

## Report on Significant Wave Hazards on Wellington South Coast: 15 April 2020



Huge swells rolling into Owhiro Bay on Wellington's South coast, causing extensive damage to roads and vehicles, on Day 21 of the Covid-19 coronavirus lockdown. Photo / Mark Mitchell

**Prepared by:**

**Wellington Region Emergency Management Office (WREMO)**

**9 June 2020**

## **Acknowledgements**

This report has been developed collaboratively by members of the Ōwhiro Bay Residents' Association (OBRA), Wellington City Council (WCC), Wellington Region Emergency Management Office (WREMO), the Meteorological Service of New Zealand (MetService) and National Institute of Water and Atmospheric Research (NIWA) in the days and weeks immediately after the events of 15 April.

Additional information contained in this report has been provided by the New Zealand Police, Wellington Free Ambulance, and Fire and Emergency New Zealand (FENZ), all of whom had front line staff who responded to the event.

Due to the restrictions imposed by COVID-19, the report was developed virtually through a series of teleconferences and email exchanges in the days and weeks following the event.

Special thanks are extended to Eugene Doyle and the members of the Ōwhiro Bay Residents' Association (OBRA) who continued to shine a light on the events of 15 April and the need to urgently review what occurred on the day in question even though the country was in lockdown at the time.

## **Table of Contents**

### **Executive Summary**

#### **1 Introduction**

- 1.1 Background
- 1.2 South Coast Definition
- 1.3 Owhiro Bay
- 1.4 Purpose
- 1.5 Structure of this report
- 1.6 Roles and responsibilities

#### **2 Review of 15 April 2020 Coastal Inundation Event**

- 2.1 Event summary
- 2.2 Timeline
- 2.3 Impacts
- 2.4 Notification process
- 2.5 Identified gaps, risks and issues
- 2.6 Actions taken and recommendations
  - 2.6.1 Immediate actions taken
  - 2.6.2 Recommendations and intended actions

#### **3 Conclusion**

### **Appendices:**

- Appendix One: Risk research on wave hazard risk to Wellington's South Coast
- Appendix Two: Social Media Coverage of Significant Sea Swells on Wellington's South Coast
- Appendix Three: Actions taken to date
- Appendix Four: Coastal Preparedness Plan
- Appendix Five: Current notification process for sea swell hazards
- Appendix Six: Proposed notification process for sea swell hazard

## **Executive Summary**

### **Report on Significant Wave Hazards on Wellington South Coast on 15 April 2020**

- On 15 April 2020 large sea swells struck parts of Wellington’s South Coast causing the evacuation of five properties, property damage and road closures.
- No prior warning of the event was received by community members, councils or WREMO.
- For Wellington’s South Coast, a coastal storm inundation threat is created by a combination of some or all of the following:
  - A storm surge of high winds and low air pressure that combine to create a bulge in the level of the sea that is driven onto the coast.
  - Huge swells, generated by the above storms, that are able to travel a significant distance allowing the waves’ energy to build up and are unimpeded by land until they hit the South Coast.
  - All the above occurring on a high tide.
  - Rising sea levels, which are gradually but inexorably rising, and the risk worsening as the sea level gets higher.
  - A La Niña weather phase of the El Niño Southern Oscillation (ENSO)<sup>1</sup> which can result in elevated sea levels in the New Zealand region (Note: the current ENSO phase is ‘neutral’).
- Given the risks outlined in this report, the sea swell risk to the communities on the South Coast is expected to increase going forward.
- Given that no warning will stop the arrival of significant wave swells, communities in low lying coastal areas need to prepare themselves for this coastal inundation hazard.
- A range of actions need to be taken to increase the level of preparedness of South Coast communities to help the community be better prepared for such events in the future.

### **In response to this event, the following actions have been identified:**

- MetService has expanded their swell warning coverage to include the South Coast.
- Various other actions, listed in Appendix Three of this report, have also been completed.
- Recommendations and intended actions across the “4R’s” of comprehensive emergency management (Reduction, Readiness, Response and Recovery) have also been identified in this report to reduce the risk of similar events happening again in the future.
- The current warning notification process will be enhanced with additional support mechanisms to expedite warnings and enable as much preparedness action to be taken as possible going forward (see Appendix Six).

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<sup>1</sup> The El Niño Southern Oscillation (ENSO) is the movement of warm equatorial water across the Pacific Ocean and the atmospheric response. It occurs every 2–7 years, typically lasting 6–18 months. ENSO has three phases: neutral, El Niño, and La Niña. In New Zealand an El Niño phase in summer can bring increased westerly winds, more rain in the west, and drought in the east; in winter it can lead to cooler southerly winds. During a La Niña phase we may experience more north-easterly winds, wetter conditions in the north and east, and higher sea levels.

# 1. Introduction

## 1.1 Background

On the morning of Wednesday 15 April 2020, five residential properties at Ōwhiro Bay were evacuated and several people were injured after large waves hit Wellington's South Coast. High tide was at 11.00 am with offshore waves recorded at 5.5 metres. Several properties were damaged and a number of roads were closed.



