

AGENDA



P O Box 747, Gisborne, Ph 06 867 2049 Fax 06 867 8076
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MEMBERSHIP: Her Worship the Mayor Rehette Stoltz, Deputy Mayor Josh Wharehinga, Meredith Akuhata-Brown, Bill Burdett, Andy Cranston, Shannon Dowsing, Sandra Faulkner, Larry Foster, Debbie Gregory, Isaac Hughes, Tony Robinson, Pat Seymour, Terry Sheldrake and Kerry Worsnop.

CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP

DATE: Wednesday 11 May 2022

TIME: 9:00AM

AT: Te Ruma Kaunihera (Council Chambers), Awarua, Fitzherbert Street, Gisborne

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Civil Defence Emergency Management

Reports to:	Council
Chairperson:	Mayor Stoltz
Deputy Chairperson:	Cr Wharehinga
Membership:	Mayor and all councillors
Quorum:	Half of the members when the number is even and a majority when the membership is uneven.
Meeting Frequency:	As required. Meetings may take place on the same day as Council meetings.

Purpose

To ensure that appropriate emergency management as detailed in the Civil Defence Emergency Management Act 2002 (the Act) is carried out within the Gisborne District.

Provide governance and oversight of the activities required to be undertaken on its behalf by the Act. Council is required to establish a Civil Defence and Emergency Management Group under s 12 (b) of the Civil Defence and Emergency Management Act 2002 (the Act).

Terms of Reference

The Civil Defence and Emergency Management Committee has responsibility and authority to:

- Be Gisborne's strategic forum for civil defence emergency management planning and policy.
- Co-ordinate planning, programmes and activities related to civil defence emergency management across the areas of risk reduction, readiness, response and recovery.
- Assist in local civil defence emergency management planning activity through developing, approving, implementing and monitoring the Gisborne Civil Defence Emergency Management Group Plan and ensuring alignment of local planning with national plans and strategy.
- Exercise the statutory powers outlined in the Act, including undertaking the functions prescribed in section 17 of the Act.

Relevant Legislation includes but is not limited to

- Civil Defence Emergency Management Act 2002

3.1. Confirmation of non-confidential Minutes 23 February 2022

MINUTES

Draft & Unconfirmed



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MEMBERSHIP: Her Worship the Mayor Rehette Stoltz, Deputy Mayor Josh Wharehinga, Meredith Akuhata-Brown, Bill Burdett, Andy Cranston, Shannon Dowsing, Sandra Faulkner, Larry Foster, Debbie Gregory, Isaac Hughes, Tony Robinson, Pat Seymour, Terry Sheldrake and Kerry Worsnop.

MINUTES of the CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP

Held via Audio Visual Link on Wednesday 23 February 2022 at 9:00AM.

PRESENT:

Her Worship the Mayor Rehette Stoltz, Deputy Mayor Josh Wharehinga, Meredith Akuhata-Brown, Bill Burdett, Andy Cranston, Shannon Dowsing, Sandra Faulkner, Larry Foster, Debbie Gregory, Isaac Hughes, Pat Seymour, Terry Sheldrake and Kerry Worsnop.

IN ATTENDANCE:

Chief Executive Nedine Thatcher Swann, Director Lifelines David Wilson, Civil Defence & Emergency Manager Ben Green, Senior Regional Emergency Management Advisor Ian Wilson, Democracy & Support Services Manager Heather Kohn and Committee Secretary Jill Simpson.

The meeting commenced with a prayer.

Secretarial Note: Cr Burdett attended the meeting in the Council Chambers.

1. Apologies

MOVED by Cr Stoltz, seconded by Cr Sheldrake
That the apologies from Cr Robinson be sustained.

CARRIED

2. Declarations of Interest

There were no interests declared.

3. Confirmation of Minutes

3.1 Confirmation of non-confidential Minutes 27 October 2021

MOVED by Cr Seymour, seconded by Cr Stoltz
That the Minutes of 27 October 2022 be accepted.

CARRIED

Once equipment has arrived the rain gauge will be sited in the Mangahauini Catchment, Tokomaru Bay.

Item 10.1 bullet point 5 refers to planning for a 3 day workshop specifically focused on the urban response and recovery. Initial planning has been delayed as considerable contribution is required nationally. Now looking at first or second week of April for this workshop.

3.2 Confirmation of Confidential Minutes 27 October 2021

MOVED by Cr Seymour, seconded by Cr Foster

That the Minutes of 27 October 2021 be accepted.

CARRIED

3.3 Action Sheet

4. Leave of Absence

There were no leaves of absence.

5. Acknowledgements and Tributes

There were no acknowledgements or tributes.

6. Public Input and Petitions

There were no public input or petitions

7. Extraordinary Business

There was no extraordinary business.

8. Notices of Motion

There were no notices of motion.

9. Adjourned Business

There was no adjourned business.

10. Reports of the Chief Executive and Staff for INFORMATION

10.1 22-31 CDEM Manager Report 2021/22 CDEM Group

Civil Defence & Emergency Manager Ben Green attended and spoke to the report. Considerable work has been undertaken for regional preparation for onset of COVID specifically around the Delta and the emergence of Omicron.

Chief Executive Nedine Thatcher-Swann advised that Regional Leadership Groups have been set up across New Zealand. In Tairāwhiti the group consists of Chief Executives from Council, iwi partners, Trust Tairāwhiti and Health along with community leaders. The purpose of the Group is to provide information and intel to Central Government.

Mayor Rehette Stoltz acknowledged the huge amount of mahi that Ben Green, our iwi partners and our Health providers have accomplished.

Questions of clarification included:

- Analytics on current case flows and vaccination rates sits with Hauora Tairāwhiti. There is concern on the pressure that will be placed on our hospital system.
- As a region Tairāwhiti is better connected in the welfare sense.
- A positive notification of COVID in a household gives direct access to the system in terms of contact tracing. Part of the contact tracing call determines the needs for welfare assistance. Initial focus for the Takatu Hub is support for the first 48 hours of notification of a positive COVID case with ongoing support for isolation.
- Acknowledges the region for reaching 90% vaccination rate and the amount of work the agencies did to get our region prepared.

The Chief Executive advised the modelling is playing out on a National scale so the better prepared we are the more we will be able to cope. It has been announced that \$140m funding will be going towards the Maori and Pacifica providers for the welfare response. Toitu Tairāwhiti were successful in securing some funding to support iwi led and community led responses to the welfare support.

- Messaging around COVID response needs to be digestible to the audience you are targeting.
- The Takatu Hub is a health run body. There are clinical leads and welfare connectors.
- The primary purpose for the Emergency Coordination Centre (ECC) for Tairāwhiti CDEM is to have a dedicated headquarters for responding to emergency events. A press release will be provided regarding the stage the ECC is at along with the purpose of the building.
- The Trifecta Programme consultation has commenced. Iwi engagement is critical and the current Act is deficient in terms of referencing to Treaty partnership.

The Chief Executive advised that the Trifecta Review is a large piece of work and as a Unitary we operate differently from other Civil Defence groups. Implications could be considerable in terms of operations depending on where it anchors itself. Running alongside this is 3 Waters Reform and the future for local government. In terms of the Trifecta Review there are good proposals coming out of it but will come down to capacity to be able to input and manage the connections across the various reform packages.

Senior Regional Emergency Management Advisor Ian Wilson advised the Trifecta Review is being broken into 11 projects. Consultation will be carried out from February through to June.

There is overall support from Iwi for the Bill recognising that this is the first step. There will be challenges for both Iwi and CDEM.

General points

- Based on the recent national 'ShakeOut' Campaign Tairāwhiti ranked 1 nationally for this campaign is well placed in terms of preparedness.
- For 2021, CDEM conducted Forty plus community hui have post the 5 March earthquake and tsunami events.
- The East Cape Road has had full access restored on 25 February following a large slip. Five families who were isolated were supported with welfare and supplies.

Ian Wilson further advised that with Omicron spreading NEMA are looking at the registration of critical businesses. Registration will allow free Rapid Antigen Tests for any employee who tests positive.

Ian also advised that an advertisement has been placed for a Senior Advisor for Maori Policy and Practice Lead.

Further questions included:

- \$1.6m of emergency equipment funding has been approved by Te Puni Kokiri for the region which includes co-funding from Toitu Tairāwhiti.

Director Lifelines David Wilson advised staff have been working with the community and landowners around Te Arai regarding the landslide and reinstating access.

MOVED by Cr Faulkner, seconded by Cr Wharehinga

That the Civil Defence Emergency Management Group Committee:

1. Notes the contents of this report.

CARRIED

11. Close of Meeting

There being no further business, the meeting concluded at .10.07am

Rehette Stoltz
MAYOR

3.2. Action Sheet

Meeting Date	Item No.	Item	Status	Action Required	Assignee/s	Action Taken	Due Date
18/12/2019	10.2	19-351 Internal CDEM Review Recommendations - Next Steps	In progress	Initiate work to deliver on the medium-term recommendations from the internal review of the Civil Defence Emergency Management activity.	Ben Green	17/03/2021 Ben Green An update was provided at 14 April 2021 CEG meeting.	11/05/2022
27/10/2021	11.1	21-228 Tairawhiti CDEM Manager's Report	Completed	The Ministry of Health was to lead the "traffic light system", however the issue concerning our borders and our geographical neighbours achieving 90% vaccinations before us would be raised with NEMA and details provided to the Group.	Ben Green	22/04/2022 Ben Green Superseded due to the current traffic light system.	Completed

10. Reports of the Chief Executive and Staff for DECISION



22-78

Title: 22-78 Tairāwhiti Civil Defence and Emergency Management Report
April 2022

Section: Civil Defence Emergency Management

Prepared by: Ben Green - Civil Defence Emergency Management Manager

Meeting Date: Wednesday 11 May 2022

Legal: No

Financial: No

Significance: **Low**

Report to CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP for decision

PURPOSE

The purpose of this report is to approve the circulation of the draft 'Assessment of the 20 June 2021 Weather Event' to the Tokomaru Bay community and to provide an update on the actions carried out by the Tairāwhiti Civil Defence and Emergency Management (TCDEM) team since the last CDEM Group meeting in February 2022.

SUMMARY

Prior to the COVID-19 Omnicron outbreak a community hui was to be arranged in Tokomaru Bay to discuss the June 2021 weather event. The attached report was to have been released for the community's input at this meeting. The Tokomaru Bay community is encouraged to have input into this draft report by contacting the report author Dr Murry Cave (Murry.Cave@gdc.govt.nz)

The report provides updates for the period that includes:

- TCDEM update
- COVID-19 update
- Emergency Coordination Centre update
- 22 March – 1 April 2022 severe weather event
- National Emergency Management Agency (NEMA) update
- Regulatory Framework Review (Trifecta) Programme update
- NEMA Resilience Fund application

The decisions or matters in this report are considered to be of **Low** significance in accordance with the Council's Significance and Engagement Policy.

RECOMMENDATIONS

That the Civil Defence Emergency Management Group:

1. Approves the draft report titled 'Assessment of the 20 June 2021 Weather Event' (Attachment 1), for circulation to the Tokomaru Bay community.

Authorised by:

David Wilson - Director Lifelines

Keywords: civil defence, emergency management, resilience, safety, natural events, cyclone CODY, rain events

TCDEM UPDATE

1. The Tairāwhiti CDEM team has experienced an eventful reporting period, given the response and recovery support to natural events that the region has been subject to. This includes:
 - 1.1. **January 2022:** A near-miss event with Cyclone Cody. Regional planning was conducted in preparation for what was forecast for the North Island. Fortunately, this did not eventuate.
 - 1.2. **5 January 2022.** The Tongan volcanic event and subsequent tsunami risk to New Zealand.
 - 1.3. **6 February 2022.** Heavy rainfall that affected the East Cape on Waitangi weekend. This resulted in damage to the East Cape Road, and the community in the vicinity of the East Cape Lighthouse, were cut off for three weeks. TCDEM coordinated welfare support to whanau during this period.
 - 1.4. **22 March – 1 April 2022: severe weather event** (Declared Emergency). Region-wide heavy rain, wind and swell that resulted in widespread damage across Tairāwhiti.
 - 1.5. **13-14 April: Cyclone FILL.** A short but intense weather system associated with Cyclone FILL brought rain, gale-force winds, and sea swells into the region. This added to the damage and impact of the severe weather event three weeks earlier.
2. It has been a very busy period for the CDEM team given the response and recovery support required for these natural hazard events. Also, the new CDEM team members have only been in place since the start of this year. This also applies to all residents of the region who have been dealing with both the onset and peak of Omicron and successive natural hazard events. The reality is that there is a pattern and regularity forming with these weather events. This necessitates the requirement to continue with developing community resilience, inclusive of self-responsibility.

CDEM WORK PRIORITIES – RECONFIGURING FROM COVID-19

3. COVID-19 will continue to be present within workplaces and communities for the foreseeable future. The shift to getting the country operating again without the restrictive constraints will now allow for the resumption of direct engagement with community groups.
4. The CDEM team will be looking to engage with our Community Link Groups to develop their capability, structure and introduce training given these groups form a vital link when activated for response activities. Given these groups have been activated for all the events this year, there are those that are still in the stage of 'reforming' due to staff succession who will be supported by TCDEM and other Community Link groups.

COVID-19 UPDATE

5. The national COVID-19 strategy now reflects there will be community transmission of COVID-19, with risks to vulnerable communities, and pressure on the health system. As such, Tairāwhiti Hauora remain the lead agency for clinical management of COVID-19 which still has the Takatu Hub providing the welfare and manaaki support.

EMERGENCY COORDINATION CENTRE UPDATE

6. The Emergency Coordination Centre (ECC) is currently about to enter public consultation about the proposed site and intention to build an ECC. The cost of build is also being developed given the challenge of the current building market and the rate of inflation.

22 MARCH – 1 APRIL 2022 SEVERE WEATHER EVENT

7. On 23 March 2022 heavy rain and flooding occurred when a subtropical low to the northeast of the North Island dumped rain that exceeded the one in 100-year levels across the entire Tairāwhiti region, for over a week (nine days). After having a dryer-than-normal spell in the previous week, intense rain fell at high elevation, running down the slopes of the ranges and filling up rivers and streams which spilled their banks and flooded low-lying areas. The impact of this severe weather affected several houses in various locations, damaged roads, bridge infrastructure and rural land. This was a complex event that necessitated the evacuation of communities (at different times) at risk of flooding in Manutuke, Mangatuna, Te Karaka and Tokomaru Bay. Several whanau voluntarily self-evacuated as the weather deteriorated through the event.
8. Given a state of emergency was declared for this event, a transition to recovery came into effect on 1 April 2022, which is being led by the Tairāwhiti CDEM Group Recovery Manager, James Baty. Consolidated Recovery Sitrep#3 and the Tairāwhiti Recovery Transition report are attached (**Attachments 2 and 3**).

9. NATIONAL EMERGENCY MANAGEMENT AGENCY (NEMA) UPDATE

10. A verbal report will be provided by the Regional Emergency Management Advisor.

REGULATORY FRAMEWORK REVIEW PROGRAMME (TRIFECTA)

11. The Trifecta Programme seeks to build a modern, inclusive, fit-for-purpose, and enduring framework for the emergency management system. It brings together three projects:
 - A new Emergency Management Bill.
 - A review of the National Civil Defence Emergency Management Plan (CDEM Plan) and accompanying Guide; and
 - A roadmap for the National Disaster Resilience Strategy.
12. Dave Gawn, NEMA Chief Executive, has provided an update on the sector reforms (**Attachment 4**) and a discussion paper for CDEM Group Chairs regarding “Clarifying the functions of local authorities and CDEM Groups” (**Attachment 5**).
13. Of note, the Hon Kiritapu Allan, Minister for Emergency Management, has proactively released the November 2021 Cabinet Paper on ‘Emergency Management System Reform’. This Cabinet Paper includes policy proposals for ensuring recognition and representation for the role iwi and Māori play in emergency management. The Cabinet Paper is available at: <https://www.civildefence.govt.nz/assets/Uploads/publications/Proactive-Release-Emergency-Management-System-Reform.pdf>

CDEM RESILIENCE FUND 2022

14. NEMA has announced that the recent application from Tairāwhiti's CDEM has been successful. The application titled "Improving resilience from rain events. Understanding the impact of high-intensity storms on property in Tairāwhiti and an analysis of changes to risk and resilience resulting from climate change" will be led by Council's Principal Scientist, Dr Murry Cave (**Attachment 6**).

ASSESSMENT of SIGNIFICANCE

Consideration of consistency with and impact on the Regional Land Transport Plan and its implementation

Overall Process: Low Significance

This Report: Medium Significance

Impacts on Council's delivery of its Financial Strategy and Long Term Plan

Overall Process: Low Significance

This Report: Low Significance

Inconsistency with Council's current strategy and policy

Overall Process: Low Significance

This Report: Low Significance

The effects on all or a large part of the Gisborne district

Overall Process: Low Significance

This Report: Low Significance

The effects on individuals or specific communities

Overall Process: Low Significance

This Report: Low Significance

The level or history of public interest in the matter or issue

Overall Process: Low Significance

This Report: Low Significance

15. The decisions or matters in this report are considered to be of **Low** significance in accordance with Council's Significance and Engagement Policy.

TANGATA WHENUA/MĀORI ENGAGEMENT

16. CDEM will be working with Te Puni Kokiri and iwi as part of getting the Tairāwhiti Marae Resilience and Emergency Preparedness Project underway. The project will be co-funded by Te Puni Kōkiri, Ngāti Porou, Ngāi Tāmanuhiri, Rongowhakaata and Te Rūnanga o Tūrangānui-ā-Kiwa. The project will be funding strategically located emergency pods in or near marae clusters throughout Tairāwhiti.

17. This represents a great outcome for the region, in particular marae in remote locations which will be resourced with quality emergency equipment that will help them survive and recover from significant disaster events such as tsunami, floods or extreme weather.
18. The project team consists of staff from Council and iwi and will be led by Ben Green, CDEM Manager. The project will be phased, with Te Puni Kokiri committing \$964,938 for Phase 1 (currently underway) and iwi committing \$596,058 to phases 2 and 3.

COMMUNITY ENGAGEMENT

19. There has been no community engagement directly associated with this update report.

CLIMATE CHANGE – Impacts / Implications

20. Tairāwhiti has experienced a significant number of severe weather events that are likely exacerbated by the impact of climate change. Severe weather events will be a frequent occurrence across the region given what has been seen over the last 12 months.

CONSIDERATIONS

Financial/Budget

21. There are no financial or budget implications arising from this report.

Legal

22. The Civil Defence Emergency Management Group (CDEM) is part of the Council's obligations under the Civil Defence Emergency Management Act 2002 (the Act).

POLICY and PLANNING IMPLICATIONS

23. There are no policy and planning implications arising from this report.

RISKS

24. There are no major risks associated with the matters in this report.

ATTACHMENTS

1. Attachment 1 - Assessment of the 20 June 2021 Weather Event [**22-78.1** - 76 pages]
2. Attachment 2 - SIT REP 3 - Tairāwhiti Region Consolidated Recovery - March- April 2022 Flooding- Cyclone [**22-78.2** - 10 pages]
3. Attachment 3 - Tairāwhiti Recovery Transition Report April 2022 [**22-78.3** - 24 pages]
4. Attachment 4 - NEMA CE Update on Emergency Management system reforms [**22-78.4** - 2 pages]
5. Attachment 5 - NEMA CE 2022 03 18 - For Discussion - Clarifying the functions of local authorities and CDEM Groups [**22-78.5** - 4 pages]
6. Attachment 6 - Tairāwhiti CDEM- Resilience Fund application Extreme Weather Events FEB 2022 [**22-78.6** - 5 pages]

Assessment of the 20th June 2021 Weather Event



Te Kaunihera o Te Tairāwhiti
GISBORNE
DISTRICT COUNCIL

Dr M. P. Cave
Principal Scientist
Gisborne District Council
August 2021

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Assessment of the 20th June 2021 Weather Event, v.2.1



Dr M. P. Cave
Principal Scientist
Gisborne District Council
August 2021

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This report is to remain in draft until the local community has had the opportunity to assess and provide feedback

Executive Summary and Conclusions

1. On the morning of 19th of June, the MetService issued a heavy rain warning for Gisborne advising the region to expect 100 to 150mm of rainfall north of Tolaga with peak intensities of 20 to 30mm/hr of rain in the evening and again the following morning. An update that evening advised to expect a further 70 to 100mm of rain on top of what had already fallen with peak intensities of 20 to 30 mm/hr Sunday 20th June.
2. The weather event developed largely as forecast by MetService with heavy rain in the Waikura Valley area in the northwest and in a band extending northeast towards Tokomaru Bay and Tolaga. Rainfall accumulations were rather higher than forecast, however, with the highest occurring in the Waikura valley area (184mm/12 hr, 194.8mm/24 hr) with heavy rain from Te Puia/Waipiro Bay to Tokomaru Bay (150.4mm/12 hr, 154.4mm/24 hr at Te Puia). A private gauge at Tokomaru Bay recorded 160mm over 12 hours.
3. The weather event lasted up to 13 hours depending on location but 93% of the mean rainfall accumulation occurred across all rain gauges within a 12 Hour window and this assessment analysed rainfall at each site for 1 hour and 12-hour intervals as it was assessed that this best defined the storm.
4. Surface flooding occurred widely from south of Tolaga Bay to Te Araroa but slips were only significant on the main highway at Oweka near the Lottin Point turnoff.
5. Unexpectedly heavy rain occurred at Tokomaru Bay starting at or soon after 6am on the Sunday with a peak rainfall from 7am to 8:30am and this cause significant flash flooding affected both the Mangahauini and Waiotu/Kaiawha catchments, particularly along Arthur Street in the Waiotu catchment and Toa Street in the Mangahauini Catchment. Deep surface flooding also occurred in low lying areas between the two catchments in the Hatea-A-Rangi area. It is estimated that around 75mm fell within 1 ½ hours but it may have been higher.
6. Using HIRDS v.4, regionally the overall storm had a 12 hour rainfall accumulation ARI (Annual Recurrence Interval) of 2.5 years but the 12 hour rainfall recorded at the private rain gauge at Tokomaru Bay had an ARI of 13.5 years. The short duration high intensity storm had an ARI of 30 to 35 years if the accumulation occurred over 1 ½ hours or 100 years if most of that heavy rain fell within an hour.
7. Flooding impacts were exacerbated by an associated storm surge which impeded drainage of flood waters.
8. Neither the Mangahauini or Waiotu/Kaiawha catchments have river flow or rain gauges and hence the event was only captured by the private gauge which could only provide overall event rainfall accumulation.
9. Rain radar data from the Mahia station provided a useful qualitative view of the storm as it progressed from off Bay of Plenty through to Tairāwhiti but did not capture the heavy rain event that hit the Tokomaru Bay area as the radar was imaging precipitation around 2km and above rather than on the ground. Post-event rain gauge corrected radar showed a narrow band of rain (at 2km +) travelling down the coast east of Te Puia.

10. The flooding affecting Arthur Street resulted from heavy rain in the Kaiawha tributary of the Waiotu rather than the Waiotu itself, and was exacerbated by significant overland flow. A large willow planted in Waiotu Stream is not considered to have acted to exacerbate flooding.
11. Flooding in the Mangahauini river overtopped the Tokomaru transfer station and a very limited amount of overtopping of the stopbank on the true right bank close to the bridge over the river occurred but is not considered to have exacerbated flooding in the Café 35, Hatea-A-Rangi area which was primarily the result of overland flow and direct-to-ground ponding.
12. A blocked culvert on State Highway 35 at “Marotiri” Stream resulted in flow down the highway towards Tokomaru Bay. Some of this overland flow re-entered “Marotiri” Stream immediately downstream of the culvert but greater volumes would have left the water table at two locations between the culvert and the sub station.
13. The flooding at Toa Street is largely the result of overland flow from the hillslopes above State Highway 35 which was channelled towards the street via the water tables either side of the highway. Additional inundation was the result of direct-to-ground rainfall accumulation. It is possible that some water from the blocked culvert reached Toa Street but it would not have dominated the inundation.
14. The storm surge associated with the weather event caused coastal impacts from Te Araroa to Turihaua Point. At Te Araroa, the surge resulted in erosion at the top of the beach which exposed and remobilised previously deposited woody debris. This woody debris comprised indigenous and willow/poplar, and forestry harvest residues do not appear to have contributed to the wood on the beach.
15. At Waipiro Bay, the storm surge events of June and earlier in the year have resulted in erosion of the road that provides access to the houses beyond Taurapu Stream on McIlroy road. This road has largely been built on fill and protected by a range of informal means of armouring. This road will become increasingly at risk from future storm surges and king tides, and sea level rise will further exacerbate this risk.
16. Storm surge damage at Tokomaru Bay was most evident at the reserve at the mouth of the Mangahauini River which was fully inundated by water and suffered additional damage over and above that experienced during the May storm surge (and previous events). At the mouth of the Waiotu, the storm surge caused flood waters to back up and threw a lot of woody debris onto land beyond the beach.
17. At Tolaga Bay the principal impact of the storm surge was to remobilise woody material already incorporated into the dune system at the top of the beach.
18. The impacts of storm surge along the freedom camping areas from Pouawa to Turihaua was largely from saltwater inundation which resulted in salt burn to the grass, thrown up rocks and woody debris and erosion. At Turihaua Point the erosion was largely of soil and grass on top of the wave cut platform while to the north the dune system was significantly eroded and inundated by salt water.
19. A number of issues were identified in the course of this assessment;

- a. Fresh cut forestry log on north Tolaga Beach. The presence of such a log indicates a failure at a forestry harvest site or landing as such logs would have been stowed ready for transport.
- b. Extensive willow woody debris washed up on Tolaga Bay beach on the 20th of June and was traced back to a recent clearance of willows at Mahanga Stream above where it crosses State Highway Thirty Five. This clearance was substantial and as was observed on the day the woody residues were stored in locations vulnerable to flood.
- c. The culvert of State Highway 35 immediately north of Tokomaru Bay was known to be blocked before the event and Waka Kotahi had planned to clear the blockage but this was not completed before the weather event. The scale of the event was such that the culvert would most likely have blocked in any event.

Recommendations

Installing a rain gauge in the vicinity of Tokomaru Bay

The absence of a rain gauge or flow gauge at Tokomaru would not have altered the outcome. A key part of any post-weather event assessment is, however, to maximise the understanding of what happened and when so that lessons are learnt and applied during the next event. Additionally, the majority of other coastal townships have one or more rain gauges in relatively close proximity and the absence of one at Tokomaru Bay is a gap. It is noted that the fortuitous presence of a private rain gauge at Tokomaru Bay proven invaluable in this analysis.

Assessment of the overall district rain gauge and river flow gauge network

It was noted in the body of the report that Gisborne/Tairāwhiti has an extensive rain gauge network relative to adjacent regions and there are few performance issues with the network (although there were some anomalous readings). On the other hand, the region has a very complex topography which results in a high degree of variability in rainfall. Some locations such as Poroporo has more than one gauge in close proximity which in this instance produced comparable results (12 hour maxima of 123.4 and 129.2 mm respectively). There is thus the case for assessing whether or not the network can be enhanced without caused a significant increase in workload for the Environmental Monitoring team.

Comprehensive Legacy Landfill risk assessment

Some work on a risk assessment of the legacy landfills has already been undertaken but a coherent work programme should be undertaken to assess and prioritise risk and develop risk mitigation plans and actions. The Tokomaru landfill is the most obviously vulnerable site but the Te Araroa, Tikitiki, and Tolaga sites as well as others require further assessment.

Better fact finding engagement with affected communities

The locals on the ground are a largely untapped source of information that could be better utilised to inform the post event review; for example improving information about flood spread and accessing social media feeds and raw photos and video.

Table of Contents

To follow

Introduction

On the morning of the 18th of June 2021, the MetService twitter feed published a map indicating that there was high confidence that heavy rain would occur from Saturday 19th June to Monday 21st June 2021 for the Bay of Plenty and the northern half of the Raukumara. A low confidence rating was put on the Tokomaru Bay to Hawkes Bay area for the period Sunday 20th to Tuesday 22nd (**Figure One**).

On the morning of 19th of June, the MetService issued a formal heavy rain warning for Gisborne;

Issued: 9:47am Saturday, 19th June 2021

Area: Gisborne north of Tolaga Bay

Valid: 1:00pm Saturday to 11:00am Sunday

Expect 100 to 150mm of rain. Peak intensities of 20 to 30mm/hr this evening, and again tomorrow morning with possible thunderstorms.

This was updated in the evening of the 19th June 2021;

Issued: 8:07pm Saturday, 19th June 2021

Area: Gisborne north of Tolaga Bay

Valid: 8:00pm Saturday to 1:00pm Sunday

Expect a further 70 to 100mm of rain to accumulate on top of what has already fallen. Peak intensities of 20 to 30mm/h Sunday morning with possible thunderstorms.

Accordingly a weather watch was initiated from mid-morning on the 18th of June, primarily using the MetService detailed 3 day rain forecast and rain radar. As the modelling from MetService can be different from other weather providers, the Weatherwatch, MetVUW and FNMOC systems were also reviewed and a high degree of forecast congruence was evident. This gave confidence that the MetService modelling was likely to be accurate within the context that it's a forecast and thus subject to the vagaries inherent in complex natural systems.

