

Kermadec Islands Earthquake 16 June 2019

Post-Event Report



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1 EXECUTIVE SUMMARY

The Ministry of Civil Defence & Emergency Management (MCDEM) is New Zealand's lead agency for tsunami hazards, and has statutory responsibility for issuing official warnings and advisories relating to tsunami activity. This role gives effect to MCDEM's wider objective of putting the safety and wellbeing of people at the heart of emergency management.

The Kermadec Islands earthquake was a magnitude 7.4 earthquake that required scientific assessment to determine if there was a tsunami threat to New Zealand.

The MCDEM Duty Team responded to the event remotely (i.e. away from the MCDEM office) on Sunday 16 June 2019. The response did not require the activation of the National Crisis Management Centre.

There were many positives for MCDEM including the performance of the National Warning System, and the confidence the Duty Team had in their roles and the support they provided to each other.

A comprehensive debriefing process was undertaken after this response to ensure that lessons were captured from this event, and that those lessons were informed by viewing the event through the eyes of the public. Areas that will benefit from improvement fall into the following themes:

- including clear public communications on why certain decisions are made and how quickly science advice can change would be helpful, and
- improvements that could be made to tsunami templates contained in the National Warning System (including the language used to describe tsunami activity).

The report provides an overview of the event and its impacts, the response at the national level and the lessons captured through the debrief process. It also suggests remedies for areas that can be improved.

2 PURPOSE

To be effective in its role of putting people at the heart of the emergency management system, MCDEM needs to learn and implement actions for continuous improvement. Every emergency provides an opportunity to reflect on our performance and identify opportunities to become more effective in maintaining public safety and in supporting affected communities, by working with our partners, stakeholders and the media to achieve this.

The purpose of this report is to provide an overview of the MCDEM response to the tsunami threat generated by a large earthquake in the Kermadec Islands on 16 June 2019. The report captures aspects of the response that may be improved and aspects that worked well. In particular, the experiences of this event have been viewed through the eyes of the public to identify lessons for effective communication in future events, with the intention of providing clear and timely advice, mitigating confusion, and ultimately, preserving life safety.

The report represents MCDEM's standard process following each response with debriefing, capturing lessons, and identifying any corrective actions that may be necessary. It focuses on MCDEM's own response performance; therefore it does not cover the CDEM Groups' response, nor does it reflect on the wider context of the CDEM framework and its structures.

3 OVERVIEW OF THE RESPONSE

3.1 Incident Overview

The Kermadec Islands earthquake was a large earthquake that occurred on 16 June 2019 and required scientific assessment to determine whether there was a tsunami threat to New Zealand. A Large Pacific Earthquake Being Assessed message was issued shortly after the MCDEM Duty Team was notified of the earthquake. After initial scientific assessment by GNS Science, a National Tsunami Warning: Beach and Marine threat was issued. Once GNS Science observed tsunami waves at gauges at Raoul Island (and were determined to be no threat to New Zealand), a National Advisory: No Threat message was issued.

The MCDEM Duty Team managed the response to the earthquake remotely (i.e. away from the MCDEM office). The National Crisis Management Centre was not activated.

3.2 Summary of Actions Taken by MCDEM Staff

3.2.1 Background to the tsunami warning process

The MCDEM Duty Team is comprised of ten staff covering the roles of Duty Manager, Duty Officer, Warning Systems Specialist, Public Information Manager, Webmaster, two Activators and three Regional Emergency Management Advisors (covering each of the three Northern, Central and Southern CDEM Groups).

Unlike the GNS Geohazard Monitoring Centre, which is a 24/7 'awake' capability, MCDEM's Duty Team is not 'awake' 24/7, working instead on an around the clock on-call basis. GNS Science has two to three staff rotating through three shifts in the National Geohazard Monitoring Centre covering a 24-hour period. The MCDEM Duty Team is required to carry basic equipment at all times and must be sober and drug-free and fulfil the various roles described above in addition to their business as usual roles. The team must be within approximately 30 minutes of the National Crisis Management Centre.

When MCDEM receives notification of an earthquake such as the Kermadec Islands event of Sunday 16 June, via the Pacific Tsunami Warning Centre, the Duty Team assesses the earthquake parameters based on pre-agreed thresholds (established in collaboration with GNS Science) and consults with GNS Science. When an earthquake does not meet thresholds but are near them, MCDEM acts upon advice from GNS Science. These thresholds are outlined in the Tsunami Advisory and Warning Plan (available at www.civildefence.govt.nz). The MCDEM Duty Team uses standard operating procedures to guide them in the process of whether or not to issue an advisory or warning.