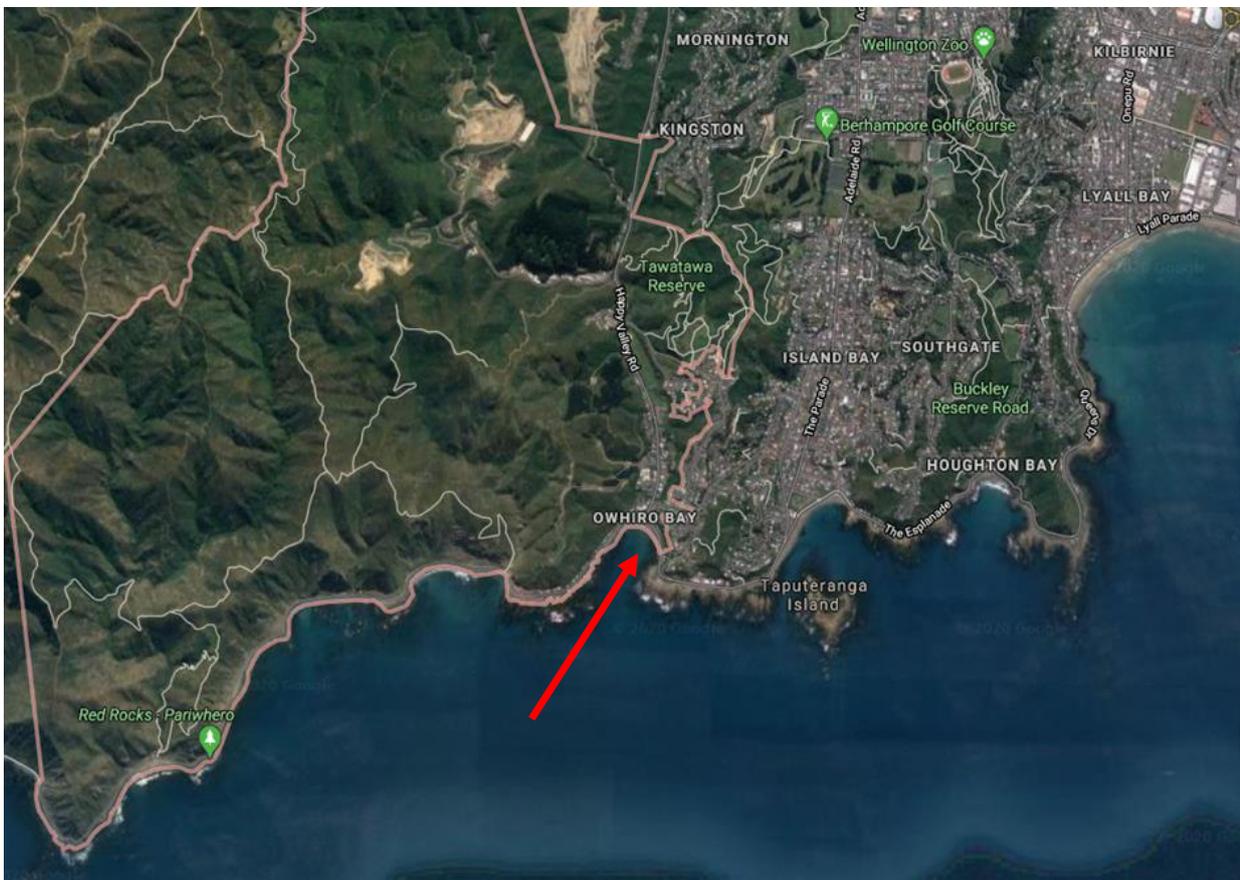
## 1.2 South Coast Definition

For the purposes of this report, the South Coast encompasses the following Wellington City suburbs that form the southern coastline from West to East: Ōwhiro Bay, Island Bay, Houghton Bay, Lyall Bay, Rongotai, Moa Point and Breaker Bay (see map below).



## 1.3 Ōwhiro Bay

Ōwhiro Bay is the western-most suburb of the above list that overlooks Cook Strait. Largely comprising of steep undulating farmland on its western side, Ōwhiro Bay has a population of around 2,000 people<sup>2</sup> mainly concentrated on its eastern side. Most residents live on Ōwhiro Bay Parade, Happy Valley Road and nearby laterals.



<sup>2</sup> 2018 National Census

The beach at Ōwhiro Bay is situated at the northern end of a long channel between two rocky outcrops. The channel is approximately 500 metres long.



Because it overlooks the Cook Strait, Ōwhiro Bay is routinely exposed to southerly weather patterns including strong winds, rain and heavy swells. Indeed, at the eastern-most side of the bay, the below sign has been positioned by the Department of Conservation. In the 'Shipwrecks' section it states: *With its brutal and unforgiving swells, Cook Strait has claimed many ships. Four of these lie within Ōwhiro Bay.*

**Department of Conservation**  
Te Papa Ataubai

## Taputeranga Marine Reserve

**All marine life protected**

**No removal, fishing, netting, taking, killing, damage or disturbance to anything from this reserve.**

**No polluting or littering.**

Offence penalties may be up to 3 months imprisonment or a \$250,000 fine. Vehicles, vessels and equipment may be seized.  
Please report offences to the DOC HOTline 0800 362 468

**Explore our underwater world**

Right on the doorstep of Wellington City, Taputeranga Marine Reserve is an ideal place to learn about our dynamic underwater world. Sites within the area are believed to record up to 1000 years of human settlement.

**What are marine reserves?**  
Marine reserves are all about protecting ecosystems in a natural state. Scientists use the reserve as a valuable 'natural laboratory'. Full protection brings the potential for:

- the return of habitats and species to a more natural state
- an increase in size and abundance of some fish and invertebrate species.

**Why have a marine reserve here?**  
This area has a large variety of habitats and rich mix of plants and animals which are under pressure from human activity. Kai moana (sea food), is smaller and less abundant than it used to be. Lobster and paua could once be caught easily in waist-deep water, but this is no longer the case. Hāpuku (groper), and tamure (snapper) are now rarely seen.

You are welcome to enjoy the marine reserve. For example, you can dive, snorkel, swim, kayak, take photos and explore rock pools.