The detailed synoptic map forecast from midday on the 19th of June for 6AM Sunday 20th showed that an extensive area would be covered by heavy rain and in particular the forecast showed intensive rain cells for the Whararata and the northern part of the district north west of the Waiapu. The forecast also showed an even more dense north-south oriented cell located offshore of central Bay of Plenty. The Poverty Bay area and coastal regions north to Te Araroa were indicated to only experience light to moderate rain within the 6AM 20th June window (**Figure Two**). The rain radar data between midday and 10pm Saturday 19th was consistent with the forecast model.

The rain radar was again assessed at 6:45AM on the 20th June and the 120km range radar showed an intense east-west oriented rain cell immediately south of Tolaga Bay covering part of the Uawa and Pakarae/Whangara Catchments (**Figure Three**). The 7AM 120km range rain radar showed this rain cell breaking up and moving offshore. Obviously enough, the 300km range radar covers a wider area than the 120km radar

and the 7:06AM image shows a dense band of rain was crossing the centre of the region particularly covering the area from Poverty Bay north to Tokomaru Bay (**Figure Four**).

At 7:30AM on the 20th June, the Tairāwhiti Civil Defence stood up in response to flood warning reports and by 8:30AM facebook posts started appearing showing the flooding in Tokomaru and elsewhere.

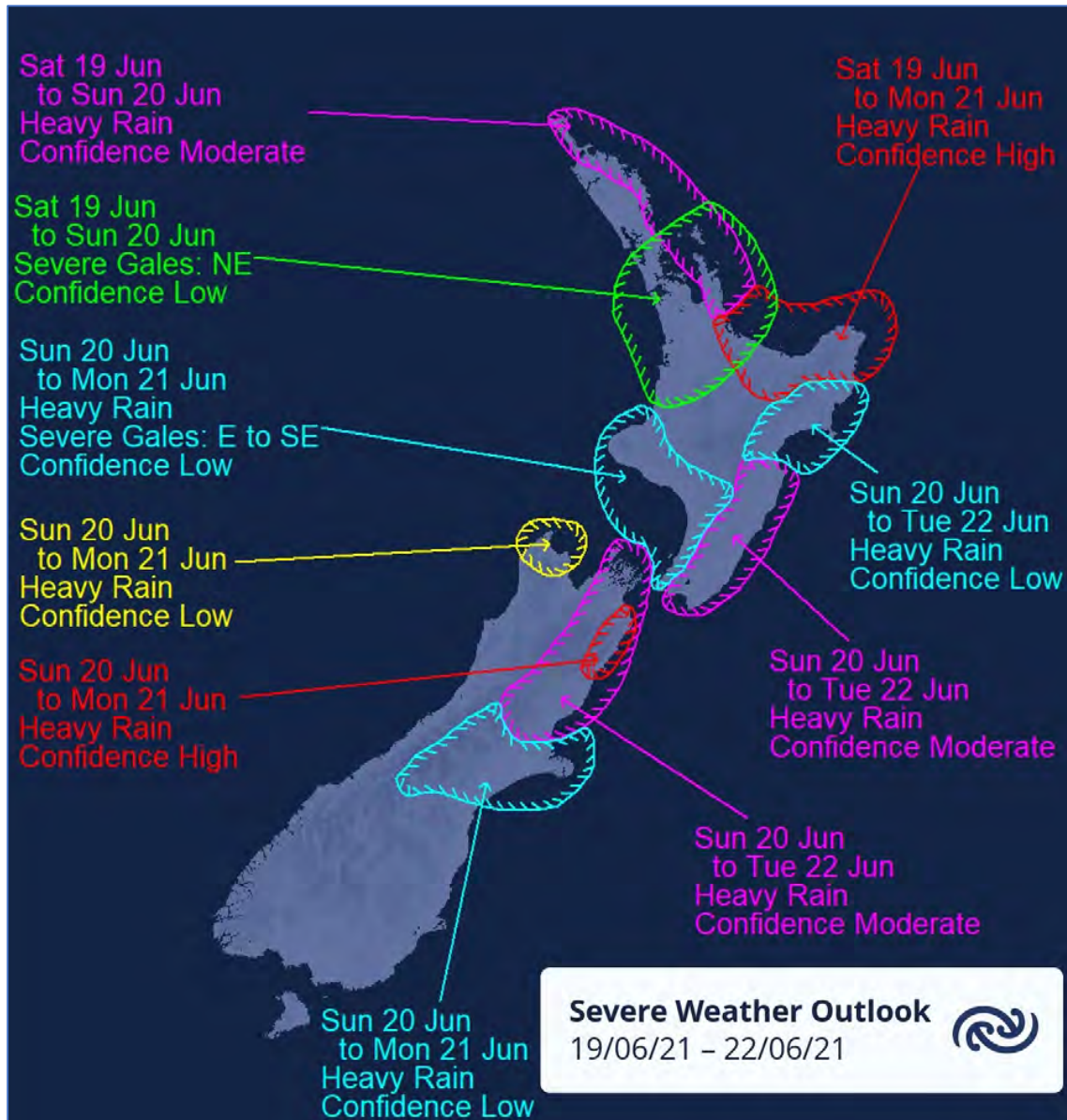


Figure One. Severe weather outlook published by the MetService via Twitter on the morning of Friday 18th June 2021.

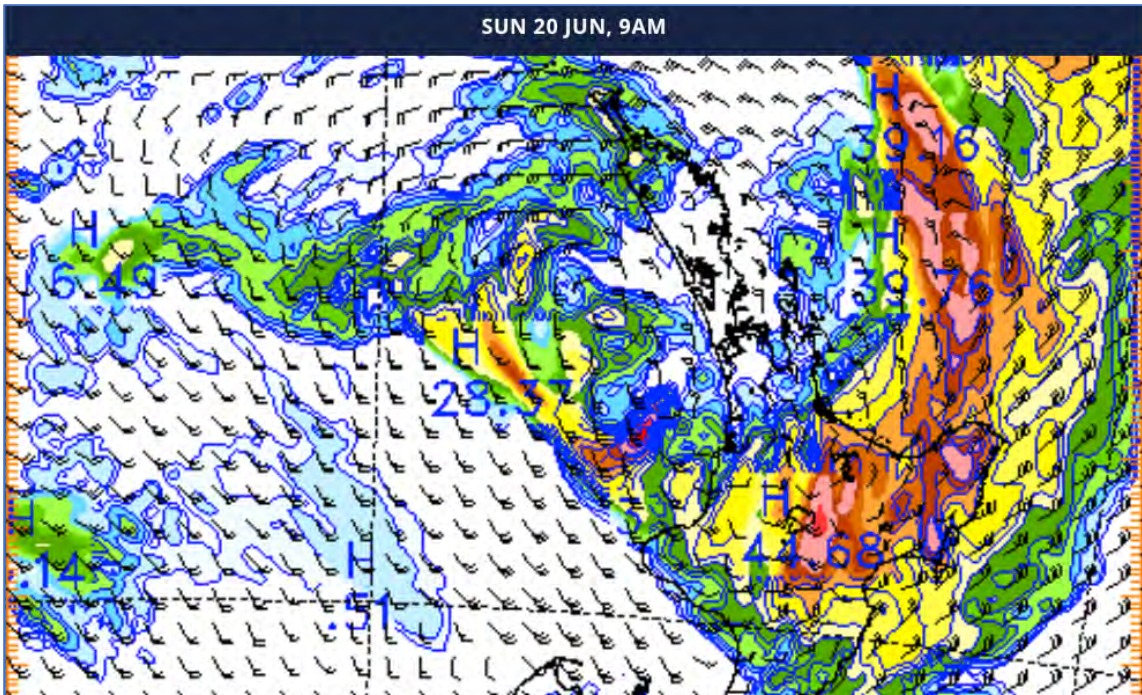


Figure Two. MetService forecast map from Friday 18th June 2021 showing a synopsis of the rainfall expected for 9am Sunday 20th June 2021.



Figure Three. MetService 120km range rain radar based on the Mahia radar station showing an intense rain cell immediately south of Tolaga Bay at 6:45AM on Sunday 20th June 2021.

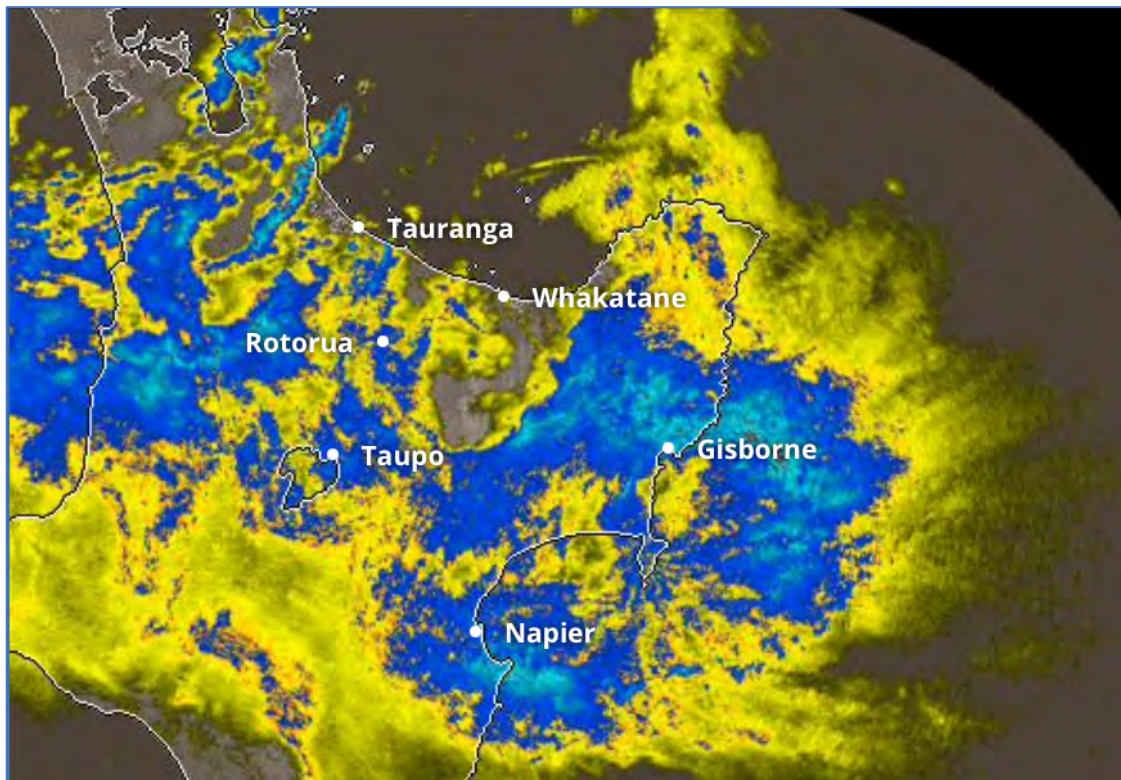


Figure Four. MetService 300km range rain radar based on the Mahia Peninsula rain radar site showing a dense band of rain crossing the region from Poverty Bay north to Tokomaru Bay at 7:06am Sunday.

The Weather Event

The impacts of the severe weather event have been broadly documented aided by the widespread social media postings, site visits, community reports and news media reports (**Figure Five**). The event was experienced widely from the top of East Cape, particularly in the vicinity of the Waikura valley, Oweka area where a large slip blocked the road (**Figure Six**) while flooding occurred widely from Te Araroa (**Figure Seven**), at Ruatoria (**Figure Eight**) and to Tolaga Bay (**Figure Nine**). The flooding on the road to Anaura at the junction with State Highway 35 (**Figure Ten**) resulted in the mobilisation of piles of willow waste wood stowed in a vulnerable location on the stream bank (**Figure Eleven**).

At Hiruharama a pre-existing river scour affecting one house after storms in 2020 was significantly exacerbated. The garage had already been dismantled after the 2020 storm as its edge was overhanging the slip. After the 20th June 2021 event the water tank and house now at risk of being lost to the river¹ (**Figure Twelve**).

At Tolaga Bay², the storm surge scoured the top of the north and south beaches and remobilised pine logs. An additional contribution of fresh willow debris on the north beach suggests that the willow piles observed being mobilised at the Anaura Bay turn-off migrated to the beach (**Figure Thirteen**).

¹ The Hiruharama risk assessment is being separately reported in more detail.

² The impacts on Tolaga Bay Beach is being separately reported in more detail

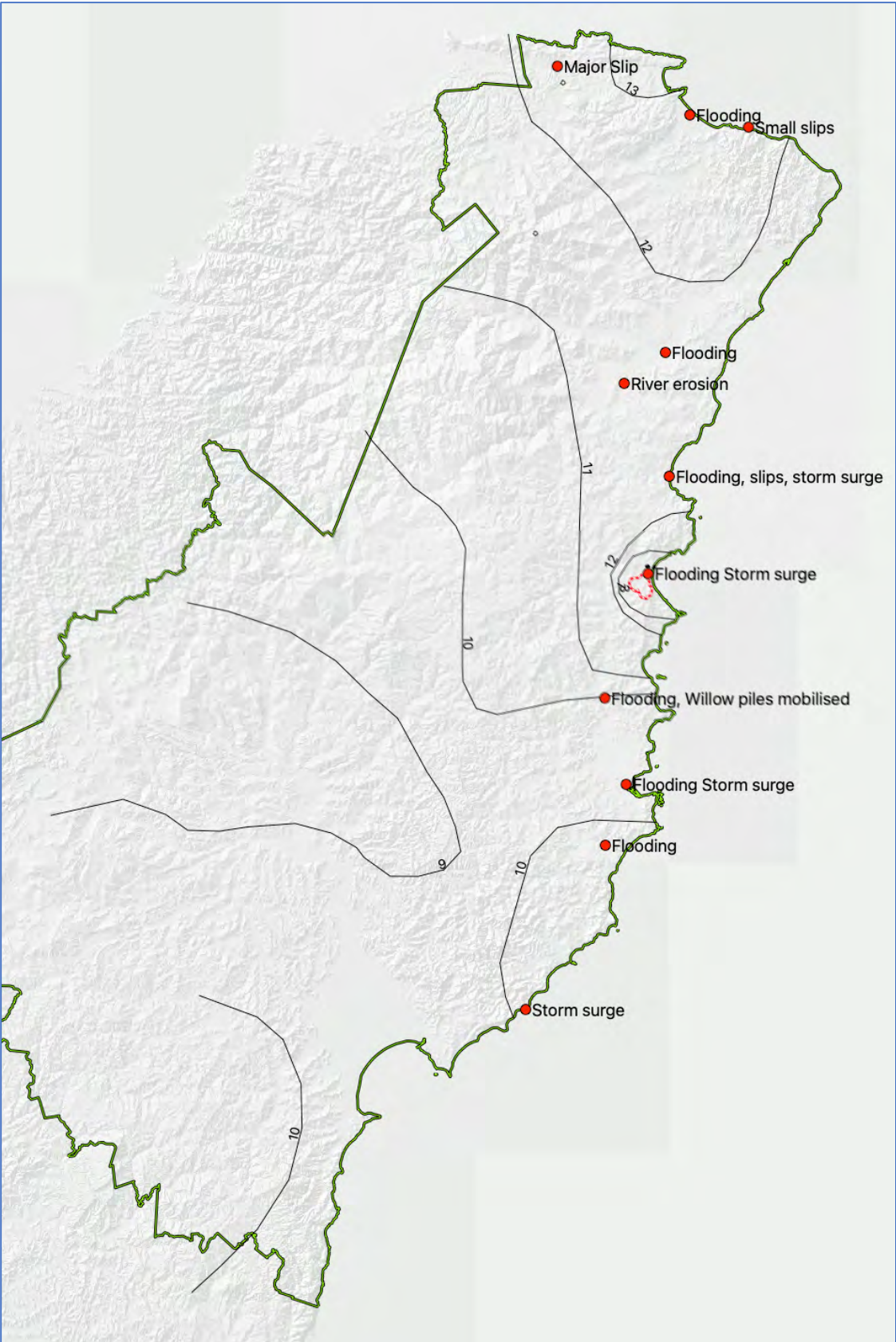


Figure Five. Map of the Tairāwhiti Region showing a contour of the main storm duration and location of main events.



Figure Six. Clearing the significant slip blocking State Highway 35 at Oweka close to the Lottin Point turn off (photograph Rex Rongo Stainton).



Figure Seven. Flooding on the road north of Te Araroa (Tairawhiti Civil Defence.. check source better quality image).



Figure Eight. Flooding at Ruatoria. Manu Caddy facebook feed.



Figure Nine. Flooding at Tolaga Bay (Uawa Live Facebook post).



Figure Ten. *Flooding on the road to Anaura east of the junction with State Highway 35.*



Figure Eleven. *Willow piles being eroded upstream of State Highway 35 Bridge, Mahanga Stream.*



Figure Twelve. Drone footage of property at Hiruharama, south of Ruatoria where slipping from a side creek is threatening a house.



Figure Thirteen. New woody debris deposited on Tolaga Bay north beach after the 20th June 2021 storm.



Figure Fourteen. Flooding on State Highway 35 south of Tolaga Bay.

Tokomaru Bay

The most significant impacts of the flooding occurring in the coastal township of Tokomaru Bay where residents reported heavy rain over night. Some residents in Kaiawha Road reported the rain getting especially heavy from around 6am while those in Toa Street and on the main road report heavy rain from early morning.

One resident in Toa Street reported flooding around their house about 7 AM or soon thereafter while at 3552 Waiapu Road sheets of water were reported running down the property from the hill behind at 7:15 AM and the road was flooding. At 8 AM photographs and video started appearing on Facebook showing the flood at full height (**Figures Fifteen, Sixteen and Seventeen**).



Figure Fifteen. Photograph hosted on the Uawa Live Facebook page credited to Kuipo Saulala and described as taken at approximately 8am.



Figure Sixteen. Photograph posted to Facebook at 8:45 AM. Image taken from number 3552 Waiapu Road by Hoana Forrester with the image taken around 8:15 AM based on the comments.

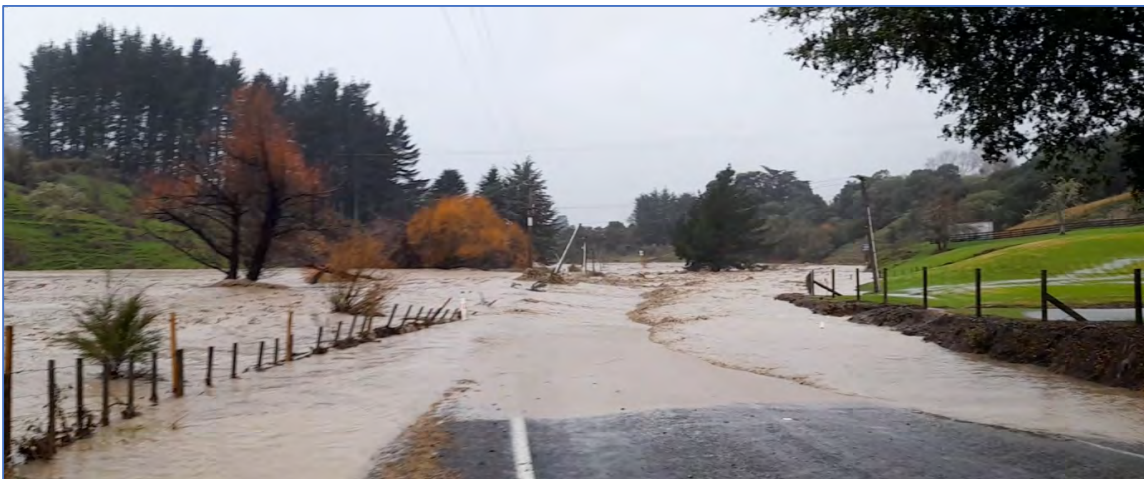


Figure Seventeen. Screenshot from a video posted at 8:46 AM by Tianna Rongonui showing what is estimated as close to the maximum extent of the flood.

Based on the information available (facebook posts and interviews), it appears that while there was heavy rain over night, rainfall intensity increased significantly from around 6 AM and flooding in Tokomaru was evident by 7 AM to 7:15 AM and reached a peak between 8:30 to 8:50 AM. The floods receded rapidly and the road became

passable sometime after 9:30 AM. The event thus meets the criteria for a flash flood and that has implications regarding capacity to model and risk assess the flood.

Tokomaru Bay Catchments

Tokomaru Bay lies within three catchments. The largest of these is the Mangahauini Stream in the north which has an area of 2,518 ha and has its headwaters just 1.6km south of Te Puia. In the south is the Kaiawha catchment which has an area of just over 535 ha (length 3.25km), and between these two catchments is the Waiotu Stream which has an area of 278.5 ha (length 3.56 km). The Kaiawha is a tributary of the Waiotu Stream joining the Waiotu just upstream of the first houses in the Tokomaru Bay settlement (**Figure Eighteen**). Flooding appeared to be generally consistent with catchment size with the Kaiawha dominating flood flow for the Waiotu/Kaiawha combined catchment. For the Mangahauini there are some indications that minor coastal sub-catchments such as the Makarangu (165.8 Ha, length 11.05km) and the small stream that rises to Marotiri (35.9 Ha, length 2.33km) disproportionately contributing to the flow.

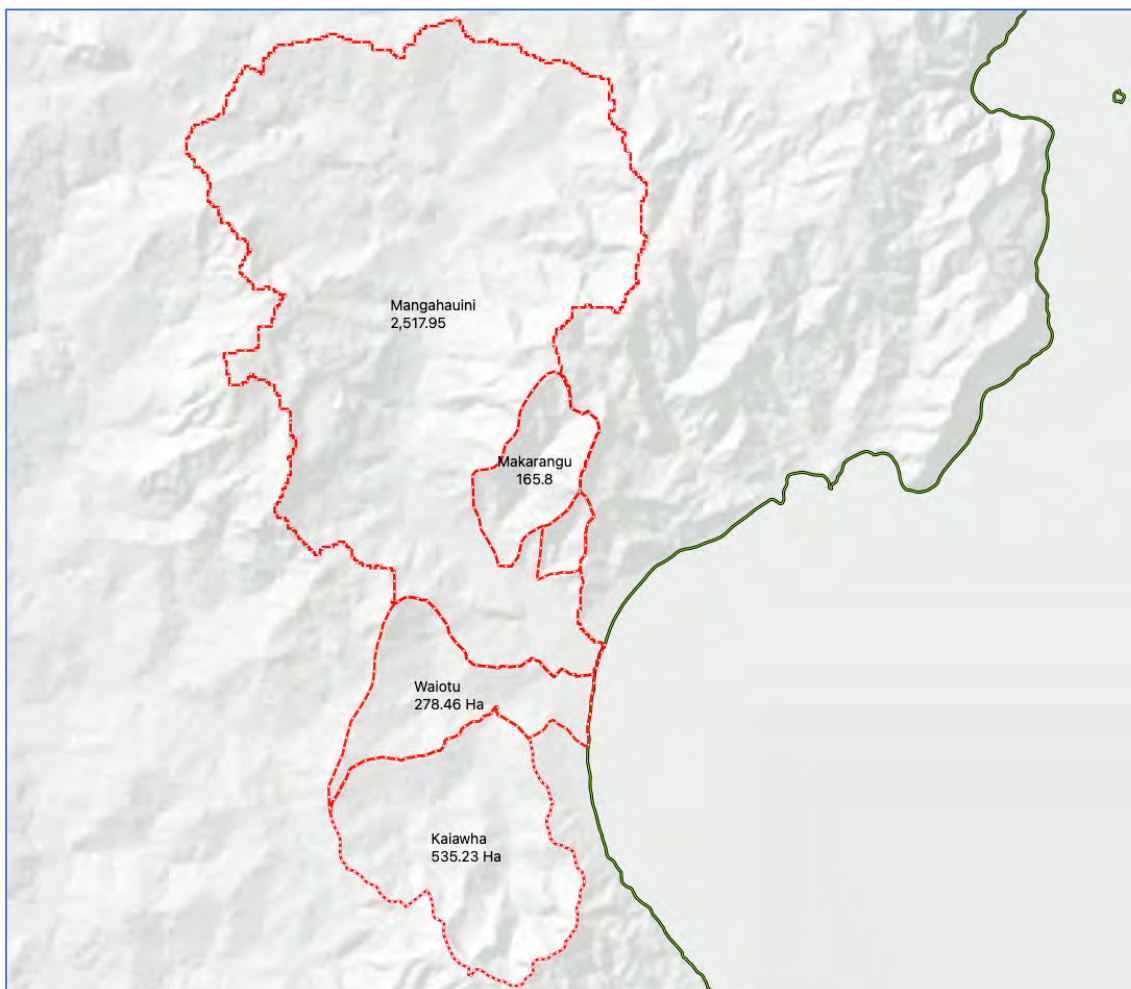


Figure Eighteen. River catchments that drain into the sea at Tokomaru Bay.

Weather Data Analysis

Data Sources

There are three main sources of data used in this analysis.

- The MetService Mahia Peninsula Rain Radar
- Barry Sanders Rain Gauge at 17 Beach Road Tokomaru Bay.
- Gisborne District Council rain gauge network.

Rain Radar

The rain radar is presented in two forms;

- The (close to) realtime web-based rain radar which is presented as either 120km range (cf **Figure Three**) or 300km range radar imagery (cf **Figure Four**).
- Post event rain gauge corrected imagery supplied directly by MetService.

Rain radar provides a valuable insight into the progress of a storm but the imagery (and associated digital data) needs to be treated with caution. The MetService operates a set of ten single-polarisation, C-band scanning rain radar with the closest site to Gisborne/Tairāwhiti located at Mahia Peninsula. While the radar has the ability to measure radar reflectivity up to 250km there are limitations to its value at those limits.

These limitations including increasing beam spreading with distance, and attenuation, where the power of the radar energy is reduced as a result of passing through dense medium such as heavy rain, snow or hail. A particularly key issue is the climbing effect associated with curvature of the earth which means that at 100km from source, the radar is measuring reflectivity at between 1.5 and 3km above the ground (**Figure Nineteen**). This means that at 100km and beyond, what the radar is not necessarily seeing what is occurring on the ground below.

For this reason, the maximum optimal range of the radars for quantitative precipitation estimation (QPE) is limited to 100km (Sutherland-Stacey *et al* 2017). Even here, it is generally noted that *“it is practically impossible to get error-free QPEs due to the inherent limitations of weather radar as a precipitation measurement tool”* Wijayarathne *et al.* (2020).

Tokomaru Bay is 120km from the Mahia and at this distance the rain radar is imaging rain events at 2km+ elevation above the Bay (**Figure Twenty**). This does not mean that the rain radar lacks value, but rather than the imagery is not directly showing the true state of the weather on the ground.

The real-time rain radar (cf. **Figures Three** and **Four**) suggest that on the 20th June heavy rain was falling in the vicinity of Tolaga township at 6:45 AM and that by 7:05 AM at Tokomaru Bay the weather was easing. This is consistent with the timing based on the Facebook posts which suggest that by 8 AM rainfall was easing. The value of the rain radar in this instance, is that in an ungauged catchment it helps tell when the heaviest rainfall occurs in close to real-time, but because its beyond 100km from the radar station it cannot give an accurate estimation of the amount of rain (rainfall depth) that has fallen.

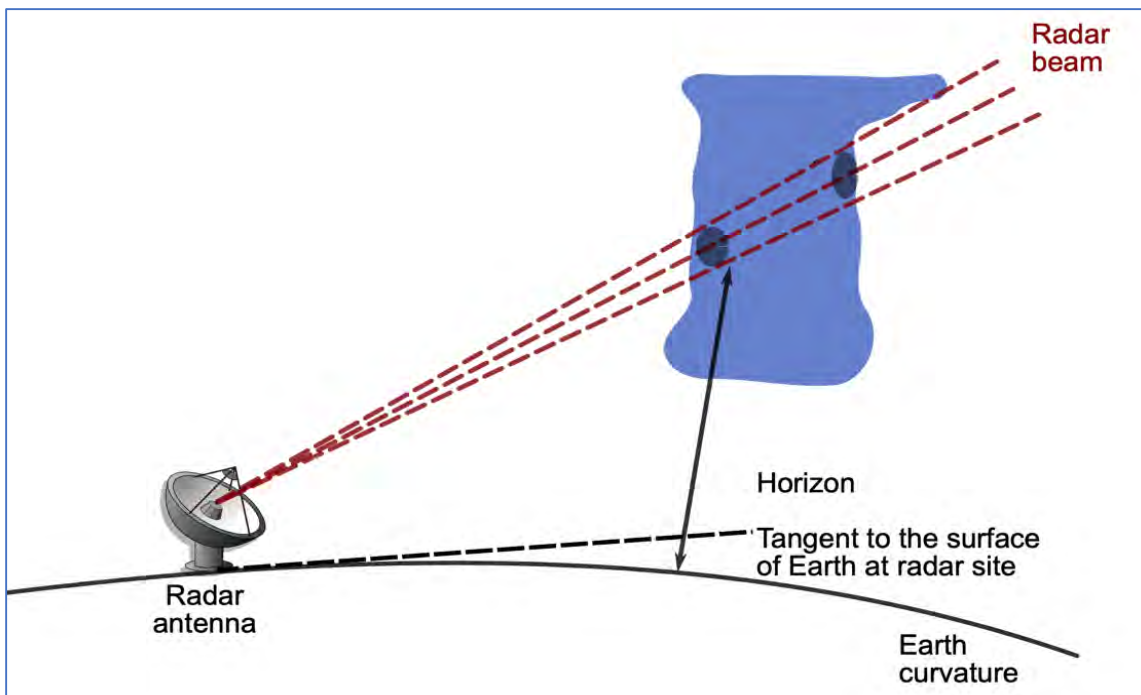


Figure Nineteen. Diagrammatic representation of a C-band rain radar showing the impacts of increased distance on the height at which the radar reflections record.