Extensive work has gone into developing tsunami standard operating procedures over the years, and after every real event or exercise, they are modified as required to reflect any lessons identified.

MCDEM is working with GNS Science to find ways to improve the speed and efficiency in the tsunami warning process, to give effect to the Government's Emergency Management System Reform decision to speed up tsunami warnings. .

In addition, GNS Science and MCDEM perform a weekly duty drill where various scenarios are exercised.

3.2.2 Response action on 16 June 2019

In the event on Sunday 16 June, the earthquake magnitude of 7.4 did not meet the threshold (of magnitude 7.9+ at a depth of <150km) to move straight to issuing a warning. However, careful consideration is required for the Kermadec Islands area, as travel times from waves could be as close as an hour away and that the magnitude may increase, or decrease, based on further scientific assessment.

As such, MCDEM issued a 'Large Pacific earthquake being assessed' message while it waited for GNS Science to provide further information. This message provides rapid assurance to the public that MCDEM is actively assessing the situation while the formal advisory or warning is being confirmed. Updates to Twitter and Facebook occurred automatically (pushed to social media by the warning system) quickly followed by an update to the MCDEM website by the Webmaster.

It should be noted that integration between the warning system and the MCDEM website is not yet automated and requires a manual step to be performed by the Webmaster. MCDEM is working with the supplier to add this functionality to the system.

Shortly after the 'Large Pacific earthquake being assessed' message was issued, GNS Science provided information to indicate that a beach and marine threat was possible. MCDEM subsequently issued a tsunami warning for a beach and marine threat. Once again, updates to Twitter and Facebook occurred automatically (pushed to social media by the warning system).

As MCDEM was updating the website with this information, GNS Science advised that the Tsunami Experts Panel, a multi-agency committee of New Zealand tsunami experts, had convened. Based on the magnitude having been revised down to 7.0 (from a magnitude 7.4) and that tsunami gauge readings at Raoul Island had been recorded and were less than ten centimetres, the Tsunami Experts Panel advised MCDEM that there was no tsunami threat.

It was agreed by the MCDEM Duty Team to issue a 'No Threat' message immediately to alert the public that the threat had passed. The MCDEM Duty Team then abandoned the update to the MCDEM website with the beach and marine threat information and instead published a notification that the threat had passed.

This resulted in a brief period in which the website did not reflect the current warning status, as to do so would be to publish information that the Duty Team knew was out of date.

Throughout this process, media were kept informed by the Public Information Manager through proactive calls and reactive responses. Radio interviews were proactively arranged.

As with all events, MCDEM and GNS Science have conducted a full debrief of events to identify any improvements to systems and processes.

4 EVALUATION

4.1 Method

This report summarises information captured during debriefing sessions for MCDEM staff who were on duty during the event response. The process for debriefs after the response followed a lessons management methodology. The following format was used for staff to provide feedback into the debrief:

- **Observation** – detailed information about what people observed during the response.
- **Barriers** – barriers that prohibited people from resolving issues in the response.
- **Opportunities** – opportunities that were identified in the response.
- **Highlights** – things that worked well in the response and should be reinforced.

4.2 Highlights (What worked well)

Feedback indicates that the MCDEM Duty Team was responsive and there was good visibility of actions through the use of text groups.

The Duty Team were confident in their roles and supported each other. The Activators promptly followed direction to activate the National Crisis Management Centre when directed (but were stood down as soon as the 'No Threat' advice was received).

The National Warning System performed well and the Duty Manager reported that sending the initial message was straightforward from the mobile phone.

The Public Information Manager proactively engaged with the media throughout the response.

The GNS Science/MCDEM conference call was clear and information was relayed quickly and efficiently. It was also useful that they left the conference call open in case MCDEM had further questions. It was the first time the new (email) advice form was used to convey the science advice to the MCDEM Duty Team and this was useful.

4.3 Key challenges

There is a fine line between the need for speed (automation) and any bespoke crafting of National Warning System messages, public information messages and social media posts.

Without pre-computed maps or bespoke maps produced with the exact earthquake parameters (the latter takes at least 10 to 15 minutes to produce), GNS Science is currently unable to provide MCDEM with an exact location for where tsunami wave activity might occur. This lack of location information means that MCDEM is unable to provide specific advice to the CDEM Groups, media and the public until that science advice is provided. During this 'information void' period MCDEM issues warnings without a map or estimated time of arrival.