**Take only photos and memories.**  
Leave only your footprints in the sand.

**Shipwrecks**  
With its brutal and unforgiving swells, Cook Strait has claimed many ships. Four of these lie within Ōwhiro Bay.

Map labels: Te Hāpuku Point, Ōwhiro Bay, The Esplanade, Old Quarry, Ōwhiro Bay Parade, Robertson St, Welland Pl, Seweryn St, Victoria University Coastal Ecology Lab, The Beach House and Kiosk, The Esplanade, Campground, Te Kopahou Visitor Centre, Downes Engineering (Wellington), Sloane Electrical.

New Zealand Government

At the beach end of the Bay there is a sea wall that is more than two metres high. However, over the years, sand, rocks and other debris have accumulated in some places of the Bay leaving much lower levels of protection in places (see images below).



## 1.4 Purpose

This purpose of this report is to:

- Provide a review of the Ōwhiro Bay wave hazard event on 15 April 2020 and the current status of risk management for coastal storm inundation on Wellington's South Coast.
- Identify actions for managing wave hazard risk through a joined up approach between Wellington City Council, the Wellington Region Emergency Management Office (WREMO) and local communities of Wellington's South Coast, acknowledging that a number of environmental factors outlined in this report are likely to make the impacts or such events more severe over time.

**Note:** Operational requirements for national agencies (MetService and NIWA) are beyond the scope of this report. WREMO will continue to work with these agencies to ensure that any changes to notification processes are embedded as required.

## 1.5 Structure of this report

The structure of this report follows an after-action review format across the following areas:

- Event summary
- Timeline
- Impacts
- Notification process
- Identified gaps, risks and issues
- Actions taken and recommendations

Preparing for emergency events requires an integrated approach between councils, emergency services, emergency management national agencies and local communities. Subsequent sections of this report outline actions that can be taken by both local government and communities to be better prepared for the identified coastal inundation hazard into the future. This approach is consistent with New Zealand's integrated approach to Civil Defence Emergency Management (CDEM), which is organised under four areas of activity known as the '4Rs':<sup>3</sup>

- **Reduction:** Identifying and analysing long-term risks to human life and property from hazards, and seeking to either eliminate them or reduce their level of risk.
- **Readiness:** Actions taken before an emergency to prepare for its potential impacts.
- **Response:** Actions taken immediately before, during or directly after an emergency to save lives and protect property.
- **Recovery:** The coordinated efforts and processes after an emergency to bring about the holistic regeneration of a community.

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<sup>3</sup> National Emergency Management Agency 4R's (<https://www.civildefence.govt.nz/cdem-sector/the-4rs/>)

## 1.6 Roles and Responsibilities

**Wellington Region Civil Defence Emergency Management Group (CDEM Group)** – Under the terms of the Civil Defence Emergency Management (CDEM) Act 2002 and subsequent amendments, the Wellington Region CDEM Group comprises of local councils, emergency services and lifeline utilities of the Wellington Region. Its role is to identify and understand hazards and risks and develop Group plans to manage the identified hazards and risks in accordance with the 4Rs (Reduction, Readiness, Response and Recovery).

**Wellington Region Emergency Management Office (WREMO)** – Leads and coordinates emergency management services for the Wellington Region CDEM Group on behalf of the region's nine councils, working closely with emergency services and lifeline utilities. WREMO staff perform the 24/7 Duty Officer function on behalf of the Wellington CDEM Group. Within the Wellington Region, warnings are initially coordinated through the WREMO Duty Officer. The Duty Officer is responsible for notifying appropriate partners and agencies. The Duty Officer is the first point of response for the Wellington CDEM Group.

**Greater Wellington Regional Council (GWRC)** – Under sections 30 (Regional Council duties) and 31 (Territorial Authorities duties) of the Resource Management Act (RMA) 1995 local authorities have statutory powers to develop policies and methods for integrated management of natural resources including for the avoidance or mitigation of natural hazards. Whilst there are similarities and overlaps between the two sections, the primary difference relates to the jurisdictional boundaries between regional and territorial authorities, with regional councils focussing on the coastal marine area and territorials focussing on the use and development of land near the coast. What this means in practice is that the GWRC has a role in avoiding and mitigating the impacts of natural hazards such as coastal erosion and inundation and rising sea levels, for example through building and maintaining sea walls, whilst territorial authorities have more of a focus on controlling the effects of land use development on the coastline to avoid or mitigate the impacts of those hazards on development.<sup>4</sup>

**Wellington City Council (WCC)** – Under the Local Government Act (LGA) 2002 all local authorities, in performing their roles, must have regard to the continuation of core services to communities, including the avoidance or mitigation of natural hazards. In addition to its responsibilities under the LGA, as a member of the Wellington Region CDEM Group, Wellington City Council has an obligation under the CDEM Act to respond to and manage the adverse effects of emergencies in its area of responsibility. This includes dissemination of warnings and providing for the welfare needs of people who are displaced as a result of an emergency event if the response required exceeds the capacity of responding agencies (e.g. emergency services).

**National Institute of Water and Atmospheric Research (NIWA)** – NIWA's core purpose is to enhance the economic value and sustainable management of New Zealand's aquatic resources and environments, to provide understanding of climate and the atmosphere, and increase resilience to weather and climate hazards to improve safety and wellbeing of New Zealanders. NIWA has agreed with Government to fulfil this core purpose through the provision of research and the transfer of technology and knowledge - in partnership with key stakeholders including industry, government and Māori - to: [among other outcomes] increase the resilience of New Zealand and South-West Pacific islands to tsunami and weather and climate hazards, including drought, floods and sea-level change.

