Police Services (QPS)
- Queensland Fire and Emergency Services (QFES)
- Local Government Association of Queensland (LGAQ)
- Banana Shire Council
- Brisbane City Council
- Burdekin Shire Council
- Cairns Regional Council
- Carpentaria Shire Council
- Cassowary Coast Regional Council
- Cook Shire Council
- Douglas Shire Council
- Gold Coast City Council
- Hinchinbrook Shire Council
- Hope Vale Aboriginal Shire Council
- Kowanyama Aboriginal Shire Council
- Lockhart River Aboriginal Council
- Logan City Council
- Mareeba Shire Council
- McKinlay Shire Council
- Murweh Shire Council
- Palm Island Aboriginal Shire Council
- Redland City Council
- Richmond Shire Council
- Scenic Rim Regional Council
- Tablelands Regional Council
- Townsville City Council
- Wujal Aboriginal Shire Council
- Yarrabah Aboriginal Shire Council

Observations

A total of 307 individual observations were collected during the AAR process, including:

- Records collected from participants during the facilitated AAR, and
- Qualitrics survey responses, which was made available to all invitees from Thursday, 8 February to Thursday, 15 February 2024.

Insights

This report considers what worked well and areas for further consideration or improvement based on the analysis of data collected. Additionally, key observations and themes identified by PIWU during the Tour informed NEMA's insights. Analysis of the observations has identified five key insights.

1. **Greater alignment of weather warnings**

Weather warnings are likely to be more effective in triggering protective community actions if there is a greater understanding of the various roles played by Australian Government, state and local agencies in issuing warning products. Insight analysis indicates there are opportunities to enhance awareness of the various warnings and who is responsible for issuing them in order to assist with the initiation, synchronisation and sequencing of warnings across the emergency management continuum. The Australian Warning System (AWS) has been developed and agreed nationally, to provide a consistent approach to warnings during emergencies such as bushfire, flood, cyclone, storm, flood and extreme heat. The AWS provides a framework to align warning across all hazards and provides consistency for call to action for the three level of warnings and consistent set of icons.

2. **Timing and sequencing of emergency warnings**

Queensland disaster management arrangements are most effective when state, district and local council's actions are synchronised and appropriately sequenced. Insight analysis identified that there were occasions where emergency managers were uncertain about the sequence of warnings and approval processes. Australian Fire and Emergency services aim to provide the public with timely and relevant information during emergencies.

3. **Emergency management sector education on warnings**

Public trust and confidence in emergency management institutions is upheld when reliable and timely warnings are issued. Issuing weather warnings is the responsibility of the Bureau of Meteorology and Australian Warning System notifications are the responsibility of Queensland state and local governments. Insight analysis identified the need for additional training to increase education and familiarisation with warning products and processes to enable speed to action.

4. **Communication and comprehension of warnings**

Weather warnings need to be easily comprehended by the public in stressful or uncertain circumstances. The text and graphics/mapping of warnings should provide clear and easy to understand information to support individuals to make informed decisions. Weather warnings need to be easily translatable by communities who may not easily comprehend complex or technical information.

5. **Community expectations**

Community expectations of warnings continue to increase with the presence of social media, access to technology and the frequency of updates, public information and notifications during the COVID-19 pandemic. Observations analysis identified that more effort is required by all organisations involved in issuing warnings to build community awareness and understanding of warnings systems and processes, their limitations, and where and how the community can access warning information from trusted sources.

Next steps

In alignment with OILL methodology, this report is the product of collaboration between agencies and departments to capture and share learnings to inform continuous improvement activities. QPS and QFES are conducting extensive reviews which have identified a number of training and education opportunities which

will be implemented in the coming months. QPS is currently implementing a range of resources to ensure that continuous improvement is occurring across the state.

Validation and Actions

The learnings outlined in this report may be used to inform a range of improvement activities, including preparedness and readiness planning to existing systems or processes. The Queensland Reconstruction Authority may wish to incorporate relevant insights into their "Get Ready Queensland" program which is a year round, all hazards, resilience building initiative designed to help Queensland communities prepare for natural disasters.

Insights were shared with AAR participants, who were provided with an opportunity to review the language and context.

Distribution

Learning products may be developed to share the lessons with a broader audience and ensure stakeholders are informed about how their observations inform state-wide learning and improvement. Key recipients for this report include: the Bureau, Queensland state and Local Government agencies, including LGAQ. Other relevant stakeholders, such as interstate agencies and departments, may also find value in this report to utilise learnings as part of their ongoing planning and continuous improvement activities.