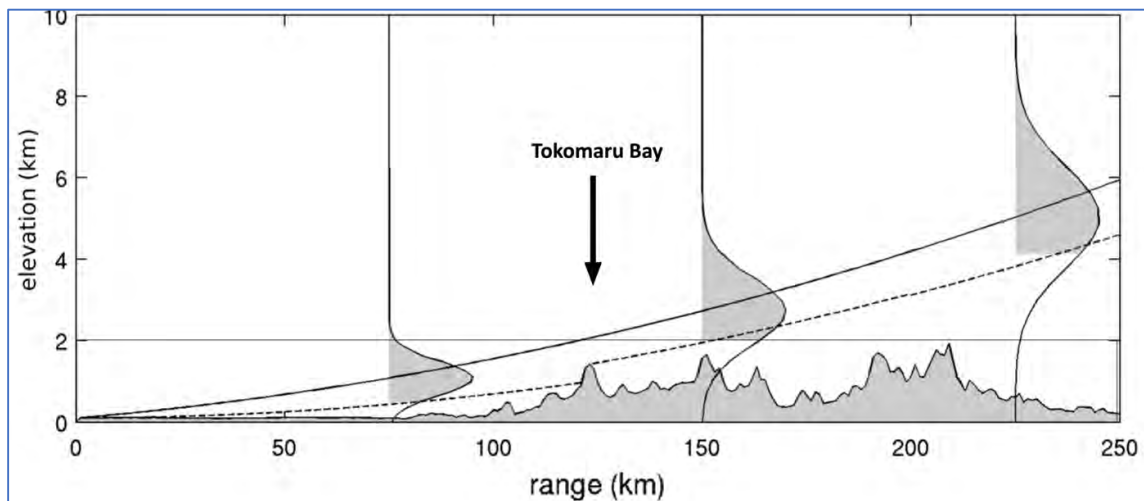


Figure Twenty. Diagram showing the relationship between range and elevation for rain radar for Tokomaru Bay with the bay at 120km from the rain radar and the recording height at 2km and above (from Sutherland-Stacey et al 2017).

Gauge corrected radar is, as the name suggests, when rain radar data is merged with rain gauge data in order to mitigate against some of the inherent errors of rain radar. Even here, however, the merging techniques do not necessarily result in a low-error estimation of precipitation quantities. The analysis needs to account for a sparse and uneven gauge network, complex topography, and a complex and variable distribution of precipitation (Amorati et. al 2012).

Three days after the storm, the MetService provided a series of gauge corrected rain radar images from 1800 hours to 2100 hours 19th June 2021. These times are in UTC or coordinated universal time and thus each of the 25 images need to be corrected to standard New Zealand time which is 12 hours ahead of UTC. Thus 1800 hrs is 6PM UTC 19th June or 6AM 20th June and 2100 hours is 9PM UTC or 9AM 20th June. It is not clear why the information was supplied in UTC rather than in New Zealand time.

The gauge corrected rain radar for the period 6 AM to 7 AM is shown below (**Figure Twenty One**). Bearing in mind that the rain radar is not showing precipitation at the surface, it shows a band of heavy rain approaching Tokomaru Bay at around 6 AM with the band passing through by 6:30 AM. By the 6:30 AM image rain cells marked by dense red patches are evident to the south of Tokomaru Bay and these can be seen building as they move south and by 6:52 AM these dense cells are south of Tolaga Bay while a linear NNW band of denser cloud approaches Tokomaru Bay from the north arriving at Tokomaru Bay by 7 AM.

It is notable that these denser cells are not visible at Tokomaru Bay in the images from 6 AM to 6:22 AM and only become apparent to the south from 6:30 AM. It is considered probable that the 6 to 6:22 AM images recording the rain mass at a height of 1.5 to 3km was masking heavier rain at altitudes below 1.5km. As the rain band moved south the radar is imaging the weather at progressively lower altitudes and the dense cells thus become more apparent. Because there are no official rain gauges in the vicinity of Tokomaru Bay, this inference cannot be verified. It is, however, consistent with the on the ground observations by some residents.

The gauge corrected rain radar for the period from 7 AM to 9 AM is shown in **Figure Twenty Two** below. This shows the narrow NNW oriented linear rain band sliding down the coast passing over Tokomaru Bay from 7 AM to 8:30 AM. By 8:45 AM this linear rain band clears Tokomaru Bay and moves out to sea.

While the gauge corrected rain radar data cannot be used for quantitative precipitation estimation (QPE), it can be used for a qualitative assessment of the duration of the event and it also is a useful tool for interpreting the movement of rain cells which will not necessarily associate with rain gauge sites. This is particularly significant in this storm as while the closest rain gauge at Te Puia captured the main part of the storm that passed over Tokomaru Bay between 6 and 7 AM the narrow NNW oriented band of rain that followed seems to have passed to the east of Te Puia and thus would not have been fully reflected in the records from that site. A direct comparison between the uncorrected and gauge corrected radar image for just after 7Am is shown in **Figure Twenty Three** below.

Barry Sanders Rain Gauge at 17 Beach Road Tokomaru Bay

Gisborne District Council does not have a rain gauge in the Mangahauini, Kaiawha or Waiotu catchments which discharge into the sea at the north end and south end of Tokomaru Bay. Fortuitously, Council engineer Barry Sanders has a gauge at his holiday home at 17 Beach Road, Tokomaru Bay. This gauge does not meet the functionality of the council rain gauge network and is not subject to the same rigorous calibration

tests as the council gauges. Barry was, however, able to provide an appropriate level of documentation that indicates that the gauge can be used to provide an indication of the rainfall over the duration of the event. He observed, *“Rain was measured for period from after lunchtime day before the rain and at 10am next morning after rain had stopped. I measured 160mm at 17 Beach Road Tokomaru bay. I don’t think it started raining until after 5 pm the day before - so 160mm fell between 5pm and 10am (more likely 9am)”*.

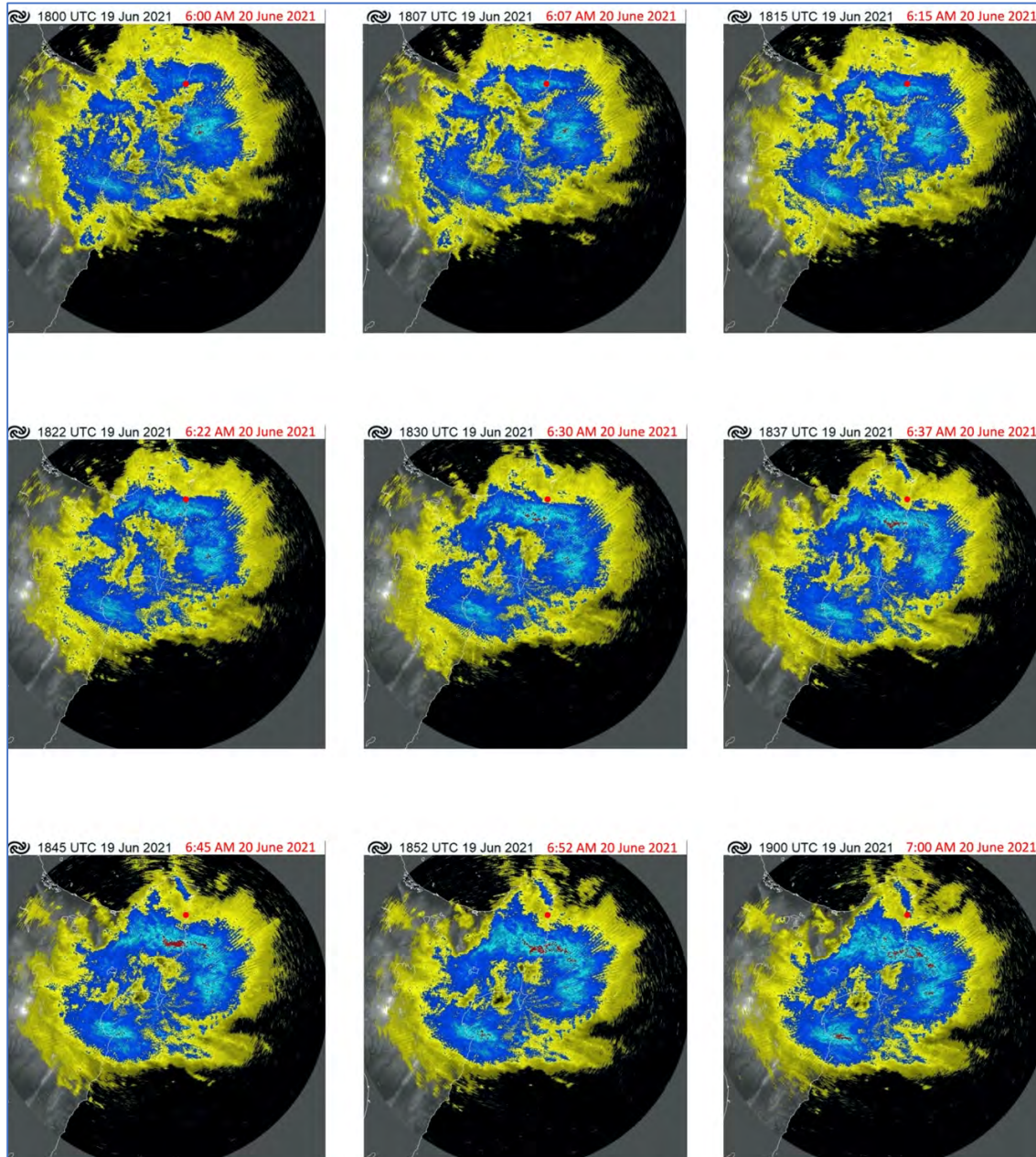


Figure Twenty One. Gauge corrected rain radar imagery from MetService for 6 AM to 7 AM showing the gradual movement of the rainstorm as it moved from the north to the south east. The red dot marks the location of Tokomaru Bay.

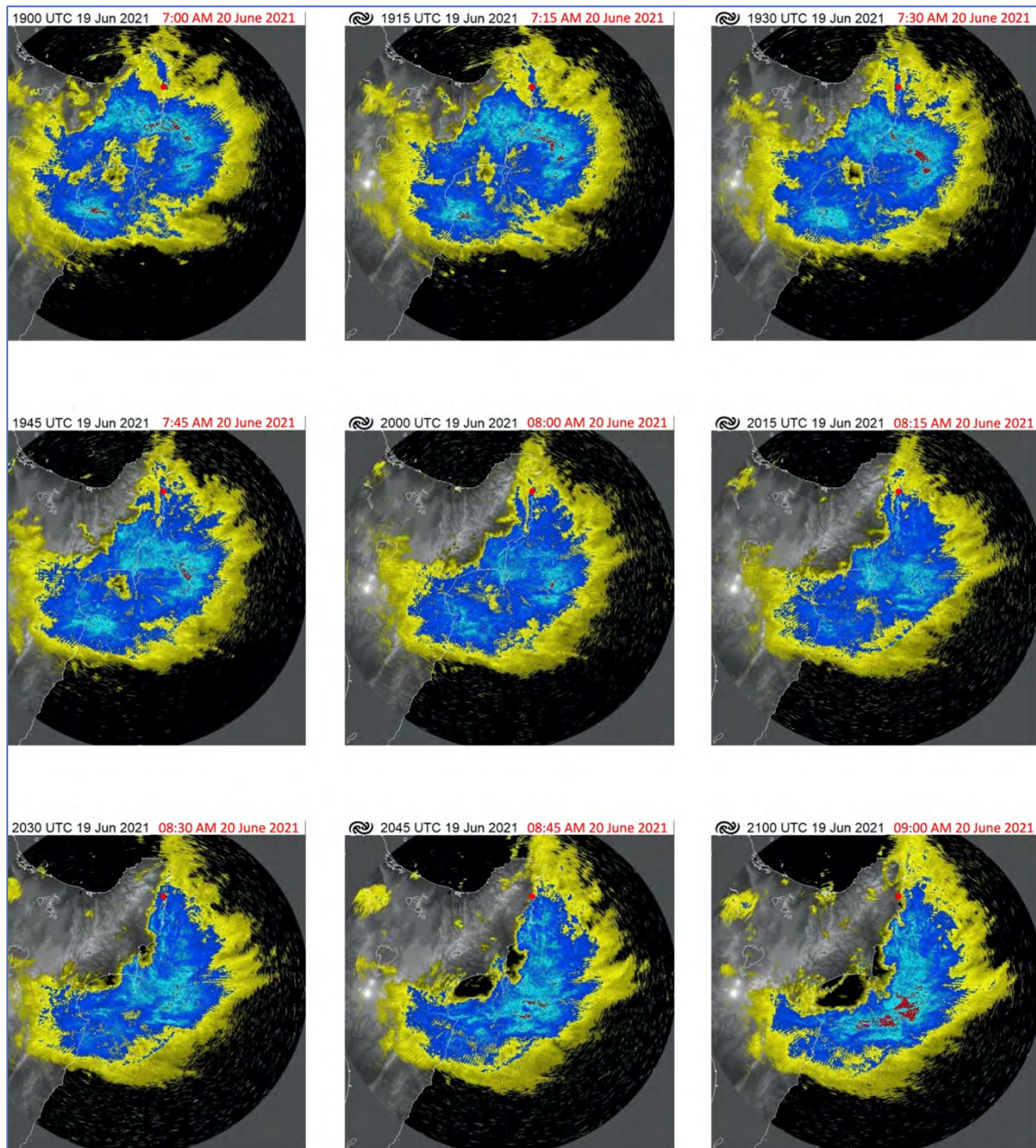


Figure Twenty Two. Gauge corrected rain radar imagery from MetService for 7 AM to 9 AM showing the narrow NNW oriented linear rain event. The red dot marks the location of Tokomaru Bay.

The Council gauges record at 5 minute intervals while the Sanders gauge only gives us the total rainfall for the event. The council gauges and the rain radar both indicate that this storm lasted for about 12 hours and locally a bit more. What it does say is that Tokomaru Bay received 160mm over the storm duration. This is less than the 180mm+ received at Waikura Valley but is more than the 12 hour accumulation at Te Puia (150.4mm) even though Te Puia is less than 8.5km northwest of Tokomaru Bay.

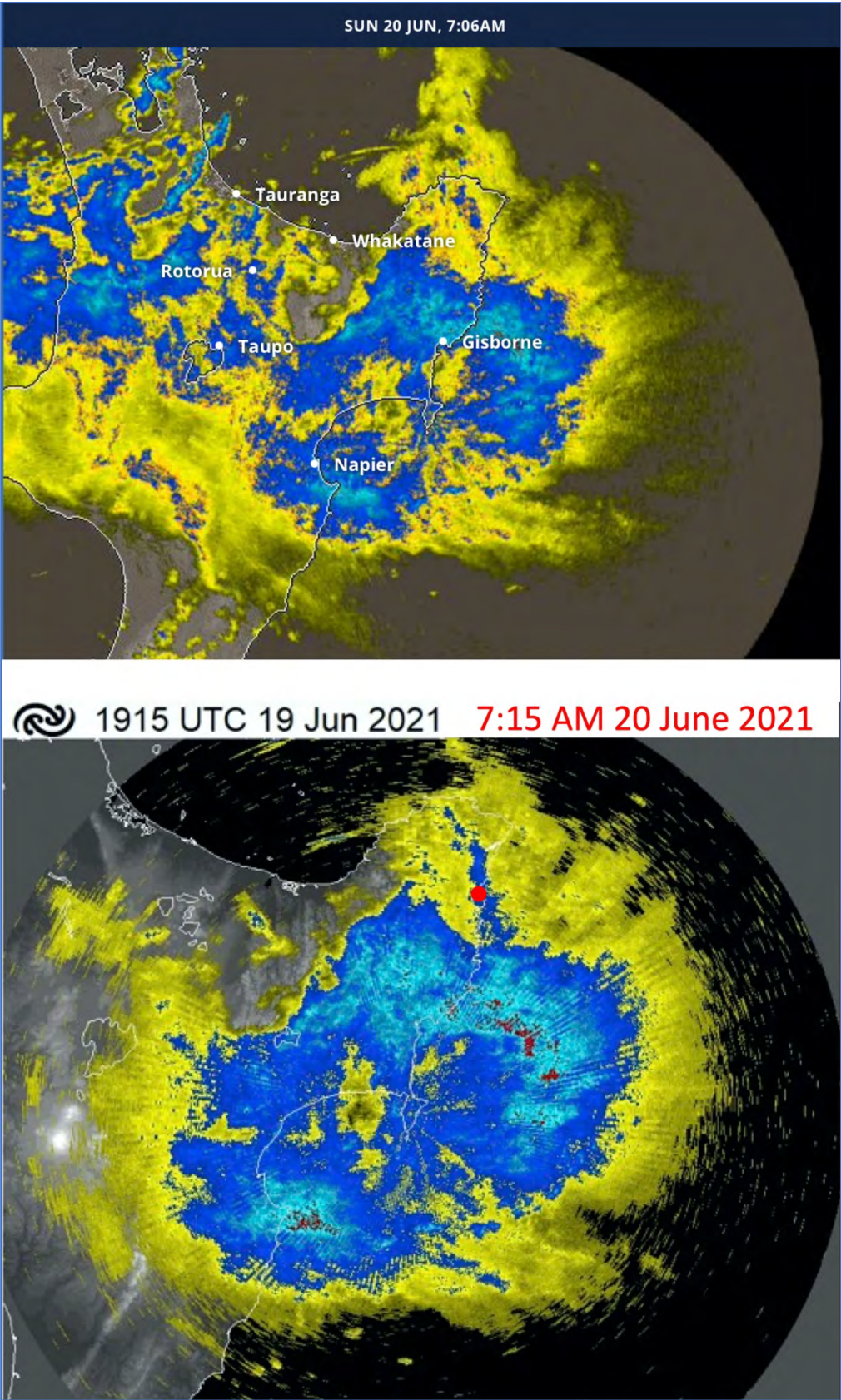


Figure Twenty Three. Comparison between the 7:06 uncorrected rain radar with the 7:15AM gauge corrected rain radar showing the more distinct tail in the gauge corrected radar..

Assessment of the Gisborne District Council Rain Gauge Network

Gisborne District is fortunate that it has an extensive rain gauge network relative to some other regions. The 20th June 2021 storm (as with other events such as the Queens' Birthday storms of 2018) demonstrates that no rain gauge network can capture all of the detail of every storm. The rain gauge network is, by definition, based on discreet locations and can thus only reflect what is happening at that point at that date and time. A localised rain cell may fortuitously miss a rain gauge and thus the network may under-report, or not accurately record individual storm events. This seems to have been the case with the storm of 11-12th June 2018 and with respect to Tokomaru Bay the same appears true on the 20th June 2021.

This is not a critique of the Council rain gauge network which is, as noted above, more comprehensive than those in some other districts. The topography of Tairāwhiti is unique with a spine of higher ranges in the Raukumara and a largely hilly hinterland between the ranges and the sea marked by very limited river valleys with a pronounced NW orientation for those river valleys between Tolaga Bay and Te Puia. This means that rainfall will be strongly controlled by localised orographic influences and there will thus always be a strong degree of unpredictability.

The rain gauge network and the 12 hour accumulations for the 20th June 2021 storm are shown in **Figure Twenty Four** below. This shows that there is a good gauge coverage for the Raukumara ranges from Tokomaru Bay north and also a good coverage of the Waipaoa catchment. There are, however, gaps in the south west, in the southern raukumara, and between the Raukumaras and the coastal sites, as well as between coastal sites in the northern half of the region. It needs to be noted that adding rain gauges to the system will add additional load on the Environmental Monitoring Team and thus have potential resource capacity implications.

It also needs to be stressed that any assessment of rainfall and storm events generally requires that a qualitative lens is placed over the data. For example, a 12 hour period has been used in this assessment but as exemplified by **Figure Five** above, the heaviest rainfall period ranged from 9 hours to 12 hour plus. A 12 hour period was determined after assessing the rainfall at each site on a 1 hour, 12 hour and 24 hour interval.

A statistical analysis indicated that 93% of the mean rainfall fell across all rain gauges in the region within that 12 hour window (See **Table One** for the rainfall data used). The 12 hour maximum accumulation shown in **Table One** has been used to generate a contour map that encapsulates the storm event (**Figure Twenty Five**).

There were some outliers such as Wheatstone road (86%), Tatapouri Hill (84%), Raukumara Station at 73% and East Cape Lighthouse at 85%. The biggest outlier at Raukumara Station is understood to be related to the exposed nature of the site where the wind loading can distort the data. Following the initial assessment, Mangaheia at Willowbank site also looks anomalous with a 12 hour rainfall accumulation of 55mm.

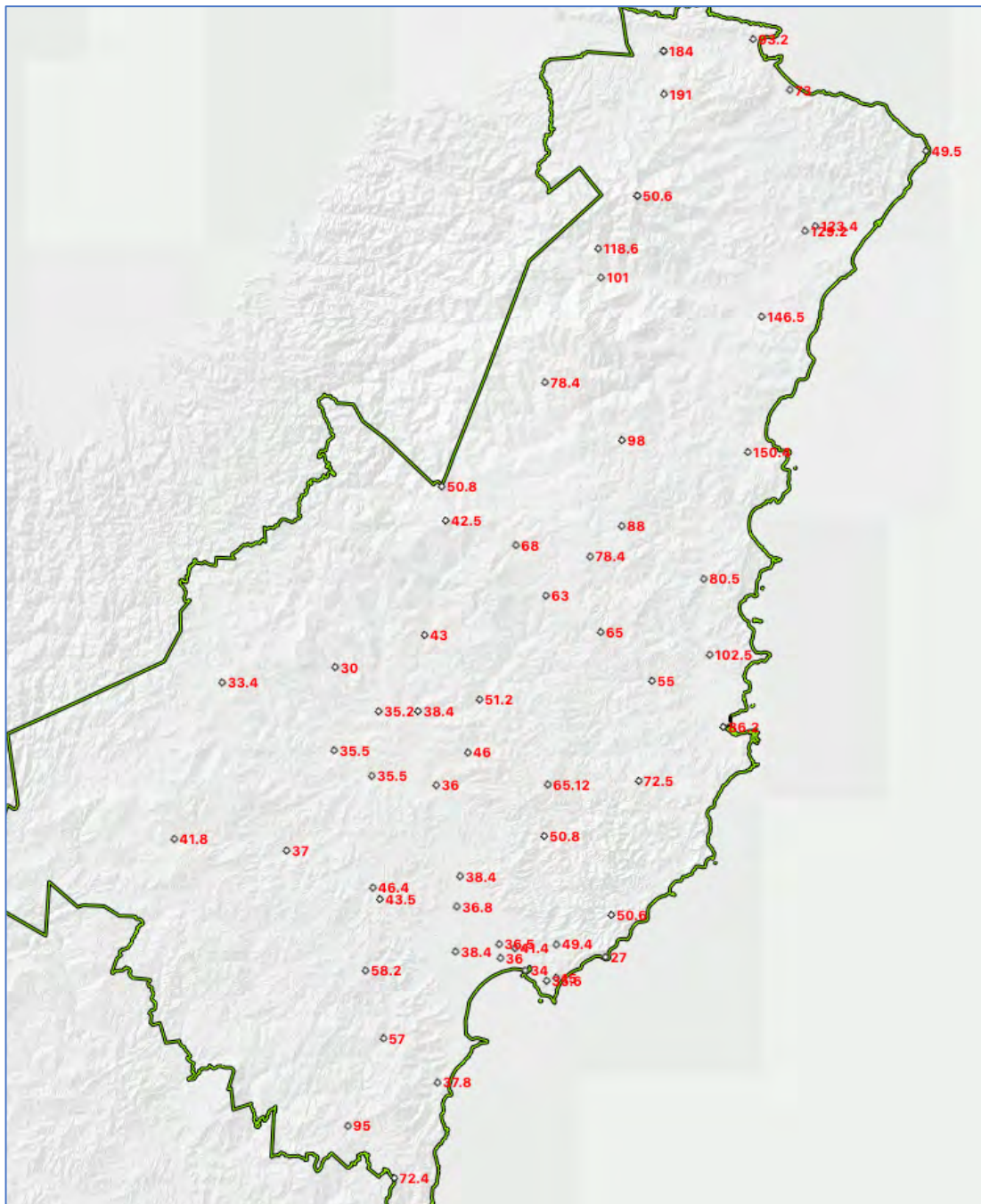


Figure Twenty Four. Location of Gisborne District Council rain gauge sites showing the maximum rainfall accumulations over the 12 hour storm event at each gauge site.

Further, this assessment is based on data exported from the Hilltop software system for hourly intervals from midnight 18th June through to midnight 22nd of June. Thus the “hours” used are the normal hours in New Zealand time. This gives a maximum hourly peak for Te Puia at 60.1mm, whereas Hilltop gives the hourly peak at 70mm because it picks the maximum 60 minute interval accumulation rather than at which hour that maximum accumulation occurs. Neither is right or wrong, they are just recording accumulations in subtly different ways.

Table One. The peak rainfall accumulation period in hours , plus 24 hour, 12 hour and 1 hour maximum accumulations.