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<sup>4</sup> Wellington National Hazards Management Strategy, Final v1.2, Feb 2017 minor updates May 2019

**MetService** –MetService issues severe weather information and warnings to Regional Councils and Territorial Authorities, covering rain, wind, snow and swell warnings. MetService weather warnings are also made publicly available through the MetService website, social media channels and an email subscription service.

## **2. Review of 15 April Coast Inundation Event**

### **2.1 Event Summary**

On 15 April 2020, five residential properties at Ōwhiro Bay were evacuated and several people were injured after large waves hit Wellington's South Coast. High tide was at 11.00am with offshore waves peaking at 5.5 metres. Emergency services were called to the south coast of Wellington, from Ōwhiro Bay through to Island Bay, due to high swells which had caused coastal flooding.

One house at Ōwhiro Bay was badly damaged, with a window frame smashed away from the wall. Other houses sustained damage to their garages and front walls. Some properties experienced surface water flooding. In several areas the footpath was ripped off the ground and the footbridge over the Ōwhiro Stream was damaged on the sea-facing side. Wellington City Council closed roads and urged people to avoid the area between Breaker Bay and Ōwhiro Bay because of the dangers the waves were causing. FENZ, Police, Wellington Free Ambulance and WCC co-ordinated a response to the wave hazard.

### **2.2 Timeline**

#### **14 April 2020**

NIWA posted on social media that "A deep area of low pressure will pass near Chatham Island on Wednesday. Significant wave height, or the highest third of the waves, is forecast to be as high as 12 metres (~4 stories!) in the open ocean between the mainland & Chatham Island via our regional modelling." However, NIWA did not contact MetService, WREMO or the Council to raise any concern about these high waves.

**11:01** - MetService issued a warning for large southerly swells (rising to 5.5m) for Lake Onoke. No record of the warning was received by the WREMO Duty Officer, so no action was taken. Subsequent investigation reveals that the warning was only sent by email to GWRC Wairarapa.

#### **15 April 2020**

**09:00** – Wellington City Council call centre received a report of coastal inundation on Wellington's South Coast from members of the public. WCC call centre informed Transport and Infrastructure team who in turn contacted Fulton Hogan and Council representatives who reported to the site. WCC contractors (Fulton Hogan) and members of Transport and Infrastructure team were on site by approximately 9:30am.

**09:30** – Police responded to reports of large swells and debris on roads at Ōwhiro Bay, Moa Point and Island Bay. Fulton Hogan already in attendance.

**09:49** - FENZ Brooklyn appliance was dispatched to an electrical fault on the foreshore of the South Coast.

**09:51** – MetService called WREMO Duty Officer to advise of heavy swells impacting Eastbourne and the South Coast of Wellington. High tide expected around 11.10am. More inundation expected. Expecting 5.5 metres of southerly swell around the south coast of Wellington during midday to late afternoon, while 4 to 4.5 metres are possible in the Wellington Harbour near Eastbourne.

**09:54** - FENZ Brooklyn unit on site reported high sea/waves were damaging properties at Ōwhiro Bay and asked for the road to be closed. FENZ Liaison Officer (LO) at ECC notified both the WREMO Duty Officer and Police Liaison of the incident.

**09:53-10:11** - WREMO Duty Officer contacted regional Emergency Coordination Centre (already activated for COVID-19) and Hutt City Council to inform them of the heavy swells and gain further situational awareness. Was about to contact WCC but was pre-empted by WCC Controller who informed the Group Controller they were already dealing with it. The Police LO in the ECC informed the Wellington District Command Centre (DCC). The DCC advised that Police were in attendance (Police Maritime Unit – vehicle mounted). ECC Public Information Management (PIM), Operations, Controller & Response Manager advised and WREMO Facebook posting was created.

**10:11am** – WCC Controller informed the Group Controller in the ECC there they were aware of the waves on the South Coast and were responding to them.

**10:20** – Swell warning published on WREMO Facebook page.

**10:59** – Swell update published on WCC Facebook page.

**Between 1100 - 11:20** – ECC Police LO received call from Wellington District Response Manager who advised that Police had established a Safe Forward Point (SFP) and had ‘evacuees’ there, 20 people from five households. Discussions occurred about moving them to a local school. WCC Primary Local Controller advised that WCC had established contact with Police and FENZ, and had emergency accommodation sorted which was a better solution than the local school due to COVID19 safety protocols. FENZ LO in ECC had two phone conversations with members of the WCC response team including WCC Primary Controller. It was agreed that this event sat with WCC response team as they were well practiced dealing with this type of incident with pre-agreed welfare arrangements in place.

**11:38** – WCC moved evacuees to alternate accommodation.

**12:13** – WREMO posted follow up Facebook page advising people not to go sightseeing in the area.

**12.47 and 14:55** – WCC post situation updates on their Facebook page.

**18:40** – Fulton Hogan contractors re-opened the road. Police remain on-site overnight to monitor Ōwhiro Bay/ Happy Valley Road cordon and vacant properties.

## **16 April 2020**

**10:00** – Residents allowed back into homes (approximate time).

**10:15** - Police stood down from Ōwhiro Bay / Happy Valley Road cordon.

## **20-21 April 2020**

NIWA informed residents in a community Zoom meeting on 20 April 2020 and the Dominion Post newspaper on 21 April 2020 that they had modelling data which predicted the large waves that hit the South Coast on 15 April 2020 (their social media post of 14 April refers). This was interpreted by residents and the Dominion Post that NIWA had detailed foreknowledge of the severity of the storm event as it impacted the coast but they did not pass on this information to others.