The end to end process for issuing a tsunami warning is complex and takes time (often under considerable time pressure) and decisions are made with the information available at the time (but noting that the situation is often evolving and will change rapidly). We have worked closely with media in recent years to better explain these processes and challenges, including the development of a *Tsunami Warnings* guide for media. These discussions with media have also informed a number of improvements to our processes.

Over the years, especially with the growth in social media, there is a growing expectation that more context is provided in the national warning messages. Current warning messages are templated (for speed and efficiency) and wording is generally not altered a great deal to ensure the information is disseminated as quickly as possible. To provide more contextual information will mean additional minutes are needed to develop succinct and accurate messages.

Unlike the GNS Geohazard Monitoring Centre, which is a 24/7 'awake' capability, MCDEM's Duty Team is not 'awake' 24/7. The Government has made a decision to establish an 'awake' 24/7 capability for MCDEM; this is currently being scoped.

Corrective Action: *Continue scoping the MCDEM 24/7 (awake) monitoring, alerting and warning capability, with a view to implementation as soon as practicable.*

4.4 What could be improved

Explaining rationale for decision making

Feedback from the public and Civil Defence Emergency Management Groups indicates that it would have helped people if they understood more about why a no threat advisory was issued shortly after issuing the beach and marine threat warning.

Prioritisation was given to 'getting the message out' using standard templates, rather than spending time to craft wording to explain the rationale behind the decision. However, on some occasions (particularly where the situation has changed), it can be helpful to take additional time to provide contextual information to give greater clarity and assurance to the public.

It appears that the use of the term 'Beach and Marine Threat' (i.e. when people need to stay out of the water and away from the shoreline and when boats/ships could be affected by unusual currents/swells) is perceived by the public as very similar to a 'Land Threat' (i.e. when people need to evacuate inland or to higher ground). Whilst both situations warrant warnings under current arrangements the actions for the public to take are different. Confusion between the two could create a 'crying wolf' perception, causing members of the public to underestimate land threat danger if/when a land threat is possible. Added to this, potential confusion arises when those in coastal areas (but not on the beach) interpret the term 'beach' as meaning 'coast'. This can result in an incorrect perception that they need to evacuate.

The lack of information regarding the location of tsunami wave activity meant that people were unsure if they would be affected or not.

Corrective Action: *Procedures and training will be amended to reflect that further contextual information will be developed and included in communication to the public to explain the rationale for downgrading or cancelling a threat at the discretion of the MCDEM Duty Manager. This will include information in the warning messages and in the website and social media posts.*

Corrective Action: *National Warning System templates will be amended to indicate with greater clarity that the situation may change quickly and to advise the public to stay informed.*

Corrective Action: *National Warning System templates will be amended to clearly indicate that for Beach and Marine Threat events, no evacuations are necessary and to warn that strong currents may be present so people should avoid beach and marine activity.*

Corrective Action: *Some indication of location must be provided in initial warnings (even if the area needs to be expanded or reduced as more information comes to hand).*

Corrective Action: Amending the terminology used when referring to Beach and Marine activity to obtain more clarity between that and a Land Threat.

Corrective Action: Use of a Cancellation message should follow a Marine and Beach Threat warning (to provide more clarity that the threat has passed).

When a warning or advisory is issued via the National Warning System, Twitter and Facebook posts are generated automatically (and mimic the wording in the warning or advisory message). The website must be updated manually due to constraints between the two systems, and as a result, are 'behind' the social media posts.

Corrective Action: The integration between the MCDEM website and the warning system must be automated. In the interim, explore whether the website can be updated immediately prior to social media posts being published, or whether references to the website be excluded from social media posts until after the website is updated.

Communication within the MCDEM Duty Team

Communication between the MCDEM Duty Team members was generally effective. With multiple teleconferences occurring for the MCDEM Duty Team and between the MCDEM Duty Team and GNS Science at the same time, there is room for clarity and sequencing to avoid confusion.

Corrective Action: Communication technology to be further explored to find ways to better communicate between duty team members regardless of their location.

Corrective Action: Training with all Duty Staff to clarify and reinforce the MCDEM Duty Conference call number.

Alignment with GNS Science

GNS Science routinely speaks with the media during events as does MCDEM. In this instance, there was some misalignment with messaging which resulted in some confusion. MCDEM and GNS should only provide media commentary relating to their direct responsibilities – that is, MCDEM speaks to the advisories and the process and advice that informs those advisories, and GNS Science speaks to the science. On this occasion, misalignment occurred when GNS provided commentary on the MCDEM-led process.

Corrective Action: GNS Science and MCDEM to work more closely before, during and after events to ensure media engagement is aligned and that the agencies speak to their respective responsibilities.