Site	Peak Period	24 hours	12 hours	1 Hour Max
Arowhana Repeater	9	53.6	50.8	7.6
Caesar Rd No.1 Bore GPG058	8	40.4	38.4	8.6
Cameron Rd No.1 Bore GPB099	7	38.5	36.5	12
East Cape at Lighthouse	8	58	49.5	9
Fernside Station Telemetry Station	10	93	88	16
Gisborne Airport Met Stn	7	38.8	36	11
Hika No.1 Bore Ferry Road GPE032	8	39.2	36.8	8.8
Hikuwai River at No 4 Bridge	11	84	80.5	15.5
Hikuwai River at Willowflat	9	109	102.5	37
Karakatuwhero River at SH35 Br	12	86	73	18
Komihana Station	8	31	30	6.5
Mangaheia at Willowbank	9	57.5	55	10
Mangapoike at Reservoir	10	99.5	95	16
Mangatu River at Omapere Station	6	37.2	35.2	6.8
Maraetaha River at No.3 Br	8	42.4	37.8	8
Mata River at Pouturu Br	10	106.5	98	14.5
Matawai Telemetry Station	8	34.6	33.4	6.8
Ngatapa school	8	49.2	46.4	10.4
Oweka River @ SH35	12	194.8	184	41.6
Pakihiroa Telemetry Station	10	109	101	18.5
Panikau Rd - Reed Rd	10	75.5	72.5	17.5
Parone Rd RG	9	37.8	35.6	9.8
Poroporo Fire	12	146.2	129.2	27.2
Poroporo River at SH35 Bridge	12	141	123.4	24.4
Pouawa Fire	10	56.4	50.6	10.4
Puketawa Station	10	88.6	78.4	15.8
Puketoro Telemetry Station	10	84.4	78.4	13.4
Raparapaririki (RIP)	11	130.6	118.6	18.2
Raukumara Stn	11	69.4	50.6	7.4
Ruatoria Telemetry Stn at Barry Ave	11	160	146.5	55.5
Stout St RG	9	44.2	41.4	12.4
Tatapouri Hill	9	32	27	6.5
Tauwhare Station	9	69.8	68	16.4
Te Arai River at Pykes Weir	10	60.5	57	12.5
Te Puia	11	154.4	150.4	60.1
Te Rata Telemetry Station	9	43.5	42.5	8
Tuahu Station	10	66.5	65	11
Tutamoe Station Telemetry Station	9	64.5	63	12
Uawa River at SH35 Bridge	9	95	86.2	34.6
Waerenga-O-Kuri	10	61.8	58.2	14.2
Waihora River at No.3 Br	8	48	46	9.8
Waikanae Creek at Customhouse Str Br	8	35.8	34	9.4
Waikohu River at No.3 Br	9	37.5	35.5	7.5
Waikakariki Stream at Kirkpatrick Br	8	46	43.5	10
Waikohu River at Mahaki Station	8	37.5	35.5	7.5
Waikura Valley	12	207	191	49.5
Waimata River at Goodwins Rd Bridge	9	52	49.4	11.6
Waimata River at Monowai Bridge	9	52.8	50.8	10.8
Waingaromia River at Terrace Station	8	52.4	51.2	12.4
Waipaoa River at Kanakanaia	9	37.5	36	7.5
Waipaoa River at Matawhero Bridge	9	41.8	38.4	10.4
Waipaoa River at Te Hau Station Rd Br	8	40.4	38.4	10
Waipaoa River at Waipaoa Station	8	43.5	43	7.5
Wakaroa Trig	8	67.4	65.2	14.4
Wharekahika River at Hicks Bay Rd Br	13	102.6	93.2	29
Wharekopae River at Rangimoe	8	40	37	10.5
Wharekopae School	7	43.8	41.8	8.4
Wharerata at Radio Track Rd	7	80.8	72.4	12
Wheatstone Rd	7	17.5	15	7.5

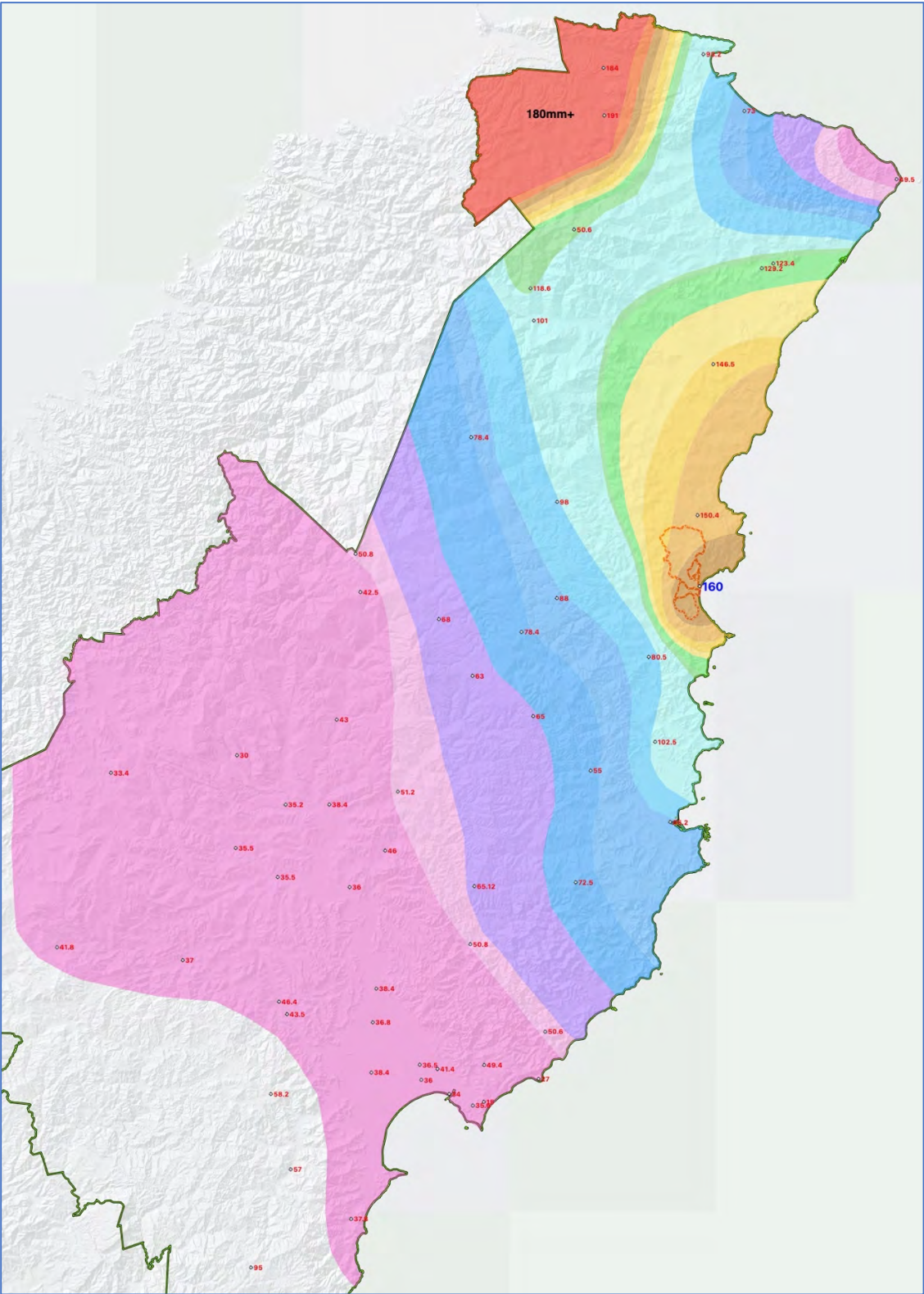


Figure Twenty Five. Contour plot of the 20th June 2021 storm using the 12 hour accumulations including the Sanders Tokomaru Bay data but discounting the Raukumara and Mangaheia at Willowbank gauges. This shows two key rainfall hotspots at the Waikura Valley and centred on Waipiro Bay to Tokomaru Bay.

Because the rain gauge data for Tokomaru Bay only provides for a total event accumulation, the two closest gauges at Te Puia and Hikuwai at No. Four Bridge have been looked at in more detail. This highlights the strongly localised nature of the event with Te Puia showing a short very pronounced short duration rainfall accumulation peak that is largely absent at Hikuwai and No. Four bridge but apart from that pronounced peak the two rainfall accumulations are very similar (**Figure Twenty Six**). It also shows that the rain event started in this area at around 10 PM on the 19th and was steady until 5 AM on the 20th when the rain started to ease. At 6AM the rainfall started to climb again at both sites peaking at 60mm at just after 8 AM at Te Puia and at 15mm at 8:30 AM at Hikuwai. Rainfall had largely stopped at 9:30 AM at both sites. The data indicates that the heaviest rain fell primarily between 7 and 9:30 AM (1 ½ hours) and then cleared rapidly.

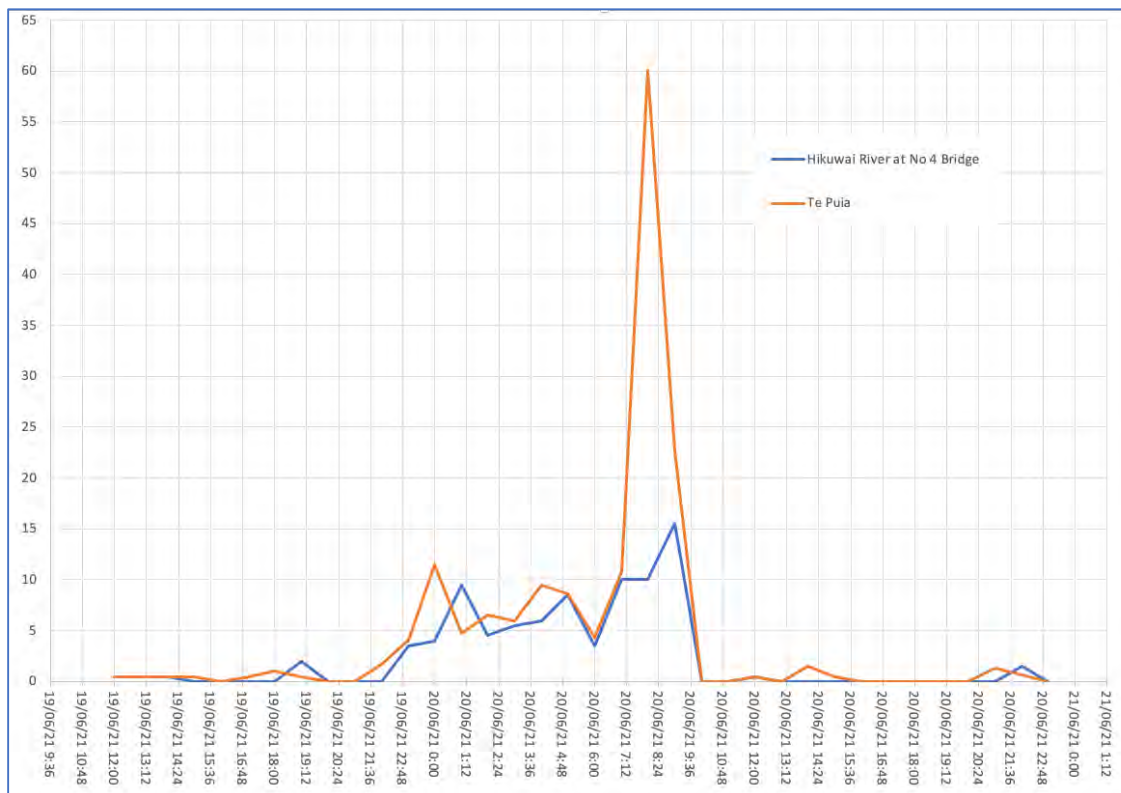


Figure Twenty Six. Rainfall accumulations for Te Puia (red) and Hikuwai at No. 4 Bridge for the 20th June 2021 event. This shows that the rainfall was very similar for both sites except for the short duration peak at Te Puia.

HIRDS v.4

The NIWA HIRDS (High Intensity Rainfall Design System) v.4 was used to determine the Average Recurrence Level (ARI) for the event. There are no gauge sites at Tokomaru Bay although there were two sites there previously (Tokomaru Bay 1 which recorded daily values from 1916 to 1968 and Tokomaru Bay 2 which recorded daily rainfall from 1967 to 1975). HIRDS does, however, allow the generation of an ARI based on a virtual

rain gauge site. Assessment of such a virtual gauge site at the Tokomaru Bay War Memorial indicates that the 160mm recorded at Barry Sanders house would have an 12 hour rainfall accumulation ARI of 13.5 years, while the event overall had a 12 hour rainfall accumulation of ARI of 2.5 years³. It is estimated that the peak rainfall over 1 ½ hours would have had an ARI of 30 to 35 years assuming that around 70 to 75 mm fell within that 1 ½ hour window or a 100 year ARI if it fell within an hour.

Conclusions from rainfall analysis

While the gauge at Tokomaru Bay cannot tell us exactly when the most intense rainfall was in the township, the alignment of the accounts from the locals, along with the adjacent rain gauge data and the rain radar all essentially tell different elements of the same story. That is, a relatively typical rainfall event with a 2.5 ARI as determined by comparison with Hikuwai and had an overprint of a short high intensity rainfall accumulation over a one and a half hour period equivalent to an ARI of 35 years or up to 100 years over a 1 hour period.

The rain radar cannot be used to corroborate this assessment, but in this particular storm the radar was useful. It shows that the event overall was marked by a frontal system which moved across Tairāwhiti with moderate to heavy rainfall from late evening on the 19th to around 6 AM on the 20th. A pronounced linear tail to this event looks innocuous on the rain radar but acted like a narrow conveyor belt bringing sustained heavy rain to a confined coastal area between Waipiro Bay and Te Puia south to Tokomaru Bay. The impact of this conveyor was not felt further south as the system moved offshore.

Flooding

Tokomaru Bay experienced severe flooding on the morning of 20th June but since there are no flood gauges in the 3 catchments that discharge into Tokomaru Bay, the observations of local residents are the only means of assessing flood duration. The flooding was exacerbated by having both main catchments, the Mangahauini in the north and the Waiotu/Kaiawha in the south receiving significant rainfall over a short duration.

The flooding was particularly dramatic as the images and video of State Highway 35 at the southern approach to Tokomaru Bay attest (see **Figures Fifteen, Sixteen and Seventeen** above). The reports from the local residents point to flooding being evident from 7 to 7:15 AM and reaching a peak by 8:30 to 8:50 AM before rapidly receding. The combination of a very short (1.5 hour) very heavy rainfall event very closely coinciding with a flood duration points to flash flood conditions.

Impact of tides and storm surge on flood spread

Council staff were on site soon after 10 AM by which time the flood had receded and local contractors had started working on clearing mud off the road. During the site

³ The normal event can only be estimated of course and is based on subtracting the peak rainfall at Te Puia from that at Hikuwai No. 4 Bridge to derive a 12 hour rainfall of 100 mm.

inspection on the 20th June, it was observed that there was a significant number of logs thrown onto the foreshore at the mouths of both the Waitutu and Mangahauini Rivers (**Figures Twenty Seven and Twenty Eight**). A high tide or storm surge can affect the impact of a flood in a coastal environment such as Tokomaru Bay by creating a barrier preventing flood flows from efficiently discharging to sea. The presence of the logs and erosion at the mouth of the Mangahauini indicates that there was a coastal influence but not whether or not it was due to the tide or the result of storm surge.



Figure Twenty Seven. Woody debris thrown up onto the freedom camping area south of the mouth of Waitutu Stream.



Figure Twenty Eight. Woody debris thrown up onto the reserve immediately north of the Mangahauini Stream. Also evident is the extent of erosion of the banks at the reserve.

The tidal data for the period was obtained from the NIWA Tide Forecaster website (**Figure Twenty Nine**) and this showed that low tide was at 7:24 AM on the 20th June 2021. Thus the flood coincided with low tide and would not have exacerbated the effect of the flood.

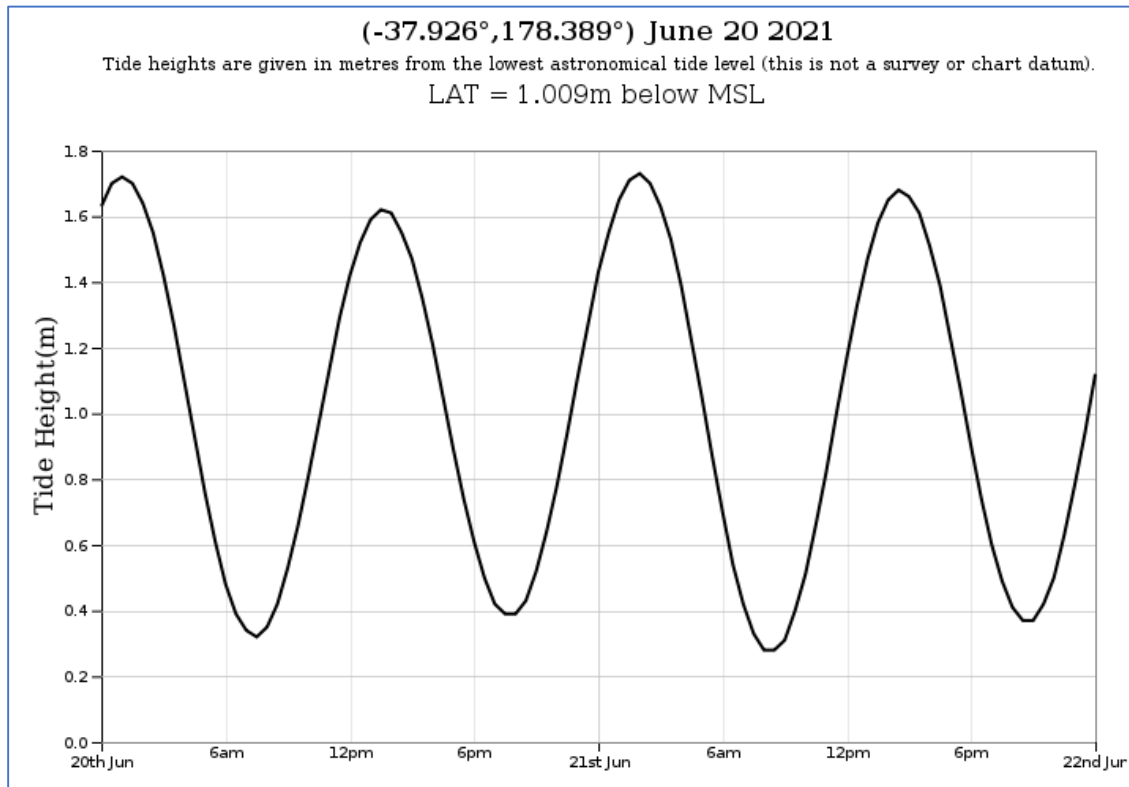


Figure Twenty Nine. Tide chart for the 20th June 2021 from the NIWA Tide Forecaster website showing that low tide coincided with the flood period.

The swell map from Weatherwatch for the 20th of June showed a 4M+ swell offshore but the Swellmap website showed a more significant swell or storm surge event with 4 to 5m swells close to shore along with NE winds (**Figure Thirty**). These maps only provide a generalised perspective of swell or storm surge and it is anticipated that a storm surge was generated by the tail end of the weather event as it moved down the coast.

Drone mapping

Two drone flights were scheduled shortly after the event to see whether or not they could assist understanding of the flood spread from the event. These were flown on the 23rd June with the first covering the mouth of the Kaiawha Stream and the lower Waitutu (**Figure Thirty One**) with the second covering the Mangahauini Stream from upstream of the Tokomaru Transfer Station (**Figure Thirty Two**). The drone footage provides high resolution imagery and contours of the areas affected by the flooding and also complements the on the ground inspections carried out on the 20th June and in the week following the flooding.

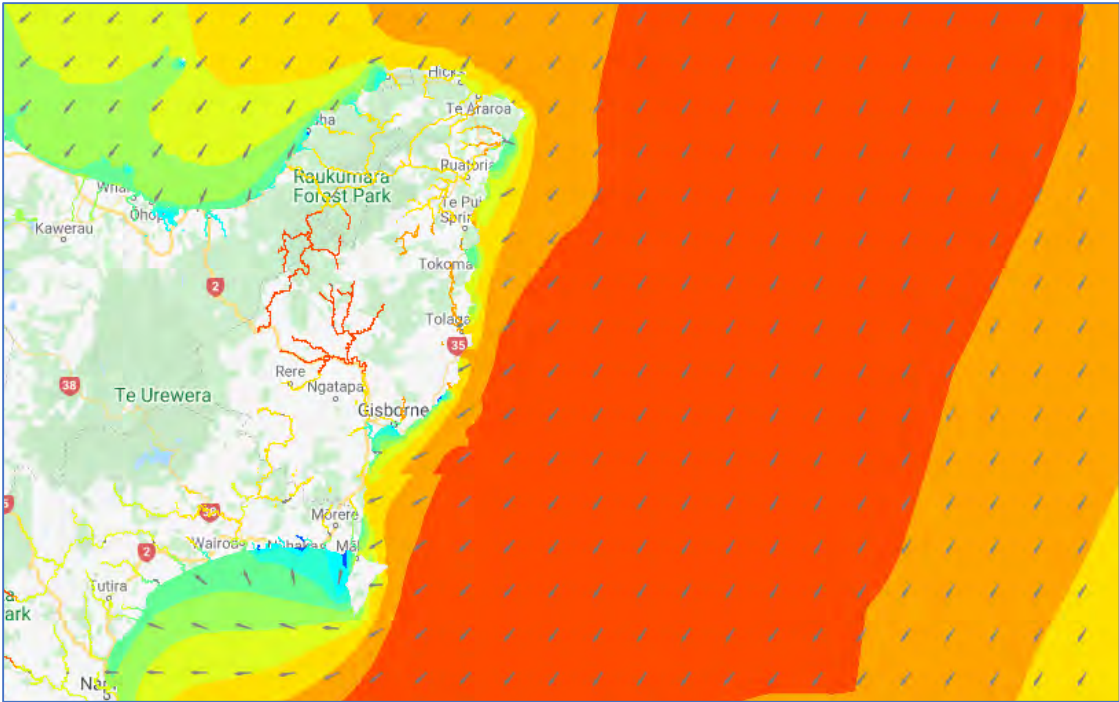


Figure Thirty. Swell map for the Tairāwhiti region for the 20th June 2021 showing 4m swells close to shore with 5m waves further offshore.



Figure Thirty One. Drone orthomosaic for the Kaiawha and Waitu Streams flown on the 23rd June 2021.



Figure Thirty Two. Drone orthomosaic for Mangahauini Stream flown on the 23rd June 2021. The 160 annotation at] the right of the image indicates the location of the Sanders rain gauge site.

Kaiawha Tributary Waitou Catchment

Dramatic flooding occurred on State Highway 35 on the southern approaches to Tokomaru Bay and this was an area of focus during the investigation into the flood event. No sign of flooding were observed until the bridge over Kaiawha Stream where mud could be seen on the true left bank of the stream immediately downstream of the bridge. There was some mud in the water tables on the road immediately east of the bridge but no sign of significant flooding until 100m passed the bridge⁴. A scan upstream of the Kaiawha Stream in the Waitou did not show signs of significant flooding but some scour was evident looking up the Kaiawha.

On the 22nd June, the reach of Waitou stream above the confluence with the Kaiawha were accessed from a variety of points. This did not reveal any signs of significant flooding. There was bank scour at a number of locations which caused some river bank trees to collapse into the river. Silt deposition was observed at one location very close to the normal riverbed level suggesting that relatively minor flooding occurred in the catchment (**Figure Thirty Three**).

⁴ As local contractors were already working to clean mud off the road, no assessment on this area was undertaken on the 20th June.



Figure Thirty Three. View of Waiotu Stream upstream of the confluence with Kaiawha Stream showing signs of scour (top left) and silt deposition (middle right). The silt is very close to normal river level and there is no indication on inundation on the true right bank (bottom right).

The Kaiawha River immediately upstream of the bridge on State Highway 35, however, showed more significant signs of flooding with the river a lot muddier, woody debris wedged against trees and a debris fence broken free from the true right bank (**Figure Thirty Four**). Mud and woody debris was observed wedged against the fence at the top of the bank indicating high flood levels (**Figure Thirty Five**).

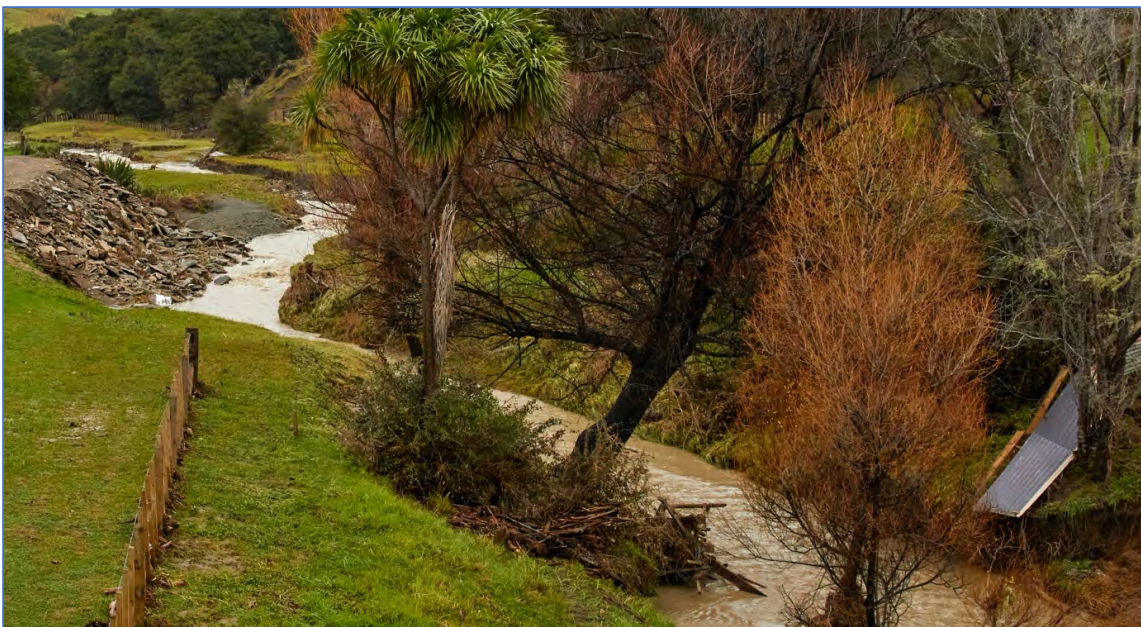


Figure Thirty Four. Kaiawha Stream upstream of the SH 35 Bridge showing the damaged debris fence and woody debris caught against the trees.



Figure Thirty Five. Fence at top of bank of Kaiawha Stream upstream of the SH 35 Bridge showing woody debris caught up in fence and mud deposited on the river side of the fence.

Approximately 650m up Kaiawha Road a ford provides access to the road end farmhouse but was blocked by up to 60cm of silt deposition. The silt deposition height was approximately 1m above river level and there was a considerable amount of debris scattered on the river bank downstream of the ford. The force of the flood appears to have been strong enough to move large boulders. (**Figure Thirty Six**).



Figure Thirty Six. Photograph of the ford 650m upstream of the bridge on State Highway 35 showing the depth of silt deposition (bottom left), the height of the flood spread based on the debris layer and the mobilised boulders on the ford path.

Further upstream the extent of the flooding was even more obvious with debris at approximately 2m above river level (**Figure Thirty Seven**) and the flood spread reaching all the way across the valley floor (**Figure Thirty Eight**) while in slightly raised parts of the valley the edge of the flood was marked by a debris line of small woody debris (**Figure Thirty Nine**). Further upstream there was evident of overground flow (**Figure Forty**).



Figure Thirty Seven. Photograph upstream of the ford on Kaiawha Road showing the extent of flooding upstream of the ford on the Kaiawha Road.



Figure Thirty Eight. Photograph upstream of the ford on Kaiawha Road showing debris caught up in the trees and mud deposited across the valley floor.



Figure Thirty Nine. Photograph upstream of the ford on Kaiawha Road showing the edge of the flood spread against higher ground.



Figure Forty. Photograph upstream of the ford on Kaiawha Road showing mud deposition resulting from over-ground flow.

Based on the on-the-ground observations, it is evident that the flood that affected the southern half of Tokomaru Bay was largely the result of flooding out of the Kaiawha Stream rather than Waiotu Stream. This is confirmed by analysis of the drone flight

from the 23rd of June and supplied video of the event. A detailed view of the drone footage is shown in **Figure Forty One** below. A few key points are evident in assessing this image. The first of these is that the flood in the Kaiawha Stream broke out of the true left river bank immediately downstream of the bridge on State Highway 35. In addition, the extensive silt deposition downstream of this discharge location. This contrasts with the lack of silt upstream in the Waiotu.



Figure Forty One. View of the Kaiawha Stream below the bridge on State Highway 35 showing the flood overtopping on the true left bank discharging into Waiotu Stream and the silt deposition downstream from there.

Video footage provided by Tianna Rongonui (cf. **Figure Seventeen** p.12) gave an good indication of maximum flood spread and enabled the drone mapping to be calibrated. It also help show that the willow in the middle of Waitotu Stream had a negligible effect on flood spread (**Figure Forty Two**). This is also evident from the mapped flood for this area (**Figure Forty Three**) which showed that it had a width of almost eighty metres while the river bed occupied by the willow was only eight metres wide.



Figure Forty Two. Video still provided by Tianna Rongonui showing the flood spread and with the large willow in the river in the background. As can be seen the flood spread was considerable wider than the normal river banks at point and had occupied the entire flood plain.



Figure Forty Three. Mapped flood spread in the Waitotu below Kaiawha Stream showing that the willow occupying the river channel occupied only a small part of the flood spread.

Figure Forty Four below which is also a still from Tianna Rongonui's video shows the extent of the flood spread on the true right and the contribution of overland flow from adjacent properties.



Figure Forty Four. Still from the video provided by Tianna Rongonui showing the flood spread on the state highway approach to Tokomaru Bay with the flood spread contribution from adjacent properties.

The video footage from 3552 Waiapu Road State Highway 35 (**Figure Forty Five**) is helpful as it graphically demonstrates the significant degree of overland flow during the storm. This calibration is useful because post-event on the ground mapping and the drone footage cannot readily differentiate between flood spread and overland flow.

The role that overland flow had in this storm is evident in **Figure Forty Four** and **Forty Five** and it is considered that this overland flow was a significant exacerbating factor particularly in the vicinity of the School (**Figure Forty Six**), at Café 35 (**Figure Forty Seven**) and the Playgrounds (**Figure Forty Eight**). The force of the flood waters within the Kaiawha/Waiotu catchments is graphically illustrated in **Figure Forty Nine** which shows the scoured out true left abutment of the footbridge at the mouth of Waiotu Stream.



Figure Forty Five. Video screenshot from No. 3552 Waiapu Road State Highway 35 showing the flood extent over the paddock and the considerable volume of overland flow on the hillside opposite.



Figure Forty Six. Flooding and silt deposition at Hatea-A-Rangi School, Tokomaru Bay.



Figure Forty Seven. Flooding at café 35, Tokomaru Bay. It is assessment that the flooding here was the result of overland flow rather than flooding from the Mangahauini River.



Figure Forty Eight. Flood water ponded at the north end of the Hatea-a-rangi Memorial Park.



Figure Forty Nine. The washed out abutment of the footbridge at the mouth of Waiotu Stream.

Mangahauini River

On the 20th June, the Tokomaru Bay Transfer Station on the Mangahauini River, off Toa Street was visited. There was considerable mud along Toa Street with clear signs that flood waters had reached the floor plate of a number of houses. At the transfer station itself, it was clear that the flood waters had overtopped the area pulling apart the fence at the upstream side of the river and scouring the riverbank on which the transfer station is built. (**Figure Fifty**).



Figure Fifty. Flood impacts at the Tokomaru Transfer Station.

The flood in the Mangahauini was more complex than for the Kaiawha/Waiotu with overland flow playing a more significant role. It is therefore helpful to establish the relative roles of river flood flow and overland flow. The location of the highway above the houses meant that overland flow would also have exacerbated flooding at Toa Street but culvert issues were also relevant here and thus have been considered first⁵.

Culvert on State Highway 35

The status of the culvert on State Highway 35 immediately north of Tokomaru Bay has been identified as a possible exacerbator of the 20th June 2021 floods. The culvert drains a relatively small stream immediately south of the prominent peak of Marotiri and has a catchment of 35.9 Ha (359,022 m²).

Reliable information on its pre-flood condition was difficult to come by although there were anecdotal reports from local residents suggesting it was blocked. This was confirmed by Waka Kotahi sometime after the event who advised that they were aware of the blockage but were also concerned that the culvert would immediately block again due to the volume of sediment in the tributary it drained. Accordingly they had initiated planning for a medium to long term solution but had arranged for contractors to clear the culvert but that was not done before the storm hit.