## **3 June 2020**

NIWA sent an apology to members of the OBRA stating that the comments made at the community Zoom meeting conveyed the wrong message of NIWA having detailed foreknowledge of the severity of the storm event and how it would impact the coast. The miscommunication was unfortunate and was never intended. While NIWA had foreknowledge of the size of the waves in the open ocean it had no knowledge of what the impact of these waves would be at the coast. NIWA were not in a position to issue any coastal flood warnings or alerts for Ōwhiro Bay as they had no detailed information upon which to base such a warning, and no such arrangements had been made with WCC or WREMO beforehand. NIWA agreed to discuss such arrangements with WCC and WREMO going forward, if required.

**Note:** See Appendix Two of this report for an outline of social media coverage from NIWA, WREMO and WCC during the swell event on 14 and 15 April 2020.

## **2.3 Impacts**

The following impacts have been reported by community members and council staff:

- Injuries to residents from the actual swell event
- Sickness to residents post the event e.g. infections from suffering abrasions/cuts during the event
- Damage to private property and vehicles
- Damage to local infrastructure e.g. footbridge and pavements, and potential damage to shoreline structures and facilities that has not yet been identified
- Psychosocial impacts for residents both from the impact of the event itself and underlying concern about similar future events

The definitive list of impacts has not yet been confirmed. Further information will be gathered as part of the community engagement going forward to understand the best ways to mitigate such impacts in the future.

## 2.4 Notification Process

Figure 1 below presents a summary of the notification process for a heavy swell warning at the time of the event. A larger version of this diagram is available at Appendix Four.

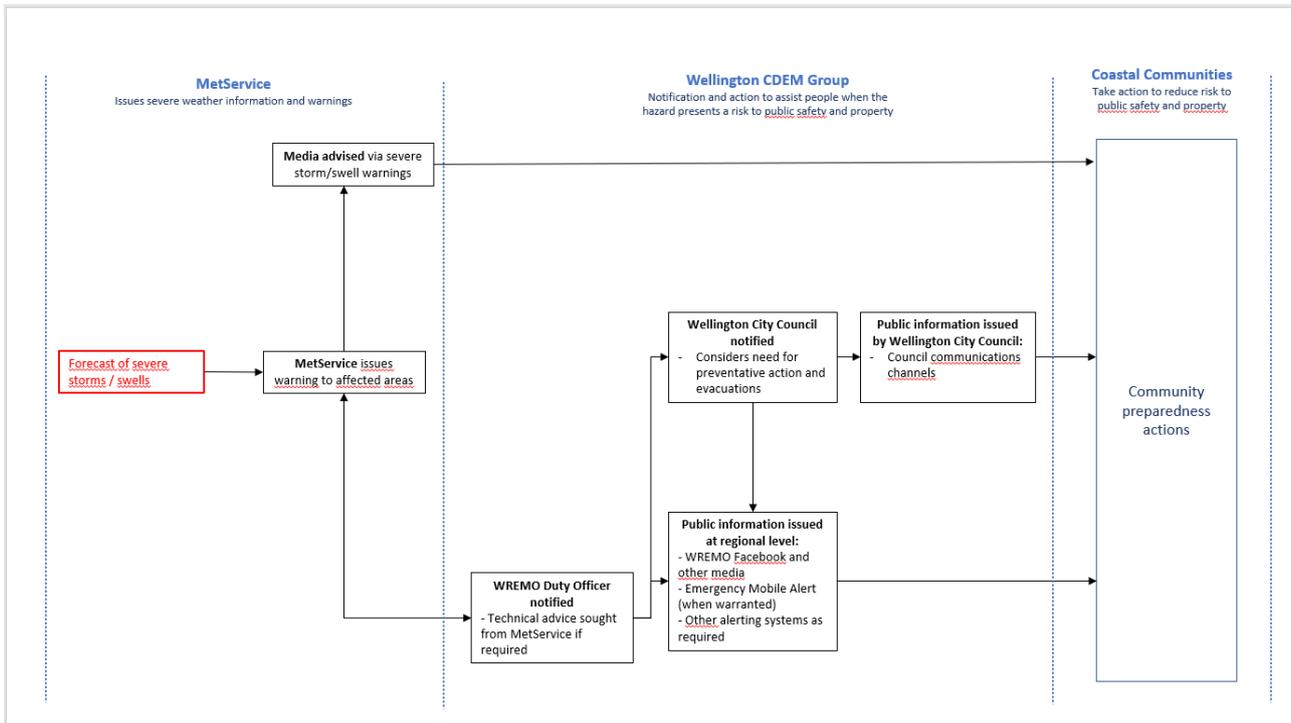


Figure 1: Notification Process

## 2.5 Identified gaps, risks and issues

- On 15 April the warning process outlined above did not work effectively for the following reasons:
  - On 14 April NIWA posted on social media that their forecast model indicated high offshore wave heights in the open ocean between the mainland and Chatham Islands for 15 April. NIWA had no forecast of the impact of these high seas to the Wellington South Coast because detailed coastal storm-tide and wave modelling had not been carried out for this location. That local modelling would be required before the forecast open ocean conditions could be translated into their possible coastal impacts by including wave breaking and overtopping processes in a nearshore model.
  - MetService did not have a monitoring and warning system set up for the South Coast to provide warning notification to WREMO. MetService have advised that that their warning processes were only set up for swell warnings for the Kapiti coastal region and the Lake Onoke area, on the eastern side of the Wellington Harbour entrance. This left a gap along the Wellington South Coast. Because of this, no warning was issued ahead of the large waves impacting the South Coast. A warning for large southerly swells (rising to 5.5 m) was issued for Lake Onoke at 1:01pm on 14 April. However, it was only sent to GWRC Wairarapa Flood Protection unit in Masterton. It was not sent to WREMO or WCC.
  - The first notification of a risk of heavy swells for the South Coast was received from MetService by the WREMO Duty Officer at 09:51am. By this time, waves were already impacting areas of the South Coast. This notification was not a formal warning.

- The WREMO Duty Officer took the appropriate action for a swell warning as outlined in the notification process diagram (above).
- However, due to the condensed timeframe of the notification, there was no time for preparedness actions to be taken by Ōwhiro Bay residents. Residents only became aware of the event when the waves arrived and were forced to take immediate protective action.
- The situation was complicated by the COVID-19 Alert Level 4 lockdown. Physical distancing requirements presented an additional challenge to residents, emergency services and council representatives when carrying out the evacuation.
- Some actions by a small number of community members – such as taking close-up photos and videos during the event - put themselves and others in immediate danger, including those who arrived to help.

## 2.6 Actions taken and recommendations

### 2.6.1 Immediate actions taken

Shortly after the event, members of the local community met with members of WCC, WREMO and MetService – albeit virtually due to the limitations imposed on physical meetings due to COVID-19 – to identify what had happened, what had worked and what had not. This report has been produced to:

- identify the lessons that can be learned,
- identify what needs to be done to reduce the risk of similar things happening again, and
- help inform thinking about the way forward.

In addition, communications have occurred between NIWA and South Coast community members. In South Coast community correspondence it was stated that WCC did not have access to the NIWA data that accurately predicted the scale, timing and location of the event on the South Coast of Wellington. This is because such detailed forecasts of the impact of these high seas on the South Coast did not exist. Communications between NIWA and community members soon after the event, seeking to help explain the meteorological and oceanic conditions that caused the large waves, did not fully explain the difference between foreknowledge of open ocean conditions and a detailed forecast of localized coastal impacts from wave breaking and overtopping. Since the event, WCC has followed up with NIWA and received the following clarification from NIWA's Chief Executive:

***The day before the waves arrived at Wellington's south coast we posted on social media that our modelling was showing high wave heights in the open ocean between New Zealand and the Chatham Islands. That was the limit of our awareness. Predicting where and when waves might impact and flood a particular location requires detailed, localised modelling linked in with the wider regional forecasts. Waves with significant height over 6 metres reaching the Wellington south coast may be expected to occur at least once a year, without necessarily having the impact we saw at Ōwhiro Bay. Waves of this magnitude in our coastal waters are not uncommon in a storm event, but they don't always cause damage. If we believe that any such event is likely to cause an extreme hazard, we notify the MetService in their role as the national hazard forecaster. In order to warn Ōwhiro Bay coast residents of any potential impact from such high waves, we would require high-resolution bathymetric and land topography data of the area (including crest heights of coastal berms or seawalls) to set up a local wave overtopping model. Then we could forecast the potential***

*impact on local houses and roads. We do not undertake this work unless we are specifically contracted to do so.*

Immediately after event, the Wellington CDEM Group recognised a gap in the current swell forecast and warning suite for Wellington. The South Coast was not included in the swell warning settings for the MetService and the WREMO Duty Officer did not receive copies of all MetService warnings. As a result, the above gaps have now been closed. MetService warning coverage will now cover the whole region, including the South Coast. The WREMO Duty Officer will also now receive copies of all regional warnings from the MetService. Specifically:

- MetService have extended the swell warning for the Greater Wellington region to include Wellington's South Coast. Currently this warning will be included in the Lake Onoke (Ferry) warning form. MetService will create a separate warning for the South Coast in due course. The swell warning will be issued by the Marine Meteorologist.
- The threshold for the warning has been set at "when swells exceed 4 metres".
- At the first issuance of a warning, a phone call will be made to the WREMO Duty Officer - the 24/7 point of contact for the Wellington Civil Defence Emergency Management (CDEM) Group – as per the current arrangement, to ensure appropriate agencies are informed regardless of the time of day.
- The warning will also be issued via email to WCC and WREMO, as well as Greater Wellington Regional Council (GWRC).
- It will also be distributed by the MetService to the media and available on its website for members of the community.

## **2.6.2 Recommendations and intended actions**

This report's analysis of the coastal inundation risk (Appendix One refers) identifies that the risk of significant swells, similar to what happened on 15 April 2020, is likely to increase going forward. This being the case, a range of actions need to be taken to increase the level of preparedness of South Coast communities to help local residents be better prepared for such events in the future. If a comprehensive risk management approach to this problem is adopted, then the actions should cover each of the "4Rs": Risk Reduction, Readiness, Response and Recovery.

The following recommendations and intended actions across the "4R's" of comprehensive emergency management have been identified to reduce the risk of similar events occurring the future:

### **Reduction:**

- MetService will continue to discuss with WCC and WREMO access to the more sophisticated swell and wave data via MetOcean (the MetService oceanographic branch). **(Action: MetService, WREMO and WCC)**
- MetService, and their sister company MetOcean will be able to provide all the data and forecasts for the South Coast region. **(Action: MetService and MetOcean)**
- WREMO and WCC will arrange a meeting with NIWA to better understand their research on waves and sea level and the development of wave forecasting systems. **(Action: WREMO, WCC and NIWA)**

- WREMO and WCC will continue to work with local residents to help gain an appreciation of the coastal inundation risk and the expected impact of sea rise **(Action: WREMO, WCC and local community)**
- WCC will engage a coastal engineer to identify possible options to reduce the build-up of debris (sand, stones and other debris) on the Ōwhiro Bay beach. **(Action: WCC)**