The key issues were;

- how serious was the blockage (ie did the culvert allow some flow),
- how much flood flow was there, and
- what impact this blockage would have had on flow paths during the flood.

The drone footage and a site inspection were used to assess whether or not the culvert was fully blocked. This indicated that there was negligible flow through the culvert but some water did reach the stream downstream of the culvert via the road surface and the water table immediately east of the culvert on the downstream side of the road (**Figure fifty One**).

The volume of water discharged by the creek was estimated using the Rational method which uses the catchment area, rainfall depth and a simplified runoff co-efficient. The runoff co-efficient was estimated using the areal reduction factor tables used in the Christchurch City Council Waterways, wetlands and drainage guide as a proxy for infiltration, natural retention, evaporation etc. Based on this a gross 27,000 m³ of rainfall fell within the 1 ½ hour duration heavy rainfall event or 57,600 m³ of rainfall during the 12 hour period. This would equate to a corrected available volume to discharge from the catchment of 23,220 m³ over 1.5 hours or 48,960 m³ over 12 hours. This equates to a peak discharge from “Marotiri” stream of 5,400 litres/second or 5.4 cumecs.

The culvert comprises two 1m diameter circular pipes which have a clear discharge rate of 1.07 cumecs each (ie 2.14 cumecs combined). No culvert will ever be

⁵ A key culvert on State Highway 35 north of Toa Street had been reported as blocked prior to the storm by local residents but it was initially not clear whether or not it was fully or partially blocked at the time. Waka Kotahi have subsequently confirmed that the culvert was fully blocked. This issue is discussed more fully below.

completely clear, however, due to debris on the culvert floor and a discharge rate of 1.8 to 2 cumecs is more realistic. The typical culvert has a 20 year ARI design storm threshold and thus this threshold would have been exceeded by the 20th June event which had a 1 ½ hour ARI of 35 years (or a 100 year ARI if the peak duration was only 1 hour).

Ultimately the analysis indicates that if the culvert had not been blocked, the culverts discharge capacity would still have been exceeded by around 3.4 to 3.6 cumecs. Thus water from “Marotiri” stream would still have flowed down highway towards Toa Street but the blockage increased the volume of flow. Not all of the peak discharge of 5.4 cumecs would have reached Toa street by this pathway, however, as some did bypass the culvert and re-enter the stream immediately downstream of the culvert (c.f **Figure Fifty One**) while the assessment of overland flow suggests that a significant portion of this water flow discharged onto ground at two points west of Toa Street (see *overland discussion below*).



Figure Fifty One. drone footage of the blocked culvert on State Highway 35 showing the overland flow path to the creek downstream of the culvert.

The upstream side of the culvert blockage prior to clearing out is shown in **Figure Fifty Two** below. The extensive area of debris fill is evident as is the overtopping of the fence on the edge of the water-table. The upstream side after removal of debris is shown in Figures Fifty Three and **Fifty Four**. This shows the buried culvert but also the considerable amount of debris remaining which poses an ongoing risk of culvert blockage in the typical storms to be expected any winter.



Figure Fifty Two. View of culvert on State Highway 35 north of Tokomaru Bay prior to clearing. Note the extensive infill of debris and the indications of overtopping on the fenceline.



Figure Fifty Three. View of culvert on State Highway 35 north of Tokomaru Bay after clearing showing the considerable volume of debris remaining above the inlet.



Figure Fifty Four. View of culvert on State Highway 35 north of Tokomaru Bay after clearing. This shows that only a small pit has been dug at the inlet to allow for drainage. It is understood that further clearance is planned and that an assessment is underway to increase culvert capacity.

Mangahauini Flood flow

Because of the issues with the culvert and the position of State Highway 35 above the dwellings on Toa Street, it is important to differentiate between flood flow in the Mangahauini and the considerable degree of overland flow that occurred during the storm. The overland flow did merge with the river of course, so differentiating between the two is difficult. The assessment based on the drone mapping indicates that except for pinch points such as the transfer station and some old meander loops, the Mangahauini remained within the river channel and stop banks on the true river bank⁶.

Accordingly, the river flood spread has been mapped separately from the overland flow to allow for the flood inundation to be assessed as accurately as possible. The river flood spread from a point immediately upstream of the “Marotiri” side stream to the bridge on State Highway 35 at the mouth of the Mangahauini has been mapped and is shown in **Figure Fifty Five** below. The river below the State Highway bridge has been excluded from the flood spread inundation as this area was predominately

⁶ There were two points where minor overtopping of the stop bank occurred. Further assessment is required of these two points.

affected by storm surge during the event. As **Figure Fifty Five** indicates the Mangahauini River was largely confined to its bed during the flood. There was flood spread into a low lying area on the true left immediately downstream of where the “Marotiri” tributary joined the Mangahauini, on the true left above the transfer station and across the transfer station itself. Some further inundation on the true left bank occurred east of Toa Street but otherwise no break out occurred.

On the true right bank the river is controlled by a stop bank and this stop bank became close to overtopping along its length but at only two locations did actual overtopping occur. These are shown in **Figures Fifty Six** and **Fifty Seven** and described below.



Figure Fifty Five. View of the river generated flood spread for the Mangahauini River from upstream of the “Marotiri” tributary to the bridge over the Mangahauini at the river mouth. The two sites where overtopping occurred are shown as red dots. The mouth itself below the bridge has been excluded from the flood spread as it is assessed that this area was dominated by storm surge during the storm. The location of the rain gauge is shown bottom right.

A more detailed view of the overtopping points is shown in **Figure Fifty Six** below and each over topping point at close detail in **Figures Fifty Seven** and **Fifty Eight** below. Both of these over topping points are relatively close to the State Highway bridge with the upper breach around 170m above the bridge and the other 56m upstream.

The upstream overtopping site shows both silt deposition on the discharge side of the overtopping as well as possible erosion of the outside slope of the stopbank (**Figure Fifty Seven**). There does not, however, seem to be any silt deposition or vegetation flattening beyond eight metres from the overtopping point. Thus this breach is not considered to have made a significant contribution to the overland flow flooding that affected Café 35 and beyond.



Figure Fifty Six. View of the lower true right bank of the Mangahauini showing the two overtopping points. The old road is shown at far right.

The lower overtopping site shows no sign of stopbank erosion but silt deposition is more widespread with indications of flood spread extending out at least 18 metres beyond the stopbank (**Figure Fifty Eight**). It is thus possible that flood waters from this overtopping contributed to the flood spread in the vicinity of Café 35 and beyond. It is equally possible that these flood waters were confined to the area immediately adjacent to the stopbank and flowed back to the river via the old road surface

immediately downstream of the overtopping. The inundation of area around Café 35 and towards Hatea-A-Rangi School was therefore just as likely the result of the rainfall accumulation on ground beyond the area flooded by the river.



Figure Fifty Seven. View of the upper overtopping point showing the silt deposition and the indications of stopbank erosion.

Mangahauini Overland flow and the impact of ponding

Overland flow off State Highway 35 was the primary cause the flooding at Toa Street rather than flooding from Mangahauini River. The *indicative*⁷ flood spread resulting from the overland flow is shown in **Figure Fifty Nine** below. While the blocked culvert in the “Marotiri” tributary could have had a impact on the inundation at Toa Street it would not have been the only source of flooding. Indeed it has already been noted that some of the discharge from “Marotiri” tributary above the blocked culvert would have re-entered the creek immediately downstream. Still more of the flood from the “Marotiri” tributary appears to have discharged from the water table at two points before reaching Toa Street (c.f **Figure Fifty Nine**).

⁷ It is difficult to differentiate between overland flow and in situ ponding in the drone footage and in addition flow through tall grasses or bush is difficult to ascertain.

Figure Forty Five above showed that significant overland flow occurred in the Waiotu catchment and while no equivalent photographs have been located for the Mangahauini a similar amount of overland flow would have occurred.

It is calculated that the area above State Highway 35 but east of the “Marotiri” tributary is around 148,000 M². This area would have received around 11,100 M³ of rainfall during the short but intense storm on the 20th June and around 23,680 M³ over the entire 12 hours of the overall storm. This would have been discharged directly on to the road surface and water tables, and this overland flow would have been directed down towards Toa Street.



Figure Fifty Eight. View of the lower overtopping point showing the silt deposition extending out onto the low lying ground beyond. The imagery does not, however, suggest flood spread beyond 18m of the overtopping point.



Figure Fifty Nine. Overland flow from SH 35 discharging above the house upstream of the substation (Point 1), the substation (Point 2), and ponding in the vicinity of Toa Street (Points 3-5).

Ponding and direct to ground rainfall accumulation would also have had a significant impact at Toa Street. Around 1,712 M³ of rainfall depth occurred over the 12 hours of the overall storm and with 802 M³ of this falling on the worst affected north side of Toa Street during the period of the high intensity rainfall early on Sunday 20th June 2021⁸.

This figure is likely to be an under-estimate, however, as more work would be required to accurately determine the area covered by direct-to-ground rainfall accumulation. Obviously, the depth of ponding was not uniform due the irregular ground surface in the vicinity of Toa Street and this would have resulted in variable impacts along the street. The capacity of Toa Street to act as a channel directing water away from the houses on the south side of the street also requires further assessment.

In summary, the flooding in the area around Toa Street was the result of a complex interaction between overland flow from the slopes east of the “Marotiri” tributary, discharge from “Marotiri” tributary as a result of the blocked culvert⁹ and direct to ground rainfall accumulation.

Hatea-A-Rangi ponding

The Hatea-A-Rangi area between the Waiotu/Kaiawha and Mangahauini catchments is low lying and inundation here was influenced by overland flow, direct to ground rainfall accumulation and probably some degree of river flooding. Additionally the coastal area immediately east of Hatea-A-Rangi was subject to storm surge which allowed the inundation to back up and delayed the drainage of the flooded areas.

The approximate inundation for the Hatea-A-Rangi area is shown in **Figure Sixty** below. The inundation from overland flow has been estimated in two segments; The steeper slopes above Tuatini Marae, and the low lying areas between those steep slopes and the Mangahauini stopbanks west of State Highway 35. These have a combined area of 144,526 M² and would have accumulated 23,125 M³ over the entire 12 main storm period and 10,840 M³ over the short duration intense storm.

The indicative area of ponding shown in **Figure Sixty** is around 39,000 M² which would equate to a direct accumulation of 6,236 M³ over the 12 hour period and 2,923 M³ over the short duration intense storm. The combination of this direct accumulation and the overland flow would have accounted for much of the ponding in the Hatea-A-Rangi area. It is considered, however, that some flood water from the Waiotu/Kaiawha would have also contributed to flooding in this area. It is not possible to determine the balance between overland flow, river flood and direct accumulation.

⁸ This estimate excludes the infiltration that may have occurred prior to the high intensity rainfall.

⁹ It is noted that a significant portion of the flow from the blocked culvert may have exited the road surface before Toa Street having a more significant affect at locations 1 and 2 in **Figure Fifty Nine** than at Toa Street itself.



Figure Sixty. Hatea-A-Rangi indicative main ponding area, Tokomaru Bay. The area east of the white line was subject to storm surge.

Storm Surge

Storm Surge had a significant impact during the 20th June 2021 storm from Te Araroa in the north to Turihaua Point in the south. Surge impacts were especially significant at Waipiroy Bay and Tokomaru.

Te Araroa

Te Araroa was visited on the 16th July 2021 following an RFS (Request for Service) reporting logs on the beach attributed to the 20th June storm (Cave July 2021). Woody debris assessments were undertaken at 3 sites and found that the woody debris was largely weathered material and was dominated by a mix of indigenous timber plus willow and poplar. There was one fresh pine tree with its' root ball intact that had washed down in the recent storms.

The beach showed obvious signs of scouring and it is inferred that some of this scour had occurred during the 20th June storm (**Figure Sixty One**). It is inferred that some of this scour had occurred during the 20th June storm but the area had been subject to several significant storm surge events since Mid May. Hence not all of the woody material would necessarily have been remobilised during the June storm surge and some may have occurred during the previous storm surges.



Figure Sixty One. Obvious erosional scour of the top of the beach that has exposed pre-existing driftwood. This is a mainly willow with some indigenous. The cuts look fresh and is probably due to being cut for firewood.

Waipiro Bay

Waipiro Bay suffered from flooding with dropouts on Waikawa road and a washout on McIlroy Road at Taurapu Stream but the most significant damage due to storm surge was to the road beyond Taurapu Stream . Not all of the storm surge damage will have occurred on the 20th June but significant damage still occurred during that event. The extent of coastal erosion at this site is shown dramatically in **Figure Sixty Two** below with the line of pine logs pushed into the beach as a retaining wall showing the extent of recent erosion. Scour has resulted in channels cut into the road surface at the approaches to the last houses at Ohineakai (**Figure Sixty Three**). Beyond the houses at the end of the road in Waipiro Bay there's a track leading up to an isolated house. Erosion associated with a broken culvert (**Figure Sixty Four**) and tension cracks higher on the road (**Figure Sixty Five**) means that there is a high risk that this property will become inaccessible. It needs to be noted that the existing, now damaged road, has been constructed on fill within the coastal zone and will always have been at risk from coastal erosion. Future sea level risk will likely exacerbate this risk.



Figure Sixty Two. The extent of recent coastal erosion at the northern end of McIlroy Road marked by the pine logs that had been pushed into the sand as retaining posts.



Figure Sixty Three. The extent of scouring and channelling of the road.



Figure Sixty Four. The road heading up to the last property at the end of McIlroy Road showing the scour and undercutting associated with the broken culvert, the car bodies and other debris used as armoring on the fill making up the access track and the “totem poles” used to buttress the slope. Note the over steepened face and overhangs.



Figure Sixty Five. Tension cracks on the bend in the road leading up to the last house.

Tokomaru Bay

Storm surge damage was widespread along the length of Tokomaru Bay. At the north end of the bay, big seas caused further damage to the Tokomaru Bay wharf (**Figure Sixty Six**) and there was damage to the road near the Te Puka tavern. Extensive scour of the beach along with woody debris was evident at the mouth of Waiotu (**Figure Sixty Seven**) and more woody debris was thrown on the freedom camping site adjacent to Waiotu Road just to the south of the river mouth (**Figure Sixty Eight**).

The most obvious damage occurred at the reserve at the mouth of the Mangahauini River which had previously been damaged by storm surge and assessed as being highly vulnerable (Cave 2019a, 2019b). This area also experienced significant erosion as a result of storm surge in May 2021 but the 20th of June storm surge was more significant with the surge extending 25m in from the bank edge pre-event. Coincidentally, the area was drone mapped on the 18th of June 2021 to assess the damage from the May

storm surge event making it easier to assess the degree of erosion resulting from the 20th June (**Figure Sixty Nine**)¹⁰.



Figure Sixty Six. Additional damage to the Tokomaru Bay wharf as a result of heavy seas



Figure Sixty Seven. Scour erosion of the top of the beach at the mouth of Waiotu Stream, with logs thrown up by the storm surge. Note the significant rubbish washed out by the flood.

¹⁰ The erosion at the Tokomaru Reserve and Playground is detailed in a separate report.



Figure Sixty Eight. A significant amount of woody debris was thrown up on the the reserve south of the Waiotu Stream river mouth.



Figure Sixty Nine. Comparison between the Tokomaru Reserve and playground drone orthomapping dated 18th June and 24th of June 2021. Note the removed tree, the overhanging concrete pad bottom left and the erosion at the turn around bay.

Tolaga Bay

Erosion at the Uawa river mouth as a result of storm surge has been occurring for the last year and is currently being assessed in detail. There did not appear to be a significant increase in erosion at the river mouth as a result of the 20th June event but increased erosion of the sand dunes north of the river mouth was observed. The principal impact of the storm surge at Tolaga was the remobilisation of logs and the spread of woody debris along the northern beach¹¹.

Pouawa to Turihaua Point

Monitoring for erosion of the freedom camping zone¹² between Pouawa and Turihaua was initiated in September 2020 and an initial report prepared in November 2020 (Cave 2020). A drone flight was undertaken in August 2021 and the limits for the May and June storm surge mapped on the ground is shown below on the drone orthomap in **Figure Seventy**. Evidence of storm surge was indicated by salt burnt grass, flattened vegetation and rocks and woody debris thrown up onto the top of the beach terrace (**Figure Seventy One**). Some erosion of top soil and grass on top of the wave cut platform was observed for both the May and June storm surges.



Figure Seventy. Drone map of Turihaua Point showing the top of the bank from the 2018 aerial imagery (red), the June 2016 bank (green), the areas affected by overland flow and inundation in June 2021 (yellow area) and the storm surge limits for May and June 2021 (yellow line).

The freedom camping area north of Turihaua Point also experienced erosion and overtopping during both the May and June 2021 storm surge events. A considerable amount of erosion of the dunes is evident (**Figure Seventy Two**), as well as overtopping (**Figure Seventy Three**) and debris deposition (**Figure Seventy Four**).

¹¹ Erosion and woody waste issues at Tolaga Bay are documented in a separate report in preparation.

¹² Note that this area has been re-classified as Freedom Camping areas under the Freedom Camping Bylaw 2021



Figure Seventy One. Photograph taken 30th June 2021 showing the debris thrown up during the 20th June storm surge.



Figure Seventy Two. Photograph showing dune erosion on the beach north of Turihaua Point.



Figure Seventy Three. Photograph showing overtopping and deposition of sand north of Turihaua Point. During the 2020-21 summer, campers occupied this site.



Figure Seventy Four. Photograph showing the debris line for the storm surge in June 2021. Grass beyond the debris line shows signs of salt burn indicating salt water inundation. Note that the large rocks were put there at 1 metre intervals to measure the extent of the surge.

Compliance Issues

Three key possible compliance issues were identified during this assessment as discussed further below.

Fresh cut pine log on north Tolaga Bay Beach

On the day of the event a fresh cut pine log was found on the beach. The log had blue identifier paint on one end, obvious waratah marks and clean cut ends (**Figure Seventy Five**). Such fresh identifiable logs are not typically found on the beaches but several were identified on the beach in 2017 following Cyclone Cook and were traced back to Willowbank Forest.



Figure Seventy Five. A fresh pine log on north Tolaga Bay Beach 20th June 2021.

Logs are more typically what are known as long-resident logs. That is, logs that have spent some time in the catchment and as a result of transport have abraded ends. A log this fresh indicates that had been graded and stored on a landing or skid site in preparation for transport to the port or a log yard. Based on the logs length, it is

unlikely to be sourced from an Aratu forest but could have come from any other operator currently or very recently harvesting within the Uawa catchment. As I am unaware of any self-reported skid failures within the catchment, one means of identifying the source would be to review recent compliance visit or records of recent active harvests within the catchment.

Mobilised willows

The 20th June storm resulted in a significant volume of woody debris being deposited on both ends of Tolaga Bay beach soon after an extensive clean-up of the beach had occurred. Some of the material on the beach during the storm was cannibalised from wood stocks buried in the beach dune system or elsewhere but new material sourced from the catchment was also identified (c.f prior section). A marked difference between much of this new material compared with prior influxes in 2017 and subsequent years is the high proportion of willow in the woody debris.

A rapid assessment of possible wood migration was undertaken on the day of the storm¹³. The Mangaheia, Tapuae, and Mangatokerau rivers on Paroa Road were also running dirty with sediment but no significant woody material was observed. The Hikuwai Bridge at Waiau Road and the Hikuwai on Arero Road were also clear as were the “three bridges” over the Hikuwai at Matairau Road.

At the State Highway 35 bridge over Mahanga Stream at Kopuatarakihi Road, however, significant volumes of willow wood was observed being eroded from piles of cut willow that was being stored on the banks of Mahanga Stream (c.f **Figure Eleven** page 8). A ten minute observation period was used to assess the quantity of material mobilising and several videos and photographs taken. It was not possible to do individual log counts as the material being mobilised were clumps which because the willow had not been de-limbed, incorporated multiple trees. From Mahanga Stream the woody debris was observed catching up on trees downstream but then being released and discharging into the Hikuwai River. Later on the 20th June 2021, willow woody debris was observed in the Hikuwai river at the Paroa Road bridge and then at the State Highway 35 bridge across the Uawa at Tolaga bay. Based on the assessment on the day, Mahanga stream location is the only likely source of the new willow on the Uawa beaches.

Satellite imagery was used to assess when the clearance of the willow was undertaken. A image dated 1st November 2020 shows the area with an extensive cover of willow while an image dated 18th of April 2021 shows a digger on site actively clearing the vegetation (**Figure Seventy Six**).

No search of Council records or the TRMP has been undertaken to assess whether or not the vegetation clearance was a permitted activity or one which would require a permit (and for which a permit was obtained). Irrespective, the earthworks associated

¹³ This followed the same methodology used from 2017; namely, migrating log counts and assessment of perched woody at each of the bridges within the catchment.

with the vegetation clearance and the placement of the willow piles on the banks of the stream within the flood plan has resulted in the discharge of sediment and wood waste into Mahanga Stream. From there it has entered the Hikuwai and then made its way downstream.



Figure Seventy Six. Screenshots of satellite imagery dated 1st November 2020 (left) and 18th April 2021 for the Mahanga Stream (right) where it crosses State Highway 35 showing the active clearance of willow during April 2021.

Culvert blockage on State Highway 35

The role of the culvert on State Highway 35 immediately north of Tokomaru Bay on the flood has been discussed in detail above. Immediately following the 20th June event, the issue of potential non-compliance of the culvert was raised as the local community had indicated that the culvert had been blocked prior to the storm. At that time it was determined that;

- Evidence of the prior blockage was anecdotal
- The scale of the event and the level of influx of sediment was such that the culvert would likely have blocked up in any case and thus the prior state could not be retrospectively assessed.
- Waka Kotahi should have been undertaking regular assessments of culvert condition to meet level of service requirements.

Thus, it was assessed that the culvert may not have materially exacerbated the flood spread. None-the-less, following the assessment of the drone footage and an on the site evaluation, further information was sought from Waka Kotahi who sometime later who advised “Yes the culvert was blocked prior to the event. It was in our forward

works programme to clear but unfortunately the weather event struck before it could be cleared." Additionally, Waka Kotahi had some concerns on how to fix the culvert long term and how to stop the culvert blocking up again straight away and instructed their contractor to clear the drain but the storm occurred before this clearance was actioned.

Waka Kotahi appears to have known that the culvert was fully blocked for some time and would have been aware that there was a risk of heavy rainfalls particularly from June to October. It is surprising that little urgency appears to have been put into clearing the culvert irrespective of their concerns about ongoing blockages which I note remains a concern as there is a considerable volume of sediment immediately above the culvert.

As also noted above, however, it cannot be established that flood waters from the blocked culvert reached Toa Street which would have received flood waters from overland flow derived from the hillslopes east of the culvert. Some direct-to-ground inundation would have also occurred at Toa Street. It is possible that water diverted from the blocked culvert did inundate a house site west of Toa Street and the sub station located at the end of Toa Street.

Silt dumping at Tokomaru Transfer Station

As a result of the flood, a significant volume of silt was deposited in Tokomaru Township. This was removed and dumped on natural ground on the town side of the transfer station pad. The volume and level of contamination of this material was a potential compliance issue. An assessment was undertaken (Cave 2021) which established that the material was less than 500 M³ and thus could be considered a permitted activity subject to whether or not the material could be classed as a hazardous substance. The assessment established that the silt contained low amounts of E.coli but did not contain any of the indicator metals or chemicals that would define a hazardous substance under the TRMP or NES. External advice from the leading New Zealand expert confirmed the assessment that the silt did not constitute a hazardous substance and could be considered as cleanfill. The dumped silt which was placed on natural ground beyond the transfer station is therefore under the threshold for requiring a consent under the TRMP and no compliance issues arise.

Summary and Conclusions

1. On the morning of 19th of June, the MetService issued a heavy rain warning for Gisborne advising the region to expect 100 to 150mm of rainfall north of Tolaga with peak intensities of 20 to 30mm/hr of rain in the evening and again the following morning. An update that evening advised to expect a further 70 to 100mm of rain on top of what had already fallen with peak intensities of 20 to 30 mm/hr Sunday 20th June.
2. The weather event developed largely as forecast by MetService with heavy rain in the Waikura Valley area in the northwest and in a band extending northeast

towards Tokomaru Bay and Tolaga. Rainfall accumulations were rather higher than forecast, however, with the highest occurring in the Waikura valley area (184mm/12 hr, 194.8mm/24 hr) with heavy rain from Te Puia/Waipiro Bay to Tokomaru Bay (150.4mm/12 hr, 154.4mm/24 hr at Te Puia). A private gauge at Tokomaru Bay recorded 160mm over 12 hours.

3. The weather event lasted up to 13 hours depending on location but 93% of the mean rainfall accumulation occurred across all rain gauges within a 12 Hour window and this assessment analysed rainfall at each site for 1 hour and 12-hour intervals as it was assessed that this best defined the storm.
4. Surface flooding occurred widely from south of Tolaga Bay to Te Araroa but slips were only significant on the main highway at Oweka near the Lottin Point turnoff.
5. Unexpectedly heavy rain occurred at Tokomaru Bay starting at or soon after 6am on the Sunday with a peak rainfall from 7am to 8:30am and this cause significant flash flooding affected both the Mangahauini and Waiotu/Kaiawha catchments, particularly along Arthur Street in the Waiotu catchment and Toa Street in the Mangahauini Catchment. Deep surface flooding also occurred in low lying areas between the two catchments in the Hatea-A-Rangi area. It is estimated that around 75mm fell within 1 ½ hours but it may have been higher.
6. Using HIRDS v.4, regionally the overall storm had a 12 hour rainfall accumulation ARI (Annual Recurrence Interval) of 2.5 years but the 12 hour rainfall recorded at the private rain gauge at Tokomaru Bay had an ARI of 13.5 years. The short duration high intensity storm had an ARI of 30 to 35 years if the accumulation occurred over 1 ½ hours or 100 years if most of that heavy rain fell within an hour.
7. Flooding impacts were exacerbated by an associated storm surge which impeded drainage of flood waters.
8. Neither the Mangahauini or Waiotu/Kaiawha catchments have river flow or rain gauges and hence the event was only captured by the private gauge which could only provide overall event rainfall accumulation.
9. Rain radar data from the Mahia station provided a useful qualitative view of the storm as it progressed from off Bay of Plenty through to Tairāwhiti but did not capture the heavy rain event that hit the Tokomaru Bay area as the radar was imaging precipitation around 2km and above rather than on the ground. Post-event rain gauge corrected radar showed a narrow band of rain (at 2km +) travelling down the coast east of Te Puia.
10. The flooding affecting Arthur Street resulted from heavy rain in the Kaiawha tributary of the Waiotu rather than the Waiotu itself, and was exacerbated by significant overland flow. A large willow planted in Waiotu Stream is not considered to have acted to exacerbate flooding.

11. Flooding in the Mangahauini river overtopped the Tokomaru transfer station and a very limited amount of overtopping of the stopbank on the true right bank close to the bridge over the river occurred but is not considered to have exacerbated flooding in the Café 35, Hatea-A-Rangi area which was primarily the result of overland flow and direct-to-ground ponding.
12. A blocked culvert on State Highway 35 at “Marotiri” Stream resulted in flow down the highway towards Tokomaru Bay. Some of this overland flow re-entered “Marotiri” Stream immediately downstream of the culvert but greater volumes would have left the water table at two locations between the culvert and the sub station.
13. The flooding at Toa Street is largely the result of overland flow from the hillslopes above State Highway 35 which was channelled towards the street via the water tables either side of the highway. Additional inundation was the result of direct-to-ground rainfall accumulation. It is possible that some water from the blocked culvert reached Toa Street but it would not have dominated the inundation.
14. The storm surge associated with the weather event caused coastal impacts from Te Araroa to Turihaua Point. At Te Araroa, the surge resulted in erosion at the top of the beach which exposed and remobilised previously deposited woody debris. This woody debris comprised indigenous and willow/poplar, and forestry harvest residues do not appear to have contributed to the wood on the beach.
15. At Waipiro Bay, the storm surge events of June and earlier in the year have resulted in erosion of the road that provides access to the houses beyond Taurapu Stream on Mcllroy road. This road has largely been built on fill and protected by a range of informal means of armouring. This road will become increasingly at risk from future storm surges and king tides, and sea level rise will further exacerbate this risk.
16. Storm surge damage at Tokomaru Bay was most evident at the reserve at the mouth of the Mangahauini River which was fully inundated by water and suffered additional damage over and above that experienced during the May storm surge (and previous events). At the mouth of the Waiotu, the storm surge caused flood waters to back up and threw a lot of woody debris onto land beyond the beach.
17. At Tolaga Bay the principal impact of the storm surge was to remobilise woody material already incorporated into the dune system at the top of the beach.
18. The impacts of storm surge along the freedom camping areas from Pouawa to Turihaua was largely from saltwater inundation which resulted in salt burn to the grass, thrown up rocks and woody debris and erosion. At Turihaua Point the erosion was largely of soil and grass on top of the wave cut platform while to the north the dune system was significantly eroded and inundated by salt water.