#### **Readiness:**

- MetService will proceed with the intended six-month trial of a wave-warning alert system on Wellington's South Coast. **(Action: WREMO, WCC, MetService and local community)**
- MetService will work with WREMO and WCC to confirm warning thresholds to ensure they capture coastal inundation events. MetService has currently adopted a current threshold of 4 metres for the South Coast. The Wellington CDEM Group's position will review the threshold periodically to ensure that it provides sufficient warning while not undermining the effectiveness of warnings due to overuse. **(Action: MetService, WREMO and WCC)**
- MetService have adjusted their coastal swell warning notifications procedures to include the WREMO Duty Officer for all warnings by email and immediate follow up by phone. **(Action: MetService and WREMO)**
- MetService will make sea swell warnings available to the public via the MetService website (metservice.com) and able to be subscribed to via email. **(Action: MetService)**
- WREMO will continue to work with the local community to help inform people about the coastal inundation risk on Wellington's South Coast and preparedness actions that can be taken in response **(Action: WREMO and local community)**

#### **Response:**

- WREMO will amend the current CDEM Group notification process for sea swell events to incorporate the changes to the MetService warning system, technical advice arrangements with NIWA<sup>5</sup> and the role of the community to expedite warnings and enable as much notice to be given as possible (see Appendices Four and Five) **(Action: WREMO)**
- WREMO will use an agreed and consistent social media message format - for use by both WREMO and councils – so it can be disseminated by coastal communities through existing local networks. **(Action: WREMO and WCC)**
- WREMO will conduct an Emergency Services Coordinating Committee (ESCC) tabletop exercise (TTE) with a wave surge scenario to consider warning and response options along the South Coast with the different agencies involved. **(Action: WREMO, WCC and emergency services)**

#### **Recovery:**

- WCC and WREMO will work with the Ōwhiro Bay community to identify lessons from future events, explore ways of 'building back better' and enhancing community resilience for future related events **(Action: WCC, WREMO and local community)**.

#### **Other:**

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<sup>5</sup> Advice from MetService is that there is currently no connection nor mandate to develop and/or verify wave projections or forecasting between NIWA and MetService. However, many other science connections do exist with NIWA. MetService has its own operational oceanographic arm (MetOcean), who produce swell models and wave forecasts which are verified against other global models via the Joint Commission for Oceanography and Marine Meteorology (JCOMM).

During the course of the above exchanges it was identified that the capabilities of the Wellington CDEM Group had not been formally assessed by the national CDEM agency (formerly the Ministry of Civil Defence, now the National Emergency Management Agency) since 2015. The capabilities of the Group were due to be assessed in 2019 but this had not occurred due to the impact of the 2017 Ministerial Review of CDEM (*Better Responses to Natural Disasters and Other Emergencies in New Zealand*), which generated a significant work programme for all CDEM Groups at the end of 2018. This work programme was then implemented by all CDEM Groups in 2019. Since the start of 2020 the Group had been responding to COVID-19. This being the case, on 18 May a commitment was given by the Regional Manager to follow up with NEMA regarding when it intended to carry out its next assessment of the Group and, if it was not scheduled for the next financial year (2021/21), a proposal would be put to governance for an independent assessment to be done.

### **3. Conclusion**

This report highlights a number of issues with the Wellington CDEM Group's warning processes for the South Coast for a significant swell and coastal inundation.

Due to the time of the notification by MetService and the absence of any formal warning there was no time for preparedness actions to be taken by Ōwhiro Bay residents. This significant wave hazard generated a number of community impacts that have been identified in this report.

A number of actions were taken by various parties immediately after the event. A number of recommendations and intended actions have also been identified to reduce the risk of similar events happening again. Going forward, the Wellington CDEM Group will:

- adjust the current notification processes for sea swell events to incorporate changes to the MetService warning system;
- enhance technical advice arrangements with MetService and NIWA;
- enable greater robustness in the actions of the various response agencies (including WCC);
- improve communication connections between these agencies and coastal communities; and
- support Wellington coastal communities in understanding the coastal inundation risk and preparedness actions that can be taken in response.

However, no warning will stop the arrival of significant wave swells. Communities in low lying coastal areas need to prepare themselves accordingly. Whilst WREMO and WCC can assist communities with their level of preparedness, affected communities also need to recognise their role in getting themselves prepared for such events and ensuring that the level of risk posed to themselves and their property is either eliminated entirely or reduced as much as feasibly possible. This is something that all parties can work together to achieve.

#### **Jeremy Holmes**

Regional Manager

Wellington Civil Defence Emergency Management (CDEM) Group

#### **Appendices:**

1. Risk Research on Wave Hazard Risk to Wellington's South Coast
2. Social Media Coverage of Significant Sea Swells on Wellington's South Coast on 14 and 15 April 2020
3. Actions taken to date
4. Coastal Preparedness Plan
5. Current notification process for sea swell hazards
6. Amended notification process for sea swell hazards

## Appendix One: Risk Research on Wave Hazard Risk to Wellington's South Coast<sup>6</sup>

**Natural variation in the height of the sea.** The height of the sea around the New Zealand coast naturally falls and rises as the tides ebb and flow, and the weather changes. As waves approach the land, they usually become smaller before they break and run up the shore. During storms, waves can reach several metres above the high tide mark along some coasts. Long-term weather patterns can change the level of the sea over many years or decades. During an El Niño phase of the Southern Oscillation, the level of the sea around New Zealand falls, and during a La Niña phase, it rises. These changes occur every 2–7 years, typically lasting 6–18 months. We are currently in a neutral phase of the El Niño Southern Oscillation (ENSO). This means we are between phases.