19. A number of possible compliance issues were identified in the course of this assessment but in one instance, silt dumping at the Tokomaru Landfill, no compliance issues were identified. For the remainder further work is required.
 - a. Fresh cut forestry log on north Tolaga Beach. The presence of such a log points to a failure at a forestry harvest site or landing as such logs would have been stowed ready for transport.
 - b. Extensive willow woody debris washed up on Tolaga Bay beach on the 20th of June and was traced back to a recent clearance of willows at Mahanga Stream above where it crosses State Highway Thirty Five. This clearance was substantial and as was observed on the day the woody residues were stored in locations vulnerable to flood.
 - c. The culvert of State Highway 35 immediately north of Tokomaru Bay was known to be blocked before the event and Waka Kotahi had planned to clear the blockage but this was not completed before the weather event. The scale of the event was such that the culvert would most likely have blocked in any event.

Recommendations

Installing a rain gauge in the vicinity of Tokomaru Bay

The absence of a rain gauge or flow gauge at Tokomaru would not have altered the outcome. A key part of any post-weather event assessment is, however, to maximise the understanding of what happened and when so that lessons are learnt and applied during the next event. Additionally, the majority of other coastal townships have one or more rain gauges in relatively close proximity and the absence of one at Tokomaru Bay is a gap. It is noted that the fortuitous presence of a private rain gauge at Tokomaru Bay proven invaluable in this analysis.

Assessment of the overall district rain gauge and river flow gauge network

It was noted in the body of the report that Gisborne/Tairāwhiti has an extensive rain gauge network relative to adjacent regions and there are few performance issues with the network (although there were some anomalous readings). On the other hand, the region has a very complex topography which results in a high degree of variability in rainfall. Some locations such as Poroporo has more than one gauge in close proximity which in this instance produced comparable results (12 hour maxima of 123.4 and 129.2 mm respectively). There is thus the case for assessing whether or not the network can be enhanced without caused a significant increase in workload for the Environmental Monitoring team.

Comprehensive Legacy Landfill risk assessment

Some work on a risk assessment of the legacy landfills has already been undertaken but a coherent work programme should be undertaken to assess and prioritise risk and develop risk mitigation plans and actions. The Tokomaru landfill is the most obviously vulnerable site but the Te Araroa, Tikitiki, and Tolaga sites as well as others require further assessment.

Better fact finding engagement with affected communities

The locals on the ground are a largely untapped source of information that could be better utilised to inform the post event review; for example improving information about flood spread and accessing social media feeds and raw photos and video.

Acknowledgements

The residents of Tokomaru Bay who provided information used in this assessment meant that the timing of the short duration intense storm could be better defined and particularly Tianna Rongonui is acknowledged for providing good quality video of the flooding on the southern approach to Tokomaru Bay. Also Kuipo Saulala who's Facebook post was helpful and the Uawa Live Facebook page.

Barry Sanders who owns a bach and art gallery at Tokomaru Bay, and who is also Building Engineer at Council who has a rain gauge and provided accurate information as to the overall quantum of the rainfall accumulation at Tokomaru Bay.

Mark Joblin of Waka Kotahi for the provision of excellent detail regarding the circumstances associated with the blocked culvert on State Highway 35 north of Tokomaru.

The un-named digger operator on Kaiawha Road who made sure I didn't get up to my knees in mud while accessing Kaiawha Stream.

Eamon Farrell, Council drone operator who, as ever, was willing and able to drop everything to make sure we got drone maps of the area as fast as possible. Additionally, Bridget Bosworth and Peter Hancock from the Environmental Monitoring team for their documentation of the rainfall data.

References

Amorati, R., Alberoni, P.P., Fornasiero, A., (2012) Operational Bias Correction of Hourly Radar Precipitation Estimate using Rain Gauges. ERAD 2012: The Seventh European Conference on Radar in Meteorology and Hydrology.

Cave, M.P., (2019) Risk Assessment Mangahauini River Mouth Tokomaru Bay. December 2019. 27 p.

Cave, M.P., (2020) Erosion protection options for Tokomaru Bay public reserve. February 2020. 6p.

Cave, M.P., (2020) Beach Erosion and Risk Assessment Turihaua Point. Gisborne District Council Report November 2020, 20p.

Cave, M.P., (2021) Assessment of Material from the 2021 Tokomaru floods stored at the Tokomaru Transfer Station. July 2021. 11p.

Cave, M.P., (2021) Inspection of woody debris, Te Araroa Beach, 16th July 2021. 4p.

Sutherland-Stacey, L., Austin, G., Nicol, J., Joseph, T., Williams, K, Brown, N., (2017) Operational use of rain radar. Water New Zealand Annual Conference 2017, 4p. Note that this canvases much the same material as Shucksmith, P.E., Sutherland-Stacey, L., Austin, G.L., (2011) The spatial and temporal sampling errors inherent in low

resolution radar estimates of rainfall. J. meteorological applications, V. 18, pp 354-360; and other papers by the same key authors.

Wijayanthne, D., Coulibaly, P., Boodoo, S., Sills, D., (2020) Evaluation of Radar-Guage Merging Techniques to be Used in Operational Flood Forecasting in Urban Watersheds. J. Water 2020. No.12, article 1494, 29p.



Situation Report

Event name:

Tairāwhiti Flood/Cyclone Event – March-April 2022
Tairāwhiti Region Consolidated Recovery

SITREP effective as at: **22/04/2022**
Next SITREP at: **29/04/2022**

Status:
Approved

Report approved by:
James Baty – Recovery Manager

Project goal: To restore and create opportunities to enhance our community wellbeing



Event Overview

23 March to 1 April 2022 (nine day) Severe Weather Event:

On 23 March 2022 heavy rain and flooding occurred when a subtropical low to the northeast of Te Ika-a-Māui – the North Island dumped rain that exceeded the one in 100 year levels across the entire Tairāwhiti region, for over a week (nine days).

After having a dryer-than-normal spell in the previous week, intense rain fell at high elevation, running down the slopes of the ranges and filling up rivers and streams which spilled their banks and flooded low-lying areas.

Many houses and much rural land were damaged, and a great number of roads were either closed or had limited access, because of slips, washouts and rock falls.

Bridge infrastructure failures, particularly on State Highway 35 isolated a number of communities, particularly on the coast.

Early on in the nine day event, flooding was concentrated around the coastal communities of Te Puia, Tokomaru Bay, Tolaga Bay and Anaura Bay.

This severe weather event compounded the impacts of the last significant rain events of June 2021 and November 2021. COVID-19 added another element of complexity to recovery efforts, as the nine days of severe weather coincided with what is considered the peak of the Omicron outbreak in Tairāwhiti.

13-14 April 2022 Cyclone Fifi:

Further heavy rain and wind was experienced in the Tairāwhiti region as ex-tropical Cyclone Fifi hurtled towards the East Coast of Te Ika-a-Māui – the North Island. A red warning for the area, including "heavy rain and severe gales" and "very large waves and coastal inundation" was issued by MetService.

Dangerous river conditions and significant flooding in some areas occurred. Slips and floodwaters disrupted travel, some roads became impassable isolating communities, and there were power outages in some parts of the region.

Social & Community

Community:

GDC, MBIE (TAS Service) MSD are collectively supporting 2 whānau that were displaced due to the March weather event. Arrangements have been made for 1 whānau to go into temporary accommodation with the support of TAS, what has been highlighted with this whānau is that have been without permanent housing for 2 years. Kainga Ora has been included in this instance as this whānau have been on the waiting list with Kainga Ora for 2 years. The 2nd whānau have been connected with TAS who have been trying to make contact.

GDC has made contact with 2 whānau who came to our attention due to property damage to ascertain if they had any welfare needs/issues which they didn't. One of these whānau came to our notice after contacting Minister Allan, they did not require welfare support, we are in communication with them to make sure they are safe and to keep them informed of what supports they can access.

Community hui with Tokomaru Bay whānau completed.

Community hui in Anaura Bay whānau completed.

We are also working with regional TPK staff to investigate funding avenues that will help to support whānau that have been impacted who do not fit the criteria of the various funding options.

MSD's 0800 559 009 line is available for any enquiries. MSD have a dedicated email inbox for escalations and referrals from agencies. On the ground they are connected to their providers and other agencies who may have whānau requiring support. Civil Defence payments are available for those impacted by the event. As at 21 April 2022, Gisborne - 846 Civil Defence payments have been made totalling \$350,381 and for Ruatoria - 122 Civil Defence payments have been made totalling \$40,251.

Temporary Accommodation Service (TAS) - Ministry of Business, Innovation & Employment:

The Temporary Accommodation Service (TAS) has extended the current active response for the Tokomaru Bay flooding event (June 2021) to include households affected by the Tairāwhiti March flooding event and ex-tropical cyclone Fifi. Registrations for TAS support can be made through the TAS website, TAS phone line, or through direct referrals from the Recovery team and stakeholder groups. TAS is working with Council to understand the accommodation needs of those issued with following recent events.

TAS has been working with Gisborne District Council to understand accommodation needs of flood affected families leading up to Easter, ANZAC and the school holiday period when accommodation availability is low.

Te Puni Kōkiri:

Housing repairs from flooding – TPK are currently pulling together information on whānau Māori homes affected by the flooding, no clear statistics, and numbers at this stage. We are working closely with GDC on sourcing information, and TRONPnui who are out in the field working directly with whānau. We will have a staff member out in the field also. The information will determine our approach and investment into a housing repairs programme during recovery.

Primary Industries:

A coordinated approach to farm and rural community recovery is being taken across Tairāwhiti and Wairoa Districts. The Tairāwhiti Rural Coordination Group (RCG) continues to meet on a regular basis to connect recovery support effort.

The Rural Support Trust continue to extend outreach to impacted farmers and rural communities connecting them to available support.

The Gisborne and Wairoa District Councils are undertaking damage assessments including satellite imagery which is expected to take place after Anzac weekend. Federated Farmers is liaising with the Gisborne and Wairoa District Council's on the farm damage assessment process.

The Minister of Rural Communities has announced \$150,000 for flood affected farmers and growers in Tairāwhiti and Hawke's Bay. MPI have finalised funding agreements with Gisborne and Wairoa District Councils focused on industry investments such as farm damage assessment, community recovery events and knowledge transfer to support recovery.

The Wairoa Community Development Trust is coordinating fund raising for a welfare outreach programme for impacted Ruakituri households and it is hoped a similar approach will be undertaken in Gisborne also.

Beef + Lamb New Zealand Ltd have confirmed assistance as follows:

- Helping collaboratively with other RCG members and industry business's at any community get together, hui or workshops.
- Simple feed planning to help adjust feed supply to feed demand e.g. 15% cover lost for winter what adjustment in stock carrying is needed.
- Help facilitate sharing of previous and current experience tips and tricks dealing with planning and recovery (3 weeks, 3 months, 3 Years discussions).
- Resources available <https://beeflambnz.com/knowledge-hub/PDF/flood-recovery-fact-sheet.pdf> and <https://beeflambnz.com/knowledge-hub/PDF/flood-recovery-fact-sheet.pdf> for examples.
- Longer term building more resilient farm system using Farm Plan through our workshops and resources and promoting community catchment establishment working with local Councils (GDC and HBRC).

National Feed Coordination Service:

The Feed Coordination Service is again connecting people with surplus feed - such as hay, silage, or grazing - to farmers who need it. It's a free service.

If you require feed, go here <https://arcg.is/0iaCq50>

If you have feed for sale, go here <https://arcg.is/0T9Dbq>.

Alternately you can call 0800 Farming (0800 327646) Opt 2 and request a call back.

Financial Support:

Enhanced Taskforce Green:

The Minister of Social Development has announced Enhanced Taskforce Green (ETFG), a labour focussed support package, for clean-up costs. Refer to link below:

<https://www.beehive.govt.nz/release/enhanced-task-force-green-approved-tair%C4%81whiti-and-wairoa-regions>

ETFG can be used for:

- Removing debris from properties; fixing and re-installing fencing; cleaning stock troughs; clearing pathways for stock movement etc. to enable paddocks to be used for stock grazing.
- Damage to community assets such as Marae, business enterprises located on Māori land used for commercial purposes, community gardens, community halls, public recreational areas.
- Properties when there is a recognized health and safety concern.

Farmers, growers and communities can self-register for Taskforce Green clean-up help by contacting 0800 834434 TFG HELP, Tairāwhiti Wairoa Rural Support – East Coast Rural Support Trust. A working party will be formed to determine priority of the clean-up projects requiring ETFG, also taking into account health and safety needs.

MSD has contracted Tūranga Ararau to employ, train and coordinate the workforce for both Tairāwhiti and Wairoa, to assist with clean-up activities, ensuring workers are adequately trained and supported to complete the tasks and have the tools and equipment needed to do the tasks. ETFG workers, may be job

seekers and/or receiving a benefit, at risk of being disadvantaged in the labour market, or workers displaced from their jobs due to the emergency event.

People interested in doing this mahi, contact MSD:

Ronelle Lambert, Wairoa, Ph: 029 951 2017, e-mail: Ronelle.Lambert012@msd.govt.nz

Trudi Wanoa, Tairāwhiti, Ph: 029 278 8045, e-mail: Trudi.Wanoa001@msd.govt.nz

or:

eastcoastjobsteam@msd.govt.nz

Civil Defence Payments:

Civil defence payments remain available (you don't have to be on a benefit to qualify for a Civil Defence payment):

<https://www.workandincome.govt.nz/products/a-z-benefits/civil-defence-payment.html>

Lottery Grants Board:

The Lottery Grants Board are also providing the opportunity of funding support for communities recovering from the impact of the event. Grants to community organisations supporting local communities, or community organisations and facilities that have been affected by flooding damage.

Examples of funding provided to communities for recovery from the impact of floods:

- Replacement water tanks
- Containers, spades, shovels, rakes, towlines, sandbags and sand
- Support to organisations providing meals to affected communities
- Earthmoving
- Repairs to fencing
- Remedial work to repair damage in walls of community facilities from heavy rain damage
- Repairing flood damage to marae driveways
- Community navigators to support access to services e.g. help with insurance claims
- Repairs to community club facilities
- Replacing carpet and lino at flooded community facilities
- Shipping containers for supplies in the event of further floods/natural disasters plus equipment to store in them, including generators
- Counselling/hauora support
- Replacement of jetties

Mayoral Relief Funding:

Minister of Rural Communities, Hon. Damien O'Connor, has announced \$150,000 for flood affected farmers and growers in Tairāwhiti and Hawke's Bay. These funds are likely to be a contribution to the Mayoral Relief Funds for Tairāwhiti and Wairoa.

<https://www.beehive.govt.nz/release/government-supports-flood-affected-tair%C4%81whiti-and-hawke%E2%80%99s-bay-farmers-and-growers>

The Minister of Emergency Management, Hon. Kiritapu Allan, has announced \$175,000 towards Mayoral Relief Funds.

<https://www.beehive.govt.nz/release/gisborne-flood-recovery-gets-support>

Insurance:

- Insurers have received about 100 claims across the Tairāwhiti district, including Gisborne, Tokomaru and Tolaga Bay.
- While the numbers are comparatively small, insurers have this flood event as a key focus because of the number of flood events the communities have had in such a short period of

time. In addition, we know from last November and June that there are many customers experiencing vulnerabilities that need extra care. Many of the households affected last time have been re-traumatised.

- Insurers have their assessing staff on the ground with many of the initial assessments happening over the course of this week. In terms of the approach for the recovery, insurers will prioritise the most damaged and the families experiencing vulnerability.
- Insurers are now agents of EQC and so the homeowners will have their insurance company looking at their home and land damage, including any landslip near homes and silt under the home. To support insurers work, EQC engaged Tonkin & Taylor to do some reconnaissance and report on land damage across the district.
- The removal of silt is of high importance to insurers to support the drying of home. Insurers will cash settle the EQCover portion of silt removal which is essentially underneath and within 8m of the residential home. Any silt beyond that is a homeowner/Council responsibility. ICNZ is working with GDC to quickly establish suitable dumpsites as this became a barrier to recovery in the June 2021 flood event. Insurers will manage the removal of the (EQCover) silt for customers experiencing vulnerability but cash settlement is the default position.
- Insurers have temporary accommodation payments available to people that are displaced due to damage as well as payments for any emergency make safe repairs. These are discussed with customers when they call their insurer to make a claim.
- In regard to properties affected by the last flood in June, ICNZ can confirm that insurers have fully settled from the previous event. As some customers wanted the cash to organise it themselves, if there are any properties not complete from June 2021, then the homeowners will be working on that and have been funded to do so.

Process Summary:

- Homeowners that have insurance will have EQCover. Insurers are the main contact point for any home or land claims – they are now the agents of EQC and are the contact point for customers.
- EQCover provides for silt removal under a person's home and within 8 metres.
- The insurer will settle with cash directly to the homeowner for the silt.
- The homeowner is then able to use those funds for silt removal.
- We suggest GDC communicates to ratepayers where they can dump silt and who they should use to do that.
- Insurers by default won't be managing this silt removal process for their customers.
- Insurers have an interest in ensuring the silt removal is done as quickly as possible as insurers will be managing the repairs for insured properties where water has gone through the home.
- If you are doing area-wide silt removal then GDC could seek reimbursement from the homeowners but that is for GDC to discuss with the homeowner.

Built & Natural Environment

Roading:

Full roading update here:

<https://www.gdc.govt.nz/services/roads-and-roadsides/road-information>

<http://www.nzta.govt.nz/traffic/regions/5>

SH35 open all the way through.

Road Status Update 21st April 2022								
Road Closures	Km mark Start/RP	Km mark End	Opening Date for Heavy Vehicles	Light Vehicles	Stock Trucks 26t	Truck and Trailer 44-50t	Logging Trucks 53t	Notes

Anaura Road	11		TBA	No	No	No	No	Closed FH to start clearing new slip 22/04/2022
Beach Road	500m			4X4	No	No	No	Crew onsite clearing culverts
Bruce Road	4km		TBA	4X4	No	No	No	4X4 Only
Bushy Knoll	0	29.4	TBA	No	No	No	No	Resident only 4x4 Daylight hours only.
East Cape	12	18	27/04/2022	No	No	No	No	Crews onsite/Access for Quads only, Crew onsite to complete remedial work including Culvert installation prior to removing slips
Glenroy	3	7	TBA	Yes	No	No	No	4X4 Only
Goodwin Road	60		TBA	Yes	No	No	No	Closed to Heavies
Haig Road			TBA	Yes	No	No	No	
Hikuwai Road	1			Yes	No	No	No	4X4 Only
Hokoroa	9.5	25 Waimata		No	No	No	No	4X4 Only
Horehore Road	Whole Road		TBA	Yes	No	No	No	4x4 Only
Ihungia (Lower) 0 - 13	Whole Road			Yes	yes (planned access only)	No	No	4x4 Only
Kaiaua Road	5		TBA	No	No	No	No	Open to 5KM then closed thereafter
Kaiawha Road	0.5		TBA	No	No	No	No	Need new fjord

Karakatuwhero Road	2.7		TBA	No	No	No	No	4x4 to 2km only, river scour into private property, landowners private access only.
Karewa Road	Whole Road			Yes	No	No	No	4x4 Only
Kopuaroa Road	2.8		TBA	No	No	No	No	
Kopuatarakihi			TBA	Yes	No	No	No	4X4 only
Mangatu Road	4.4		UP to 44t	Yes	Yes	Yes	No	Dropout RP 4
Matahiia Road	6		Open to the 6km	Yes	No	No	No	4X4 Only
Mcllroy Road Waipiro Bay	1.2		TBA	No	No	No	No	Remains closed
Ngakoroa	11		TBA	4x4	26t Only	no	No	Truck only access for heavy vehicles
Paparatu Road	From Waingake Intersection		TBA	4x4	No	No	No	4x4 Only
Paritu Road	4x4		TBA	Yes	Yes	No	No	Dropout
Potikirua Road	Whole Road			4X4 only	No	No	No	Dropout
Pukefiti Road	1.5			4x4	No	No	No	4x4 Only
Rangitikia Road	8.5		TBA	4x4	No	No	No	4x4 Only
Ruakaka	7		TBA	Yes	Yes	No	No	
Stevens Road	2.6		TBA	4x4	No	No	No	4x4 Only
Tapuaeroa Road	0		TBA	4x4	No	No	No	Access to RP 14, onwards need work
Tuparoa	4		TBA	4X4	No	No	No	4x4 Only
Te Hue Road	Whole Road			Yes	No	No	No	4X4 only
Waihau Beach Road/Loisels	0		TBA	No	No	No	No	Resident only 4x4
Waikawa	Whole Road		TBA	4x4	No	No	No	4x4 only, slips still on the move and will close in the next rain
Waipiro Bay Road	3.3		TBA	4x4	No	No	No	Drop out

Whareponga	6.5		TBA	4x4	No	No	No	4x4 Only
4x4 Only	Km mark Start/RP	Km mark End	Opening Date for Heavy Vehicles	Light Vehicles	Stock Trucks 26t	Truck and Trailer 44-50t	Logging Trucks 53t	Notes
Andrews Road	Whole Road			4x4	Yes	Yes	Yes	Flooding subsided but very muddy
Cave Road Off Riverside	Whole Road			Yes	Yes	Yes	Yes	
Kanakanaia	21.5			Yes	Yes	Yes	Yes	
Mangaoporo Road	4x4		TBA	Yes	Yes	Yes	Yes	Requires metal
Mutuera Road	Various		TBA	Yes	Yes	Yes	Yes	Culvert crossing flooded
Pakarae Road	1	3		Yes	Yes	Yes	Yes	4X4 only
Paroa Road	Rapid Number 258		Yes	Yes	Yes	Yes	Yes	Clear
Taumata Road	6.5km			Yes	Yes	Yes	Yes	
Tauwhareparae Road	15	28		Yes	Yes	Yes	Yes	
Te Kowhai Road	1.4			Yes	Yes	Yes	Yes	
Te Kumi	Whole Road			Yes	Yes	Yes	Yes	4X4 only
Take Care	Km mark Start/RP	Km mark End	Opening Date for Heavy Vehicles	Light Vehicles	Stock Trucks 26t	Truck and Trailer 44-50t	Logging Trucks 53t	Notes
Darwin Road	Rapid Number 184			No	No	No	No	Clear
Dryden Street/Off Valley Road				Yes	Yes	Yes	Yes	Clear
Kaiti Beach	Beach End			Yes	Yes	Yes	Yes	Clear
Kiore Road	10km			Yes	Yes	Yes	Yes	Tree Clear
96A Lytton Road	Driveway			Yes	Yes	Yes	Yes	Clear
Makarika Road	0			Yes	Yes	Yes	Yes	Reports of surface water, Take Care

Mata Road	0		TBA	Yes	Yes	Yes	Yes	4x4 Only
Panikau Road	13.5			Yes	Yes	Yes	Yes	Minor tree clearance
Parikanapa Road	0	10		Yes	Yes	Yes	Yes	Remedial work continues, Take care
Waimata Valley Road	18			Yes	Yes	Yes	No	Take care
Waiomoko Road	Whole Road			Yes	Yes	Yes	Yes	
Wharekiri	1.7	1.8	TBA	Yes	Yes	Yes	Yes	Clear
Utting Road	3			Yes	Yes	Yes	No	Take care

Schools:

Hatea-A-Rangi School, Makarika School, and Te Kura Kaupapa Māori o Tokomaru that were closed during the nine day rain event due to flood damage and road access issues.

Makarika is currently closed due to silting.

Initial meeting with Principals, BoT, MoE and Council officers held Thursday, 21 April 2022. Further coordination meetings being scheduled.

MoE consultants have received GDC data (LIDAR, titles, previous event records) to assist their efforts to re-open schools.

Te Kura Kaupapa Māori o Tokomaru: The flood damage report has been done and the School Principal and MoE advised that the school is ok to open. Council are arranging the work to replace/repair the groynes below the school and source railway irons. The school is assessing the work to infill the bank above. The flood damage report has been upgraded identifying a higher risk from further flooding. The recommendation is to close the school or evacuate if further flooding occurs. The Moana St School Principal has been advised.

Drainage/Flooding Damage:

Tokomaru Bay:

- Septic tank assessments done and recommendations for each property being worked through with owners.
- Mangahauini River: flooding and bank erosion - designs to fix damaged groynes
- Mangahauini River: bank slip - School notified of slip danger if river level running high.
- Arthur Street: community meeting held Tuesday 12 April attended by Council and residents. - Hydrological assessment done, critical overtopping locations identified. Issues raised by the red sticker process were addressed as were concerns about longer term solutions to prevent further flood events occurring

State Highway 35 Bridge:

- Hydrological assessment done, survey to be completed.

Anaura Bay:

- DOC site clean-up completed ahead of further 13 April rain event.
- Community meeting planned for Tuesday 19th April.

Waingake:

- Te Arai river slip highlighted by recent event. Work underway to cost up replacing the bridge.

Building Services:S124 notices:

Currently 4 properties with S124 notices in place, 1 further property has had their s124 notice lifted.

Currently 1 property being assessed for S124 notice.

Red stickers:

Currently 10 properties with red stickers. GDC Building Control are waiving council consent fees on those houses that may need lifting in order to clear dirt/silt deposits.

General:

26 further property related issues being assessed and determined, none currently requiring escalation.

Satellite imagery work confirmed and process underway to secure images.

Other:Dirt/Silt Removal:

GDC are working with insurers to coordinate silt removal efforts through approved contractors to Council disposal site.

Further coordination underway to used Enhanced Taskforce Green resources to clear silt from uninsured properties and from insured properties where the silt is not covered by the insurance policy.

Disposal site secured and process being confirmed for property owners and insurers to use the site for disposal.

Camping sites up the Coast:

All Council camping areas around the region close from Tuesday, 12 April 2022.

Recovery Office

- Recovery Office team:
 - Recovery Manager – James Baty – James.Baty@gdc.govt.nz
 - Joint Social Lead - Fleur Paenga - Fleur.Paenga@gdc.govt.nz
 - Joint Social Lead - Tim Breese - Tim.Breese@gdc.govt.nz
 - Build Environment Lead - Steve Breen Steve.Breen@gdc.govt.nz
 - Recovery Admin Support - Heather Kohn - Heather.Kohn@gdc.govt.nz
 - Recovery Comms - Melanie Thornton Melanie.Thornton@gdc.govt.nz
- Transition Report completed.
- Transition notice completed.
- Decision to designate an area under s133BC completed.
- Draft Recovery Plan released for stakeholder feedback. Feedback received. We are confirming and finalising this plan.
- Second Recovery Partners Meeting completed 19 April 2022, rhythm set for bi-weekly.
- Multiple media releases completed.
- Numerous internal coordination meetings completed.



Tairāwhiti Civil Defence Emergency Management Group

Response to Recovery Transition Report

Event:	Severe Weather Event March 2022		
Regions/Districts/Wards affected:	Gisborne District		
Prepared by:	Ben Green (Manager Tairāwhiti Civil Defence and Emergency Management)		
Handover from:	David Wilson	Signature:	
Handover to:	James Baty	Signature:	
Date of handover from Controller to Recovery Manager:	1030 1 April 2022		
Status:	APPROVED		

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Executive Summary

On 23 March 2022 a severe weather event (rain) occurred across the Tairāwhiti region when a subtropical low to the northeast of the North Island directed a moist north-easterly flow with an embedded front onto the Island.

The effect of which caused major flooding extensively through the region with a number of houses damaged and many roads affected (slips, washouts, rock falls). Bridge infrastructure failures also contributed to substantial isolation of communities while rural land impacts are extensive, and access limited or closed off. This event is compounded with the impacts since the last significant rain events of June 2021 and November 2021.

This Transition to Recovery Report aims to provide situational awareness to the Gisborne District Council (GDC) Recovery Team outlining key response arrangements and ongoing risks as the response transitions to recovery.

Ongoing priorities include:

- **Transition Recovery Support**
 - ensuring a smooth transition to recovery, particularly in the welfare space, so no one 'falls through the gaps'
 - establish and maintain links with Iwi and affected communities to support recovery
 - establish and maintain links with agencies supporting recovery
 - coordinate recovery efforts with agencies and Iwi
 - secure resources and location to support the TCDEM Recovery Team
 - establish recovery framework and reporting requirements
 - ensuring requests for services are checked and closed off to ensure no gaps.
- **Communication and Information**
 - the need to continue to provide public information so affected persons know where they can access support
 - develop and communicate key messaging on recovery activities and progress to key agencies and affected communities
 - integrate with Council communication processes to provide seamless messaging.
- **Lifelines**
 - re-establish lifelines
 - re-establish road access to stranded communities
 - establishing building assessment outcomes
 - the ongoing management of flood-damaged material/waste.
- **Community Needs**
 - transitioning those displaced from emergency to temporary accommodation as required
 - the emerging psychosocial needs of those affected by the floods
 - Identify and understand the needs of affected communities to determine their specific requirements and prioritisation of recovery activities and services
 - establish the criteria and awareness of the Mayoral relief fund.

- **Rural Economy, Farming, Horticulture, and Forestry**
 - assessment of primary industry impacts
 - restoration of agriculture land and access back to its primary use
 - impacted operations because of limited or loss of access
 - horticultural impacts.

- **Current and emergent risks**
 - assess current and potential risks and contingency plans to mitigate e.g., further heavy rain events
 - understand cumulative impacts from previous weather events.

Next Step for the CDEM Recovery Team

Development of:

- GDC Recovery Team and office
- Recovery Plan
- Communication and Engagement
- Indicators to inform progress.

Emergency and Response summary

Summary of the event

On 23 March 2022 a severe weather event (rain) occurred across the Tairāwhiti region when a subtropical low to the northeast of the North Island directed a moist north-easterly flow with an embedded front onto the Island.

- The effect of which caused major flooding extensively through the region with a number of houses damaged, many roads affected (slips, washouts, rock falls) and three bridges with the Mangahauini in Tokomaru with lost abutment.

Rural land impacts are extensive, and access limited or closed off. The impacts of this are isolated families, communities, and displaced people.

Tairāwhiti Civil Defence Emergency Management led an integrated centrally located, regional response with emergency services.

During the event, evacuations occurred across the region particularly in Tolaga Bay and Tokomaru Bay.

Extraordinary powers

Declaration Notice	Start date	Expiry date	Given by	Terminated by	Area covered	Comments (include reason for declaration / notice)
State of Local Emergency	0630 23 March 2022	0630 30 March 2022	Mayor Rehette Stoltz	Mayor Rehette Stoltz	Tairāwhiti Region	Severe Weather Event
Extension of State of Local Emergency	0630 30 March 2022	1030 1 April 2022	Mayor Rehette Stoltz	Mayor Rehette Stoltz	Tairāwhiti Region	Severe Weather Event
Notice of local transition period	1030 1 April 2022	+28 days	Mayor Rehette Stoltz		Tairāwhiti Region	Severe Weather Event
Designation of an Area for Building Management(subpart 6B of the Building Act 2004)	0830 1 April 2022	3 years subject to 90 day reviews	Mayor Rehette Stoltz		Tairāwhiti Region	Severe Weather Event

Summary of emergency powers exercised

No emergency powers were formally exercised during this event; however evacuations were carried out by emergency services and roads were closed (state highways and local) and weight limitations placed on specific roads to avoid further damage as required.

A transition period is required for this response, as recovery activities require the use of associated powers under the CDEM Act 2002.

Expenditure, funding, and assistance

Expenditure generated during response

The exact expenditure generated during the response will be obtained from both TCDEM and GDC Logistics and Welfare teams as the transition to recovery takes place, and invoices are received from the goods and services used during the response. Costs may include:

- welfare costs attributable to displaced persons because of the event
- open purchase orders generated during response
- supplies of goods and medicine
- flights/accommodation/living costs from deployed agencies/surge support
- other operational costs.

Transition to recovery actions:

- Group Controller to decide whether to submit separate or a joint expense claim to NEMA for eligible expenses under Section 33 of the Guide to the National CDEM Plan
- GDC and TCDEM to task appropriate staff member to compile appropriate costs for reimbursement claim.

Ongoing costs

Ongoing costs for response include:

- residual welfare
- emergency accommodation
- lifelines/roads/bridges.

Funding and support

Ongoing support

Centre	Status	Ongoing support
Group ECC	Activated on 0630 on 23 March 2020 in a coordinating role with intent to continue to be activated until at least 1030 1 April 2022 where outstanding activities will be transferred to the GDC Recovery Team. CDEM Group will then transition into a supporting role for the recovery phase.	

Financial support

CDEM Emergency Fund

The CDEM Emergency Fund will be utilised for expenditure applicable to the terms and conditions for use. This will be administered by the Welfare Manager in the first instance.

A Welfare Fact Sheet has been compiled by all key welfare stakeholders detailing what support and services are available for those impacted by the event. This has been issued to those directly affected by the events and made available to those who will be identified whilst assessments are being conducted.

Government assistance

Mayoral Relief Fund	Gisborne Mayoral Relief Fund has been established and received a donation from Central Government \$175,000. Eligibility criteria and process is to be finalised.
Government Assistance	Enhanced Taskforce Green process for funding has been commenced by Ministry of Social Development to seek assistance with clean ups and arrange the management of resources.

Other Agency Funds

Ministry for Primary Industries (MPI)	MPI Emergency fund – medium event- shared with Hawkes Bay Region \$150,000
Ministry of Social Development (MSD)	Established Civil Defence Emergency Flood Funds for community and business loss

Response staff

Emergency Coordination Centre (TCDEM-led)

Function	Function Manager
Control	Primary – David Wilson (GDC/TCDEM)
Response Manager	Ben Green (TCDEM)
Intelligence	Kumeroa Papuni-Tuhaka (TCDEM)
Welfare Manager	Donna Shaw (GDC)
Planning	Janic Slupski (GDC)
Logistics	Donna Shaw (GDC)
Operations	Phil Nickerson (GDC)
Public Information Management	Anita Reedy – Holthausen (GDC)
Iwi Liaison	Gene Takurua (GDC)

ESCC Members

ACTIVATED

Agency	Agency Representative
FENZ	Ray Dever
St John	Shane Clapperton
NZ Police	Darren Leigh-Paki
Tairāwhiti DHB	Dallas Haynes

CDEM Support in recovery

The TCDEM Group have allocated the following resources to support the GDC-led recovery to the Tairāwhiti Floods.

Role	Resource allocation
Group Controller – David Wilson	<ul style="list-style-type: none"> Support/advice through the Recovery Manager on an ongoing, as required basis.
CDEM Manager - Ben Green	<ul style="list-style-type: none"> Ongoing support in capacity as GDC Emergency Manager.

Information management

Information gathered during the response includes:

Information	How has it been gathered	Where it is recorded	Ongoing information management
Road Closures and restricted access	Direct from: <ul style="list-style-type: none"> NZTA Gisborne District Council 	Traffic map (nzta.govt.nz) Road Information Gisborne District Council (gdc.govt.nz)	Updated as required
Needs Assessment data	Needs assessment gathered through: <ul style="list-style-type: none"> triaging the GDC Request for Service (RFS) logs staff deployed in the field. 	Welfare and Recovery Tracker spreadsheet currently managed by Welfare and Logistics.	Data collated and managed and will be available as required ensuring privacy protocols.
Evacuated properties spreadsheet	Collated information from various sources (GDC, FENZ, GDC) regarding evacuated properties.	Authored and held by TCDEM ECC Intelligence Team in the Welfare and Recovery Tracker spreadsheet.	
Outstanding information and actions to gather it	TCDEM ECC Intelligence team. Data matching displaced persons with uninhabitable properties.	Held by ECC Intelligence Team including links to GDC Assessments team.	Welfare and Recovery Tracker spreadsheet will be updated.
Building assessments data and confirmation of un-inhabitable dwellings	GDC Building Assessors	Currently being managed by GDC (Ian Petty).	GDC in process of compiling intelligence regarding building assessments.
Situation Reports and Action Plans	Gathered information from the ECC Intelligence and Planning teams.	Within the TCDEM MS Teams Response site.	This will be archived and is available if requested.

TCDEM Group Claims Spreadsheet	Collated by TCDEM Logistics team	GDC document management system	Updated as required
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Challenges and outstanding issues

- Due to the extended widespread impacts in the region, the extended rainfall challenges one week on from the declared event, has meant the total challenges and locations of the affected areas (including remoteness) is not yet fully known.
- **Access**
 - Roading repairs will continue to challenge recovery efforts with community access and farming operations significantly impacted. This will increase costs, time, and frustrations.
 - As of 31 March 2022, 50 roads in the region are closed or reduced to one lane or weight limited. 3 major bridge repairs are as follows: Waikura, Mangahiau and Mangahauini (the Mangahauini in Tokomaru with lost abutment).
 - Due to the uncertain time frames and the continuation of road closures the levels of frustration and anxiety will increase.
 - Access to some properties requiring repairs will be a challenge.
 - The areas isolated are spread across the whole of the Tairāwhiti region and not concentrated in one area.
 - Continuation of providing supplies to isolated communities.
 - Implications of emergency service access.
 - Implications for business operations.
 - Many roads open require 4-wheel drive access which limits or excludes numerous members of the community to safely travel.
- **Rural**
 - Rural areas have had damage to their farming infrastructure including fencing, erosion, silting, debris, and surface flooding. The extent of damage is uncertain and requires assessment.
 - Animal welfare issues are starting to emerge.
 - Slips not yet assessed by geotechnical experts – limited skilled resources available.
- **Insurance:**
 - None or inadequate. (Replacement insurance for properties can be particularly expensive because of access issues, especially for those who do not have road access. Although insurance paid, some properties have not been completed in repairs from previous weather events of June 2021 and November 2021.)
 - Temporary accommodation insurance has limited timeframe which is usually less than any timeframe for substantive rebuilds.
 - A number of properties are damaged and deemed uninhabitable- this is significant for families with loss of homes and unknown futures.
 - The need for Residential Advisory Service (RAS) to support insurance matters and advocacy if necessary.
- **Risks**
 - Potential for future rain events to cause further damage.
 - Delays in assessments of damage as a result of ongoing rain and access limitations.
 - Adequate resourcing to support the Recovery Team.

Nature and extent of consequences (short, medium and long-term)

Condition of community affected by the emergency

The roading network is critical in enabling communities (including farming), to access services, supplies, work, homes and supply networks more generally.

Situations with potential to re-escalate or exacerbate

Areas or situations with the potential to re-escalate the impacts of the emergency include:

- finished floor levels of dwellings that have been flooded that are below flood level events (i.e. dwellings will be susceptible to future flood events)
- the ongoing welfare requirements for those without home and/or contents insurance
- the psychosocial impact of the emergency, including the compounding impacts of the COVID-19 pandemic plus two previous significant weather events in 2021
- the collection and disposal of flood affected items from properties and curb sides in Tairāwhiti
- pre-existing regional housing/accommodation shortages
- further heavy rain events
- further slips putting residential property and key infrastructure at risk
- the emergence of medium-to-long term health impacts due to the flooding or contamination from sewerage discharge
- the building assessment process and how owners and occupiers are advised of results as well as next steps
- weather events causing further damage to roading, properties and land
- ongoing restricted or no access to properties and businesses
- increased travel times for day-to-day activities
- properties left unchecked for damage for long periods of time
- properties not or under insured.
- unknown number of residents who are socially isolated, with compromised health and on very low incomes (superannuation, sickness benefit). They are less likely to seek help than some other residents and may only come to our notice through concerned whānau, local community advocates or neighbours
- property owners at risk from slips above their properties – pressure to remove slips, distress / anger at a perceived lack of action
- not feeling adequately supported through recovery
- lack of accommodation
- state of access and weight limitations on roads has major implications for forestry operations.

Social environment

The consequences of this emergency on the social environment may include:

- existing housing and social needs compounded by impacts of event
- disruption to day-to-day life
- impacts on physical and mental wellbeing - stress/anxiety
- increase in alcohol and substance use as a coping mechanism

- increase in family harm due to stress from disruption of normal life
- limited access to homes/living in temporary accommodation
- crowded accommodation where households are staying with family/friends
- no access to usual belongings
- stress of managing insurance claims/excess
- no insurance or not enough cover
- isolation
- loss of memorabilia
- loss of personal belongings or property
- security of unoccupied properties
- unknown period of displacement
- logistics of managing repairs in remote locations with reduced or no access
- additional financial stressors
- impact on people from multiple recent weather events
- loss of job security and income from access limitations.

There are 2 people who have been placed in CDEM emergency accommodation who are unable to access their property. There have been numerous requests for CDEM assistance to access food, household goods, medical supplies, and shelter/accommodation.

It is not known how many displaced persons/whānau have made their own accommodation arrangements with friends or family.

Consequences on people and communities and probable future needs

Impact	Extent	Comment	Future needs
Deaths	NIL	N/A	N/A
People displaced	As of 31 March 2022, 37 inspections have been completed. 13 No priority, 1 buildings, and 8 No S124s issued	<p>There are families that have voluntarily evacuated their premises. However, the numbers are not yet fully known.</p> <p>Implications for uninhabitable buildings imply minimum of 13 families.</p> <p>The full extent of potential displaced is yet to be determined as further inspections are undertaken.</p>	<p>Transfer of displaced persons as required to:</p> <ul style="list-style-type: none"> • temporary (MBIE-led) accommodation • return to own dwelling once fit for habitation. <p>Those who have self-evacuated into unsustainable situations with family and friends. In future may need temporary accommodation needs.</p> <p>Critical lack of housing in the region.</p>
People injured	0	There are no official reports of injuries because of the event.	N/A
People in emergency accommodation	0	As at 30/03/2022 two (2) displaced persons required accommodation because of road access closure not allowing them back home. A number of people are in temporary accommodation with whanau, friends or neighbours.	N/A

Impact on crime and community safety	0	No concerns from police within the impacted communities in the aftermath of the weather event.	Monitoring as part of BAU
Impact on children and young people	-	Two (2) schools are damaged by flood waters.	Makarika School operations relocated to Ruatoria. Tokomaru School to be determined. Previously reopened within 6 weeks before this event.
Impact on older people	-	The impacts on older people who self-evacuated are not known to TCDEM or GDC. There has not yet been requests by older people for assistance with cleaning their homes or properties.	Continue to promote availability of services to help those affected by the floods. Prioritisation of recovery work to assist most vulnerable.
Impact on iwi and marae	-	Pākirikiri Marae wharenui and wharekai roof damaged. Te Puni Kōkiri and Toitu Tairāwhiti continue to engage with mana whenua to understand impact and support ongoing needs. At Anaura Bay, the Urupa land surrounds has been impacted with scouring of banks.	Continue to promote availability of services to help those affected by the floods. Ongoing engagement and involvement of tangata whenua in recovery.
Impact on Pasifika community	-	Welfare is connecting with the Pasifika community to determine impact (if any) from the event. They are working with church leaders to ensure the Pasifika community understands the support that is available. There may be families who have taken in evacuees putting pressure on their own household.	Continue to promote availability of services to help those affected by the floods. Ongoing engagement with the Pasifika community in recovery. Translation services and translated resources may be required.
Impact on migrant community	-	No reported impact or concerns have been reported.	Continue to promote availability of services to help those affected by the floods. Translation services and translated resources may be required. Ongoing engagement with the migrant community in recovery.
Impact on disability community	-	The Disability Network has reached out to clients living in the affected communities. There have been no reports of significant impact on those living with a disability.	Continue to promote availability of services to help those affected by the floods. Ongoing engagement with the Disability Network in recovery.

Impact on chronic health community (incl. mental health and addictions)	-	The DHB has contacted all clients living in the affected area who have a chronic or mental health condition. Currently there are no adverse issues or trends to note. The health providers: TDH, Ngati Porou Haurora, Turanga Health will collaborate on the process and procedures to support the delivery of health services.	Continue to promote availability of services to help those affected by the floods. Ongoing engagement with the Health Networks in recovery. Difficulty in accessing services for appointments and medical services.
Impact on homeless	-	There has been no reported impact on the homeless population.	TBC Continue to promote availability of services to help those affected by the floods.
Impact on foreign nationals	-	There has been no reported impact on foreign nationals. Red Cross is connecting with the Foreign Nationals Network to check if there are any concerns.	TBC
Impact on foodbanks	-	None reported.	Contributed to food resources. Hauraki and Waikato Māori wardens top up for Te Runanganui o Ngāti Porou.
Impact on rural community and animal welfare	-	Significant impact on rural community is widespread. Access for operations is not available or limited. Widespread farm damage, crop loss and slips are apparent but not yet quantified. Increasing animal production welfare issues may emerge given restricted road access and the capacity of meat processors who currently have work forces impacted by COVID-19.	Continue to promote availability of services to help those affected by the floods. Ongoing support by MPI and Rural Welfare Coordination Group in recovery as needed. Impact assessments required. Forestry operations impacted from road weight limitations. Horticultural assessments needed. Vet advice ongoing with animal care.
Impact on pets	-	Properties that are at risk due to slips that may require residents to not reoccupy will be considered for support with animals. Some people in temporary accommodation are known to be returning to their properties to feed pets.	There may be further challenges for pet owners who are unable to return home for some time or move into alternate accommodation that are unable to accommodate their pets. Ongoing support may be needed by MPI and SPCA in recovery.

Impact on business community	-	Extent of impact is unknown although there are some businesses who have been impacted who do not have insurance. IRD can provide some assistance to impacted businesses. The rural sector (horticulture and agriculture) has been impacted. Assessments are yet to be undertaken.	Continue to promote availability of services to help those affected by the floods. Ongoing engagement with EQC, insurance sector and IRD in recovery.
H&S issues	Tairāwhiti	Health and safety issues are primarily due to the flood water and the impact of heavy rainfall on roads and farmland. These include: <ul style="list-style-type: none"> • being contaminated with sewerage which may affect the health of individuals exposed to these contaminated materials • risk of slips or structural stability for staff conducting assessments on properties • road stability issues and traffic safety • soil saturation and ability of effect repairs. 	Public Health messaging regarding how to deal with contaminated property has gone out. Ongoing communications for public health will be in place. Ensuring risks of slips reactivating is managed through direction to landowners and assessments being completed/reviewed.

Temporary Accommodation

As of 30 March 2022, there are 2 people in emergency accommodation because of access issues to their properties. However, families requiring accommodation have been taken in by whānau, friends or neighbours. Requests may emerge through recovery and request for rents.

MBIE will prepare for any emerging requirements for temporary accommodation (TAS) and will be working in liaison with GDC and TCDEM to identify those in need of this service. This will be informed by the development of the building assessment database led by GDC.

Navigators

The resourcing of a navigation service is being investigated by the Recovery Team. Typical funding may come from health agencies, NEMA, and lotteries grants subject to comprehensive needs assessments.

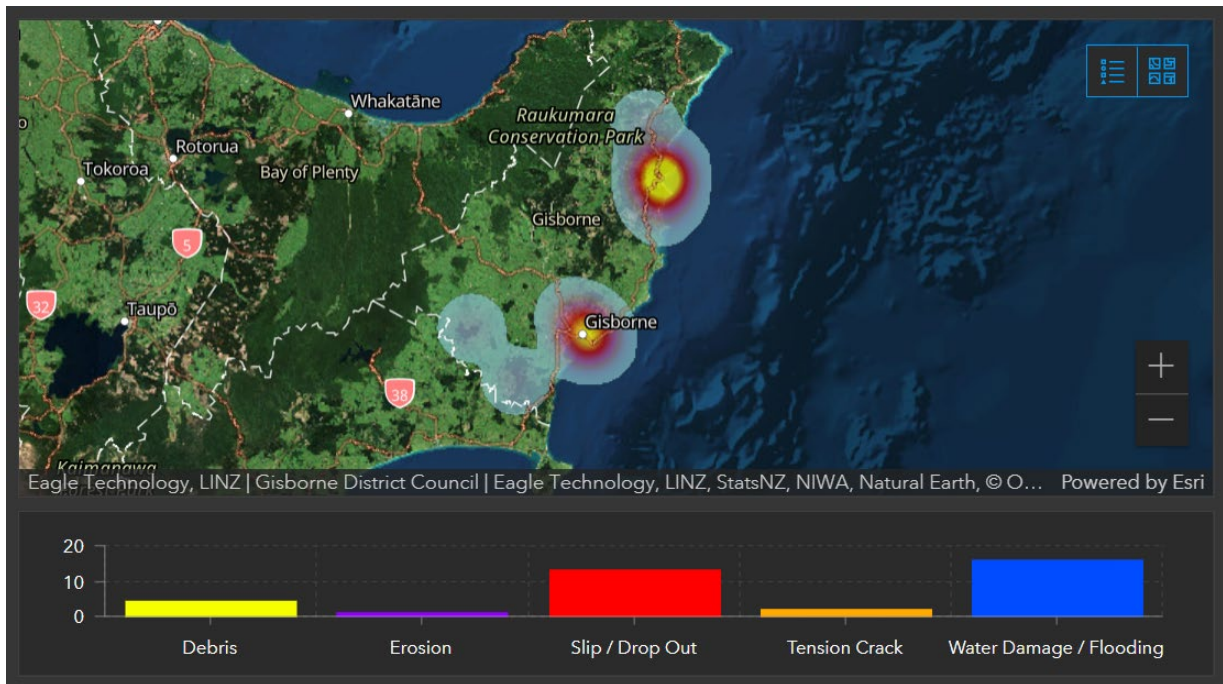
Built environment

Ian Petty (GDC Building Services Manager) is leading the collation of building assessment data which will include:

- a) property ID
- b) physical address
- c) primary occupant contact details
- d) status of Building Assessment.

Residential buildings

As of 30 March 2022, the following areas highlight current inspections and clustered issues:



Note that as access allows then further assessments will be undertaken.

Assessments of accessible properties were completed during the state of local emergency.

GDC advise that management of impacted buildings and property will be via the provisions of the Building Act and/or specifically under subpart 6B of Part 2 of the Building Act 2004 as required.

Commercial buildings

As of 30 March 2022 there has been no notified flood damage to commercial buildings.

Community assets

There has been an impact on reserves (lost land) in Tokomaru Bay requiring assessment.

GDC-owned community buildings and assets elsewhere were not damaged during the weather event however assessments will be completed by to inform this.

Roads (State highways and Local)

Local roads

As at 30/03/22 1400, 50 roads remain closed or required significant repairs.

National roads

As at 1000hrs 31 March 2022 all roads into Gisborne remain open.

SH335 from Tokomaru Bay to Te Puia Springs remains closed. Bypass via Mata and Ihungia now open

Ports, harbours, airports

Significant debris in and around the harbour requiring assessment

Three waters infrastructure

Type	Status
Storm water	Restored back to normal operation.
Wastewater	Private sewers and septic tanks may need GDC assistance for emergency temporary repairs for H&S. There will likely be properties that require land remediation to enable permanent repairs.
Drinking water	GDC water supply is operating normally.
Reservoirs	No reported impact. There are slips that are close to supply lines in the Waingake catchment that are being monitored.

Stop banks, flood protection structures and dams

No outstanding issues.

Lifelines (electricity, fuel, telecommunications)

Electricity

As of 30 March 2022, less than 20 households are without power in the region.

Fuel

No current issues. Test drive of key access is being undertaken in northern area for petrol delivery

Telecommunications

No current issues.

Natural environment

Impacts on the natural environment include:

- contaminated land due to sewerage discharged into flood waters
- increased deposition of silt and nutrients into waterways and bodies due to excess runoff
- significant storm water discharge (including sewerage) into the inner-city rivers
- landslips predominantly to residential dwellings on the hills in urban suburbs
- hazardous substances introduced into waterways
- disposal of damaged household items (carpets, electrical items etc) to landfill.

The impacts to the natural environment are being monitored and mitigated as reasonably practical by GDC in conjunction with ongoing assessments.

Hazards

Slips or compromised soil stability are the primary hazards because of the flood event. The high-risk sites are designated as 'Priority 1' properties and will be subject to ongoing monitoring. There will likely be further sites identified because of the event that will be at risk with the next weather event.

Rivers, Coasts, and National Parks

N/A

Ecosystems

N/A

Urban landscapes

Land stability risk for at risk residential properties on hillsides.

Rural landscapes

No significant impact reported or notified as of 30 March 2022.

Water drainage

No standing floodwater remaining but the land is saturated.

Debris/Waste management

There has not been a requirement to coordinate waste or silt attributable to the weather event, in particular households that may have been flooded.

Land contamination

Floodwater in the affected areas is likely to have contaminated vegetable gardens and soil.

Damage to fauna and flora

N/A

Economic Environment

The Tairāwhiti flooding has had a significant impact on the regional economic environment. The horticulture sector has been impacted given the late summer/autumn harvest. The agriculture sector has been impacted by erosion and damage to farms which has yet to be quantified. The forestry sector will be impacted by road damage and the ability to move logs on the local and main road networks. It is anticipated that as recovery progresses, a clearer picture will form as to the impact of this event on the economic environment.

Employment / Business resumption

There are no formal assessments of disruption to the economy, businesses, or employment because of the flooding. However, loss of access has affected:

- employment as communities remain isolated
- farming entities unable to remove stock or undertake supply requirements
- forestry operations
- horticulture impacts
- cropping and loss of grass.

Initial Ministry of Social development support is available to eligible individuals and business for loss of income subject to criteria.

Rural Coordination Group are arranging rural impact assessments.

Insurance

Insurance data regarding the event is not yet available. GDC Recovery are in contact with the Insurance Council and EQC.

Those who were not insured and require financial assistance will be referred to MSD.

Rural environment (Primary production)

Refer employment and business resumption above.

GDC Recovery will liaise with MPI and Rural Support Group and other stakeholders to understand the regional impacts.

Governance arrangements

Recovery Managers

	Name of Recovery Manager	Contact Details
Local Recovery Manager	Heather Kohn (GDC)	Heather.Kohn@gdc.govt.nz 06 867 2049
Group Recovery Manager	James Baty (GDC)	James.Baty@gdc.govt.nz 0273929029
National Recovery Manager	N/A	N/A

Response Handover

CIMS function	Name of Lead	Handover to	Date handed over
Control	David Wilson (GDC)	No change	
Welfare	Donna Shaw (GDC)	No change	
PIM	Anita Reedy-Holthausen	No change	
Logistics	Peter Moore	NO change	
Intelligence	Kumeroa Papuni-Tuhaka	No change	
Planning	Janic Slupski	No change	

Recovery Leads

Social Lead – Fleur Paenga fleur.paenga@gdc.govt.nz

Other Leads and support TBC

Plans

This Transition Report will inform preparation of recovery plans and decision-making thereafter.

Reporting

Reporting and governance mechanisms developed for the recovery to COVID-19 will be utilised by GDC for the flood recovery.

Upcoming Meetings and Forums

Recovery Meeting scheduled to be developed and promulgated.

Engagement and communications

Engagement plans

GDC will be responsible for leading engagement and communications regarding the recovery to the Tairāwhiti weather event.

Engagement with key partners

Iwi Partnership

Engagement with iwi will be undertaken to recognise and provide a practical commitment to the Treaty of Waitangi.

Iwi point of contact remains in place via Toitu Tairāwhiti designated contact- Ronald Nepe 027 224 9548.

Other key stakeholders

Engagement regarding the transition to recovery is currently underway with the following government agencies:

- National Emergency Management Agency
- Ministry of Social Development
- Ministry of Business Innovation and Employment (TAS and RAS)
- Insurance Council of New Zealand.

Community engagement

Community engagement will be undertaken as appropriate via GDC Recovery where necessary/appropriate.

Communications plans

As per Section 5.1 GDC will be responsible for the development of a Recovery Communications Plan.

Risks

Key risks and issues arising because of the emergency and in moving from response to recovery, and actions proposed and underway to reduce the impact.

Risk/issue	Action needed	Responsibility	Result
Those not insured for contents needing to pay for TAS	Non-insured to be identified and linked with MSD. Access to financial help.	GDC, MBIE, MSD	Non-insured do not fall through gaps.
Landlords raise rent after repairs due to building back better	Ensure tenants are connected with the right services so no one 'falls through the gaps'. Link those who are re-building with Heat Smart/Healthy Homes programmes to build back better (Recovery Opportunity). Access to financial help.	GDC, MBIE, MSD	No one falls through the gaps. Properties are built back better.
Complex needs emerge requiring a navigation service	Establish a navigation service as part of recovery.	CDEM, GDC, HB DHB, MSD	Pending
Emerging psychosocial impacts of those affected by flood			
Increased incidents of family harm within impacted communities	Police to monitor, investigate and respond as appropriate. Ensure Family Violence network are linked into CDEM navigation service.	Police	Improved coordination and delivery of service to whānau experiencing family harm.
Effect of pre-existing accommodation pressures in Gisborne on people requiring temporary accommodation	MBIE Temporary Accommodation Service ('TAS') to assist those requiring temporary accommodation due to the flood.	MBIE	MBIE will be ready to provide temporary accommodation service (TAS).
Need for a single source of truth regarding building assessment outcomes/ displaced persons and results of ongoing re-assessments.	Single source truth using building assessment data and intel needed to ensure common operating picture across agencies.	GDC (Ian Petty GDC)	Pending

Risk/issue	Action needed	Responsibility	Result
Affected persons (all people residing and or working near flooded or damaged properties) and workers are unaware of the dangers with respect to a property.	Properties should be assessed and if necessary be issued a section 124 notice or action under. A list of these properties needs to be provided to agencies.	GDC (Ian Petty GDC). Risk information maintained on the welfare and recovery task tracker.	Reduce the likelihood of injury occurring in those properties which pose a potential life safety hazard both to occupants and staff/tradespersons involved in the recovery.
Affected persons not knowing where to go for help	Continued regular communications of where to access help for those affected. Recovery Factsheet has been developed detailing agency responsibilities and services to support those affected by the weather event.	TCDEM	Ongoing communications led by GDC regarding recovery through various media. Community can access all latest information relating to the flood event via Fact Sheet
Timely escalation of issues to governance	Provide regular updates to governors to ensure they are aware of the situation and any risks.	GDC Recovery Manager	Ongoing task to mitigate risk.
Access to continued intelligence to inform recovery when ECC demobilised	GDC Recovery to link into key stakeholders to identify any trends/patterns regarding ongoing welfare needs.	GDC Recovery Team	Ongoing task to mitigate risk.
Silt/flood dust issues in the city/properties	Public Health messaging to be confirmed by Medical Officer of Health.	GDC Recovery Team	Reduce exposure of residents and businesses to silt/flood dust which may be contaminated.
Roading and bridge repairs	Restricted access impacts individuals, families, and business activities with unknown or extended repair time frames	GDC Recovery Team	Monitor and report

Section 7: Transition of CDEM Welfare Response to Recovery

Recovery in the welfare context involves the continued delivery of welfare services to affected communities following an emergency to bring about the immediate, medium-term, and long-term holistic regeneration of a community following an emergency.

This report will support the development of the Tairāwhiti Recovery Plan and the recovery team.

Refer to Annex 1 attachment – Tairāwhiti CDEM Welfare Factsheet for Tairāwhiti Severe Weather Event March 2022

Tairāwhiti severe weather event information

Contact details for support and assistance



Attachment 22-78-3
Tairāwhiti
EMERGENCY MANAGEMENT

GROUP

Tairāwhiti Civil Defence Emergency Management (CDEM)

Tairāwhiti Civil Defence Emergency Management are assisting communities affected by the severe weather and flood event across Tairāwhiti. If you need assistance, please contact:

- Gisborne District Council 0800 653 800 or 06 867 2049
- Email: service@gdc.govt.nz

Road and Water Information

Information on roads and water supply:

- Waka Kotahi for state highways www.nzta.govt.nz
- Gisborne District Council for local roads www.gdc.govt.nz
- Gisborne District Council water and wastewater www.gdc.govt.nz

Updates are also available on the Tairāwhiti Civil Defence Facebook page.

Covid-19

Government guidelines advise, during emergencies where urgent help is needed, emergency services still operate even if a household is isolating. In an emergency, evacuations may be needed. The immediate safety of people takes absolute priority and overrides isolation requirements.

Once safe, precautions will then be taken to prevent the spread of the virus such as physical distancing and wearing face masks.

MSD Financial Support

Civil Defence payments are available for people who have been affected by the severe weather and flood event across Tairāwhiti. These payments are available to anyone affected. Please call 0800 559 009

Assistance may include:

- Emergency food, clothing, and bedding if they have been damaged or destroyed.
- Accommodation costs if you have been evacuated and are staying in accommodation such as a motel, hotel or temporary rental accommodation.
- Loss of income due to an inability to work caused by the weather event.
- Payment if you have evacuees staying with you in places such as a private home, marae or community centres.

Assistance with other costs

There are other ways in which MSD may be able to help with things such as medical costs, rent, power bills, or other essential items. Please contact MSD on 0800 559 009.

Houses subject to Section 124 of the Building Act (red stickered)

Houses may be red stickered if they are deemed uninhabitable. Red stickers can be issued when a house or structure has been affected or threatened by events such as flooding or land movement. The effect of being red stickered means that, until Council is satisfied the threat has been removed, you should not be in your property unless it's to remove valuable possessions or essential items. Occupants of red stickered houses that are insured should contact insurance providers for alternative accommodation cover.

Please contact the following Council staff if you have concerns:

- Mike Elers – 021 743 128
- Ian Petty – 027 628 7075





Insurance and lodging a claim

If you have damage to your home, property or car, please contact your insurance company as soon as possible and they will guide you through the claim process. If you have a residential house claim and need advice to support you through the process, please call the Residential Advisory Service (RAS) on 0800 777 299.

If your home is damaged and uninhabitable, ask your insurance provider if you are eligible for a temporary accommodation benefit which is included in most home and content policies.

Key things to note:

- Take photos before you remove or repair anything and report it to your insurance company as soon as possible.
- If you need to make your home safe, sanitary, secure and weather tight, please record the work done, take before and after photos, and keep copies of the bills you have paid.

Support for Farmers and Growers

Affected farmers and growers can contact:

- The Rural Support Trust - call 0800 787 254 or visit www.rural-support.org.nz.
- Horticulture New Zealand - fruit and vegetable growers 0508 467 869 or Andrew Bristol 021 0216 2021
- Federated Farmers Gisborne / Wairoa - Toby Williams 06 868 8996
- Councillor Sandra Faulkner - 021 529 041 (Chair of Tairāwhiti Rural Coordination Group)

Other Livestock or Feed Related Issues

Farmers needing expert feed support to do a feed plan, to source supplementary feed, or who are looking for other assistance with their livestock, should contact their levy body or Federated Farmers.

- Federated Farmers - 0800 327 646
- Beef + Lamb New Zealand - 0800 233 352
- DairyNZ - 0800 432 479 69

Other support services

Animal welfare concerns

- Ministry for Primary Industries (MPI) - email awem@mpi.govt.nz or call 0800 008 333
- Or visit <https://www.mpi.govt.nz/animals/animal-welfare/animals-in-emergencies>

Business advice and support

- Trust Tairāwhiti - email businesssupport@trusttairawhiti.nz or contact business growth advisors, Ryan 021 579 703 or Joe 021 197 7957

Health support / advice

- Healthline - 0800 611 116
- Need to talk - text or call 1737

Tax payment / financial difficulty

- Inland Revenue - 0800 473 566
- Gisborne office - Palmerston Road

Temporary accommodation services

- Ministry of Business, Innovation and Employment (MBIE) - 0508 754 163

Tenancy information - landlords and tenants

- Ministry of Business, Innovation and Employment (MBIE) - 0800 836 262 or visit <https://www.tenancy.govt.nz/>

[UNCLASSIFIED]

Update on Emergency Management system reforms

13 April 2022

Tēnā koutou katoa,

Thank you for participating in the emergency management sector hui on 16 February 2022. It was great to hear from the 60+ of you who were able to attend and share your thoughts on how better outcomes for Māori in emergency management can be empowered through the new Emergency Management Bill. Please feel free to share this message with others you think we may have missed or who might want to participate in this mahi in the future – we see this as valuable as we continue to build our network across the motu.

Insights from emergency management sector hui

We received a large volume of insights from the day to inform the development of the Bill. Some of the key themes we heard were:

- That while there is overall support for the Bill as an enabler of change, this is only a small, first step towards equity of outcomes.
- Real equity and equality will come from operational changes and how we partner across the emergency management sector.
- There is opportunity to build greater representation and mana ōrite, clarifying the role of any national Māori emergency management group and reflecting partnership in all levels of the system.

We are now working on advice to the Minister about the Bill and non-legislative changes which will draw on your feedback.

Updated timeline for the Emergency Management Bill

Recently, the Minister for Emergency Management, Hon Kiri Allan agreed to a new extended timeline for the Bill allowing more time for policy development and drafting.

The Minister intends to introduce the Bill to the House of Representatives in late October. While the Select Committee will set the timeframes, submissions are likely to be called for in late November, with a view to hearing from submitters in early 2023 once the House is sitting again.

This is a change to the timeline only; the scope of the work will remain the same. As you have heard, the Bill will not be a fundamental transformation of the emergency management system but will instead address a number of identified shortcomings to ensure the system is robust and agile to meet current and future needs.

We are hoping the Bill will come into force in mid-2023. Between now and then we intend to engage on the review of the National CDEM Plan and Guide and other regulatory matters and undertake steps to ensure we are ready to operationalise the Bill when it comes into force.

Review of the national CDEM Plan and Guide

The National Civil Defence Emergency Management Plan Order 2015 and the accompanying Guide to the National CDEM Plan 2015 (the Plan and Guide) are key documents in our emergency management system. The Plan sets out the guiding principles and roles and responsibilities for CDEM across the 4Rs at the national level, while the Guide provides additional information on operational arrangements to assist and support agencies and CDEM Groups to achieve the purpose and objectives of the Plan.

The Plan review team are keen to partner with iwi and Māori in scoping the new National Emergency Management Plan, and we would love to hear from individuals who have operational experience in nationally-significant events.

We have divided the new National Emergency Management Plan into sections (or lines of effort), which are based around the outcomes we want to achieve. We would like to develop a process that gives you the opportunity to engage as little or as much as you like depending on your interest and capacity. There will be opportunities to be involved early-on (between now and July) in the co-development Phase as well as opportunities to test and review the draft Plan content between October 2022 and March 2023.

We look forward to updating you on this soon.

Cabinet paper proactive release

The Minister has proactively released the November 2021 Cabinet Paper on some aspects of the emergency management system reforms. This Cabinet Paper includes policy proposals for ensuring recognition and representation for the role iwi and Māori play in emergency management.

The Cabinet Paper is available at:

<https://www.civildefence.govt.nz/assets/Uploads/publications/Proactive-Release-Emergency-Management-System-Reform.pdf>

Thank you for your continued support. Your perspectives and knowledge are essential in building a more disaster-resilient Aotearoa.

Ngā mihi,

Dave

Dave Gawn ([he/him](#)) | Chief Executive

National Emergency Management Agency Te Rākau Whakamarumarū

www.civildefence.govt.nz

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Empowering communities before, during and after emergencies.





**National Emergency
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Te Rākau Whakamarumarū

FOR DISCUSSION

Clarifying the functions of local authorities and CDEM Groups

What is the Issue?

- 1 Section 17 of the Act sets out the functions for each CDEM Group and applies concurrently to each member local authority. Section 64(1) also outlines a separate duty for local authorities to “plan and provide for CDEM within its district”.
- 2 In 2017, TAG found that the effectiveness of, and confidence in the emergency management system was impacted by the wide variation of regional approaches and recommended CDEM Groups take a regional approach to emergency management with a majority in support of requiring shared emergency management services in each region.
- 3 The Government response to the TAG (2018) proposed to give CDEM Group and member local authorities clear and separate responsibilities for emergency management. CDEM Groups would continue planning with an explicit function to coordinate across the region while local authority members would be required to give effect to, and resource decisions of the CDEM Group. At the time, it was considered that the overall benefits of regional coordination and clear lines of accountability to the CDEM Group outweighed the loss of local autonomy.
- 4 Engagement with local government stakeholders has raised concerns that about this loss of local autonomy but has also acknowledged support for greater clarity around local authority and CDEM Groups functions (roles and responsibilities).

Draft revised proposal

- 5 We are not proposing to change who can declare states of local emergency/notice of transition periods (this would remain with the Mayor, person appointed by Group or Minister) or who can appoint Group/Local Controllers (this would remain with the Group). However, to provide clearer lines of accountability and overall coordination, one option is to clarify the distinct and separate functions of local authorities and CDEM Groups.
- 6 Attached is a table which demonstrates how some of the existing functions could be allocated. In summary these clarify that:
 - a) CDEM Groups are responsible for regional coordination and governance; and
 - b) Local authorities are responsible for delivering local emergency management in their communities and for participating in the CDEM Group.
- 7 For example, under this proposal the respective planning functions may be:
 - a) For CDEM Groups to develop, approve, implement, and monitor a CDEM group plan and regularly review the plan; and
 - b) For local authorities to:
 - provide input into the development and review of the CDEM Group plan and to implement the plan as applicable to their district (or region), and
 - plan for local emergency management in their district (or region) in alignment with the CDEM Group plan.

Discussion Points

- What are the pros, cons and risks of the approach proposed (in the table)?
- How would you describe the functions and duties of the Group, territorial authorities, and regional councils for CDEM in an ideal world? (Noting the mix of small and large, metro and rural, and unitary authority make-up)
- Can you provide examples where Joint Committee Groups work well? Does it make sense that Groups and local authorities have the same functions under the Act (s17)? And that Local Authorities have a separate additional duty to provide for CDEM (s64)?
- Which specific responsibilities or functions would most benefit from increased consistency or regional 'coordination' and which would most benefit from local tailoring?
- Do you agree that having national standards regarding qualifications and experience of persons holding specific CDEM roles (Controller, Recovery Manager, Group Manager etc) are needed? If not, why not? Can you think of any functions which could benefit from a national standard?

Table demonstrating examples how existing section 17 functions could be allocated between the CDEM Group and Local Authorities

note that not all functions/existing subsections will be modified

Existing s17 Function	Proposed function for CDEM Group in EM Bill (Group members are jointly responsible)	Proposed function for Local Authority in EM Bill (local authorities individually responsible)	Comment
<p>s17(1)(a)</p> <p>identifying, assessing, and managing hazards and risks:</p> <p>consulting and communicating about risks:</p> <p>identifying and implementing cost-effective risk reduction:</p>	<ul style="list-style-type: none"> • Lead identification and assessment of hazards and risks for the Group area • Coordinate management of hazards and risks within the Group hazard-scape, • Support local authorities with their hazard and risk identification/assessment and the consultation and communication to their communities, • Identify and implement cost-effective risk reduction. 	<ul style="list-style-type: none"> • identify and assess the hazards and risks subject to their jurisdictional area and report to the CDEM Group, • manage those hazards and risks, • consult and communicate with the community, identify and implement cost-effective risk reduction. 	<p>Each local authority is best placed to identify the hazards and risks for its specific geographic area, whereas the CDEM Group may be best placed to identify wider hazards/risks across the Group area.</p>
<p>s17(1)(b)</p> <p>maintaining and providing suitably qualified available suitably trained and competent personnel, including volunteers, and having an appropriate organisational structure for those personnel for effective emergency management</p>	<p>Ensure there are suitably trained and competent personnel, including volunteers, and an appropriate organisational structure for those personnel* for effective emergency management in the area of the Group.</p>	<p>Arrange for the provision of suitably qualified personnel*, including volunteers, and appropriate organisational structures at the local level/area subject to their local authority jurisdiction.</p>	<p>A territorial authority with a small rating base may not have resources with the knowledge and experience to be the controller.</p> <p>Under this approach – the Group would be responsible for ensuring there are suitably qualified and trained people to fill these roles (or support the local person to develop these skills/experience).</p> <p>A district with a small population base may not have the personnel (including volunteers), required to respond to a large emergency. The Group will be responsible for working across its area to ensure sufficient support is available (to assist that territorial authority with its response).</p> <p>The Group would be responsible for working with the territorial authority to ensure they have trained volunteers/personal etc in their districts.</p>

Existing s17 Function	Proposed function for CDEM Group in EM Bill (Group members are jointly responsible)	Proposed function for Local Authority in EM Bill (local authorities individually responsible)	Comment
<p>Ss 17(1) (d) and (e):</p> <p>(d) respond to and manage the adverse effects of emergencies in its area:</p> <p>(e) plan and carry out recovery activities:</p>	<p>Respond to and manage the adverse effects of emergencies in its area.</p> <p>Plan and carry out recovery activities within the area.</p>	<p>Respond to and manage the adverse effects of emergencies within the area of its local authority.</p> <p>Plan and carry out recovery activities within the area of the local authority.</p>	<p>Under this approach there would be greater emphasis on the Group for coordination of responses and recovery to emergencies, particularly where the impacts may go beyond the district.</p> <p>The Group would also need to support a territorial authority with responding to emergencies in its area, district or ward subject to the local authority jurisdiction.</p>
<p>S 17(1)(i)</p> <p>develop, approve, implement, and monitor a civil defence emergency management group plan and regularly review the plan:</p>	<p>Develop, approve, implement, and monitor an emergency management group plan and regularly review the plan.</p>	<p>Provide input into the development of Group Plans and implement the Group plan as applicable to their district or region.</p> <p>They would also be required to plan for emergency management for their district or region in alignment with the CDEM Group Plan.</p>	<p>Under the Group Coordination approach the Group would be responsible for ensuring that the Group plan was approved, implemented and reviewed.</p> <p>The local members will be required to “buy in” to the Group plan and ensure that their own planning was consistent.</p>



**National Emergency
Management Agency**
Te Rākau Whakamarumaru

CDEM Resilience Fund project application form

This form provides the minimum of information for the application; a detailed project plan should be developed to inform this application and may be attached.

Project title	
Project title	<u>Improving Resilience from Rain Events</u> Understanding the impact of high intensity storms on property in Tairawhiti and an analysis of changes to risk and resilience resulting from climate change
Date of application	31 st January 2022
Details on application	
Applicant <i>(Note: CDEM Group must endorse/sponsor all applications)</i>	Gisborne District Council/Tairawhiti CDEM group/NIWA
Sponsoring CDEM Group	Tairawhiti CDEM Group
Other local authorities, Groups or organisations supporting this proposal	N/A
Project description	
<p>Executive summary <i>[200 words maximum description]</i></p> <p>Tairawhiti is one of New Zealand's regions most vulnerable to hazards. This is exacerbated by a low ratepayer base, and small, largely coastal settlements outside of Gisborne. The impacts of 2017 Cyclone Cook and 2018 Queens Birthday storms highlighted the need to focus on high frequency, high impact events that affect the community and their hard-won assets.</p> <p>The impact of these storms is well known. Cyclone Bola was felt acutely in Tairawhiti resulting in a programme of converting land to permanent forest cover to protect it from weather-induced instability. These forests have since been converted to harvest forests and this has exacerbated the effects of high intensity storms on communities when harvested. The impacts have included flooding of dwellings, loss of residential land due to slipping and isolation of vulnerable communities due to failure of infrastructure.</p> <p>Compounding the impacts are the timeliness of weather warnings. For example, a severe weather warning was not received for the 2018 Queen's Birthday storm leaving local communities unprepared. Thus, Gisborne District Council seeks to improve community resilience and mitigate the risks from such events to our communities through developing a bespoke system that better integrates the NIWA HIRDS model with Council's rain and flood gauge dataset. This will allow for the existing flood models to be more accurate and improve councils capacity to better anticipate the scale of events and thus improve preparedness.</p>	
<p>Challenge/opportunity <i>[200 words maximum description]</i></p> <p>The principal tool for assessing rainfall return periods and intensity nationally is NIWA's High Intensity Rainfall Design System (HIRDS). It is designed to estimate high intensity rainfall at any location for a range of return periods and durations. While widely used, it can be inconsistent with gauge observations, especially for post-event analysis. For example, the 2018 Queens Birthday storm showed the difficulty in linking modelled probabilistic return periods with real-world events and their impacts on communities. The results from one site may not reflect overall storm intensity, and localised cells embedded within high intensity storms may have a huge impact on local communities. The system is based on a set of rain gauges which are widely dispersed (Figure One) and do not include key rain gauge sites from the GDC network. Adding some of these rain gauges will improve the resolution of the system thus enhancing post-event analysis.</p> <p>The project will use a new method of estimating return periods, where the shape of the extreme value distribution is constrained to be regionally consistent rather than derived on a per-gauge basis. This will provide better modelling of storm events under a suite of weather systems, such as ex-tropical cyclones and extreme southerlies that have caused significant infrastructural damage to the region. The resulting system will provide more spatially informative and up-to-date storm intensities under different future climate scenarios. This will be of great benefit to disaster preparedness and when developing resilient infrastructure.</p>	

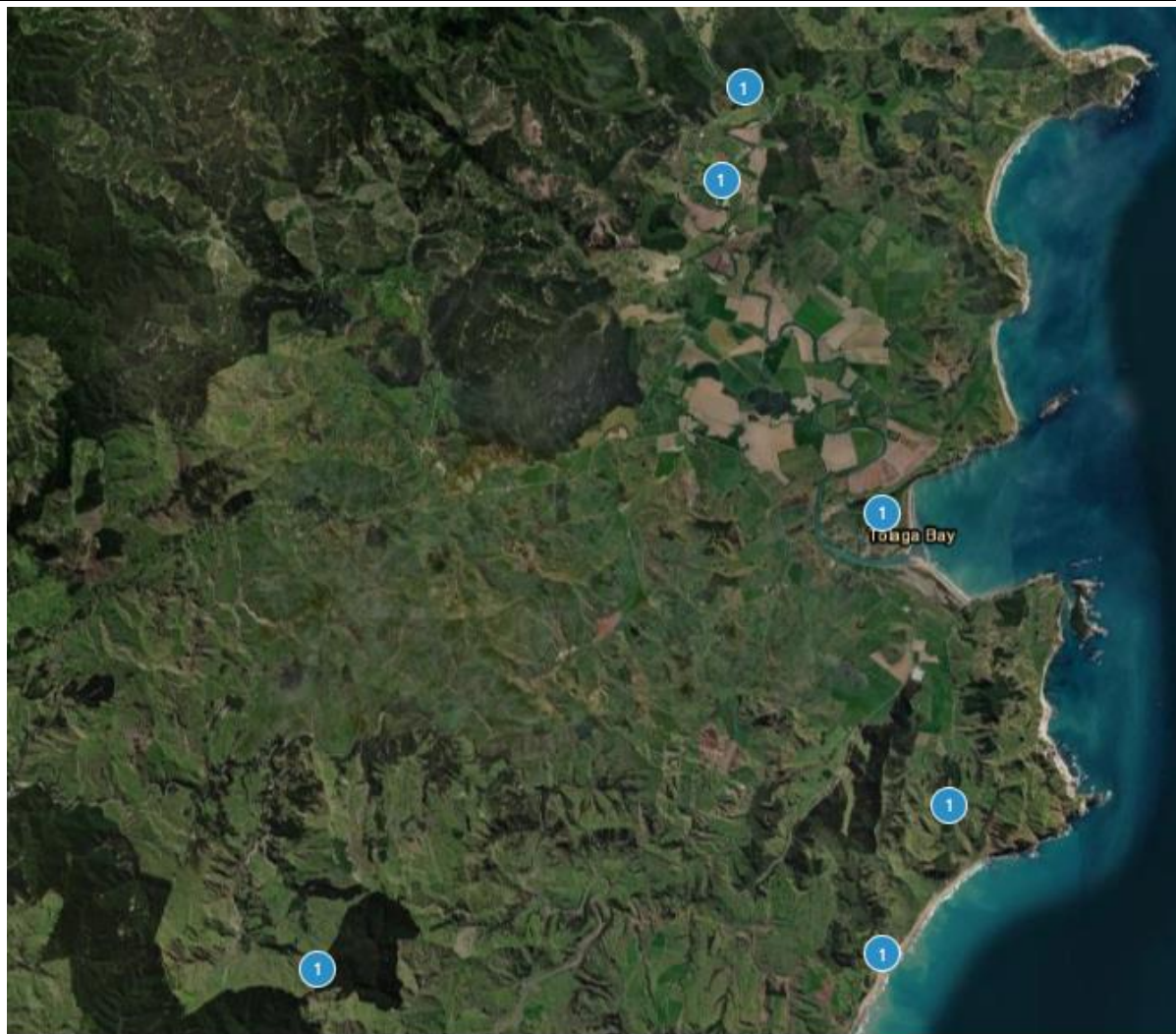


Figure One. Screenshot of the HIRDS sites in the Uawa Catchment. As this shows there is a large part of the catchment not covered. A Council rain gauge is located in the middle of the area on no coverage (Mangaheia at Willowbank) and including this in the database will allow for greatly enhanced coverage over this vulnerable catchment.

Alignment with priorities and objectives of the National Disaster Resilience Strategy (NDRS) [\[200 words maximum description\]](#)

Managing Risks: Experience has shown that it is currently difficult to assess the hazard potential of an approaching storm with the tools at hand. GDC has a flood hazard system which uses the current HIRDS model to anticipate potential flood levels from an event. We have found that HIRDS, although an excellent tool, needs to be more accurate at a regional level and better take orographic anomalies into account.

The tool will allow for more timely and more accurate information to be disseminated to the CDEM community link teams and thus improve responsiveness and resilience at a township level.

Alignment with Principles and Allocation Preferences [\[200 words maximum description\]](#)

The research is well aligned with the NDRS.

The project is likely to lead to a refinement of the HIRDS system and is thus expected to have national benefits, particularly as many regions do not have enough rain gauge and flood flow recorders to allow for real-time monitoring tools in all catchments. It is expected that the research will allow for a greater understanding of the topographic anomalies that can cause storm damage to infrastructure and private property as well as imperil lives. The storm that occurred in the second week in June 2018 (following the Queens' Birthday storm) is a good example of such an anomaly, as it caused significant flooding resulting in damage to properties and significant environmental impacts but did not trigger any rain gauge alerts.

Our recent climate change study also signalled that rare extreme rainfall events and more frequent storm events will both increase in severity under all climate change scenarios. As a consequence, Council needs a robust system to assess the potential future impacts of rare extreme events (and how these may change in duration and intensity under expected climate change), as well as more frequent but still damaging storm events. The project will be useful in assessing future rainfall and flood risk in ungauged catchments.

Experience has shown that the impacts of extreme weather events more significantly impact on rural communities, most recently Tolaga. Tairāwhiti's rural areas are dominated by Maori (cf. Tolaga 86%, Ruatoria 95%) and these communities will obtain the greatest benefits from the project.

The project would result in an enhanced flood hazard model for the Gisborne region.

Nationally, the methodology could then be applied to improve the flood models used by other regions allowing resources to be better allocated as there will be potential greater certainty in identifying and responding to rainfall hotspots

Application of outcomes/benefits to sector *[200 words maximum description]*

The results of this project will be used by Council to enhance its storm and flood risk modelling and by presentations to the community via reports to Council and to the regional CDEM network. As it is expected that the research will have national benefits, it will be shared with Regional Councils nationally via the Regional Councils Hazards Response and Management Special Interest Group.

Ongoing costs (post project) and how it will be funded *[Please provide a summary of ongoing costs (if any) and how it will be funded/managed - 200 words maximum]*

The project will result in an upgraded council flood model which is funded on an ongoing business as usual basis. The results will help inform the review of the Tairāwhiti Regional Management plan



Project design

Project manager	Dr Murry Cave, GDC Principal Scientist
Other project members	Janic Slupski, Senior Policy Advisor Gisborne District Council (Application of public policy to Hazard management) Bridget Bosworth (Senior hydrologist), Gisborne District Council
External providers/contractors	Dr Trevor Carey-Smith, Climate Scientist, National Institute of Water and Atmosphere Research
NEMA Resource (if required)	

Deliverables *[Note: payments will be made after successful completion of milestones identified]*

Key Milestones	Date for completion	Cost (Invoice Amount) ¹
Detailed scoping workshop between GDC and NIWA to establish final design and data requirements for project. Report to Governance committee	Within 2 months of project approval	\$10,000 (\$5000)
Mid project workshop to identify issues, validation assumptions and obtain stakeholder feedback Final report to Governance committee	Within 7 months of project approval	\$50,000 (\$10,000)
Emerged training for GDC staff into HIRDS modelling generally and GDC Model	Within 10 months of project approval	\$ 20,000 (\$10,000)

¹ Council costs in (Red Brackets)

Preparation of and submission of final products and project report. Final report to Governance committee	Within 12 Months of project approval	\$25,000 (\$5,000)
Identified risks		
Risks	Suggested mitigation / management	
Staff changes at Council	Build in redundancy with more than one staff member with a good understanding of the project and outcomes.	
Staff changes at NIWA	Build in redundancy with more than one staff member in NIWA with a good understanding of the project and outcomes.	
Delay in project completion due to events outside of Council or NIWA control of a Covid 19 outbreak	Liaise with NEMA regarding amended milestone timeframes	
Project not complete within 12 months of project approval	NIWA to advise GDC and NEMA as soon as the time overrun becomes apparent so that milestones can be amended.	
Funding request and use		
CDEM Resilience Fund contribution	\$105,000	
Local authority/organisation contribution	\$30,000 (primarily in kind)	
Other sources of funding or support		
Budget <i>[Please supply spreadsheet]</i>	\$135,000	
Applies if application exceeds \$100,000 over the life of the project	Are you prepared to attend an interview in support of this application (if needed)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Application confirmation		
Is this application from an individual or other organisation (not CDEM Group)? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Does the CDEM Group support this application? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>(Sign-off below confirms support)</i>		
Approval of Chief Executive <i>(Chief Executive or Head of the organisation receiving the funding)</i>	Nedine Thatcher Swann 	
Approval of CEG Chair	Nedine Thatcher Swann 	
<i>All communications regarding the application, including approval decisions will be addressed to the Chief Executive and CEG Chair</i>		
CDEM Group comment		

Note: Only complete forms will be considered for assessment. All completed forms and supporting documents must be emailed to NEMA on Resilience.Fund@nema.govt.nz

NEMA Assessment (Internal Use Only)		
Principles	Yes	No
Local/Regional Focus	<input type="checkbox"/>	<input type="checkbox"/>
Valuing the role of Maori in Emergency Management System	<input type="checkbox"/>	<input type="checkbox"/>
NEMA involvement required	<input type="checkbox"/>	<input type="checkbox"/>
Allocation Preferences		
Alignment with NDRS	<input type="checkbox"/>	<input type="checkbox"/>
Achieving equity of outcomes for Māori communities, marae, hapū, iwi, and Māori organisations.	<input type="checkbox"/>	<input type="checkbox"/>
Outcome focused	<input type="checkbox"/>	<input type="checkbox"/>
Applicable in other regions/CDEM Groups	<input type="checkbox"/>	<input type="checkbox"/>
Enables national consistency	<input type="checkbox"/>	<input type="checkbox"/>
Wider funding/resource commitment (i.e. co-funding, on-going funding, resource time committed)	<input type="checkbox"/>	<input type="checkbox"/>
Builds on existing work	<input type="checkbox"/>	<input type="checkbox"/>
Operational expenditure (Opex)	<input type="checkbox"/>	<input type="checkbox"/>
Capital expenditure (Capex)	<input type="checkbox"/>	<input type="checkbox"/>
Other		
Application from individuals or other organisations endorsed/sponsored by CDEM Group	<input type="checkbox"/>	<input type="checkbox"/>
NEMA Subject Matter Expert Comment		Supported <input type="checkbox"/> Not supported <input type="checkbox"/>
NEMA Regional Emergency management Advisor Comment		Supported <input type="checkbox"/> Not supported <input type="checkbox"/>
NEMA Review Panel Comment		Supported <input type="checkbox"/> Not supported <input type="checkbox"/>
NEMA Director Decision Sign-off		Approved <input type="checkbox"/> Declined <input type="checkbox"/>
<p>_____ Director of Civil Defence Emergency Management</p>		