**Wave climate.** Wave climate means the statistical description of how wave conditions vary in time and in different parts of the ocean. This is ideally found by actually measuring waves over many years e.g. with wave buoys, but relatively few such measurements have been made around New Zealand. Consequently, to assess wave climate and derive probabilities of extreme wave conditions, use is made of computer models to hindcast (the opposite of forecast) wave conditions from past wind conditions over a sufficient period of time, usually decades. Waves tend to be defined by their significant wave height (Hm0), which is an average height over a certain period (around one hour). The highest individual wave in that time could well be twice the significant wave height. On average, the highest (and most energetic) waves (average Hm0 = 3-4 m) are found to the south of New Zealand, which is most exposed to swell from the Southern Ocean. Mean wave heights decrease further north, as exposure to these swells decrease. In waters south west of New Zealand, significant wave heights of 7-8 metres are by no means uncommon.

An analysis by NIWA (Richard Gorman) of wave-height occurrences over the past 20 years (from March 1998 to April 2019) of the Baring Head buoy record has revealed 27 events with peak significant height over 6 m, of which 8 events were over 7 m, 2 events were over 8 m and 1 event over 9 m (southerly gale on June 20, 2013). The last year when there *wasn't* at least 1 wave event over 6 m was 2012. This means that large waves can be expected most years.

**High astronomical tides.** Tides are controlled by the gravitational forces of the Moon and the Sun pulling the Earth's water towards them. How high the tide reaches varies over time, with relatively high 'spring tides' occurring about every two weeks when the Earth, the Sun and the Moon are aligned. King tides are particularly high spring tides that occur several times a year when the Earth, the Sun, and the Moon are aligned, and the Moon is closest to the Earth.

**Winds travelling over the surface of the sea create waves.** How high waves get depends on the strength and duration of the wind, as well as the depth of the sea and how far the waves have travelled. Wind blowing over the sea surface produces short waves or ripples. The stronger the wind, and the more time and distance it has to work on the waves, the higher and longer they get.

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<sup>6</sup> The information in this section of the report is drawn from the following sources:

- Ministry of the Environment Report: *Preparing New Zealand for rising seas: Certainty and Uncertainty*, November 2015
- Stuff.co.nz article 3 Aug 19 by Michael Daly: *Alone in a wild ocean, New Zealand gets smashed by some of the world's biggest waves*
- R.A. Pickrill & J. S. Mitchell (1979) *Ocean wave characteristics around New Zealand*, New Zealand Journal of Marine and Freshwater Research, 13:4, 501-520, DOI: 10.1080/00288330.1979.9515827
- NIWA Report 2012: *Assessing the storm inundation hazard for coastal margins around the Wellington region*

If unimpeded by land, a wave can travel thousands of kilometres. Wellington's south coast is sometimes pummelled by huge swells that are generated by storms as far away as Antarctica.

**Storm surges.** During a storm, high winds and low air pressure can combine to create a bulge in the level of the sea that is driven on to the coast. Such storm surges can be thought of as very long, slow waves. In April 1968, Cyclone Giselle formed in the Coral Sea and began tracking toward New Zealand where it was reinforced by a storm from the south. The waves reached 12 metres in Cook Strait causing the sinking of the Lyttelton–Wellington ferry Wahine on 10 April 1968. The sinking of the ferry was New Zealand's worst modern maritime disaster. Fifty-one people lost their lives that day and several died weeks later from injuries sustained during the event.

**Causes of wave hazards.** A 1979 paper by RA Pickrill and JS Mitchell from the NZ Oceanographic Institute which drew data from a wide range of sources made some first order generalisations about the wave regime around the New Zealand coast, explaining the wave regimes that impact New Zealand coastline. New Zealand is wholly within a belt between latitudes 30 degrees and 70 degrees where westerly winds blow around the Southern Hemisphere virtually unimpeded by any large land masses. "*Waves dominated by these westerlies control the wave climate on most of New Zealand's coastline,*" the paper said.

*"New Zealand is isolated from other large bodies of land. In almost every direction fetch (the area of ocean over which the wind blows in an essentially constant direction) conditions for wave generation are unlimited; Australia is the closest neighbour, 2000km to the northwest, and for all but extremely rare events this represents unlimited fetch conditions for wave generation."*

The Pickrill and Mitchell paper goes on to observe that New Zealand can be divided into four broad regional groupings on the basis of wave characteristics:

- a. **In Southern New Zealand** the wave environment was "extremely high energy", with the prevailing deep water wave being 3.5-4.5m high. Rarely did wave heights drop below 2m and waves up to 11m had been recorded.
- b. **In Western New Zealand**, off the west coast of central New Zealand, prevailing deep water waves were 1-3m high, changing to 0.5-1.5m when seen from the beach. While this grouping was also exposed to the prevailing winds, the westerlies were not as strong as those further south and that was reflected in the lower wave height.
- c. **Eastern New Zealand**, which was sheltered from the prevailing winds, had prevailing deep water waves 0.5-2m high. Onshore, that was transformed into a 0.5-1.5m wave. Storm waves on the east coast were rarely more than 3m high, except on the south coast of Wellington where southerly wave trains arrived at the shore unrefracted and storm waves may be higher than 4m.
- d. **In Northern New Zealand**, the area between North and East capes - had a 0.5-1.5m deep water wave, which was probably transformed into a 0.4-0.8m wave at the beach. Storm waves at the shore were probably only occasionally more than 2.5m high.

According to a NIWA coastal and estuarine physical processes scientist: "*As the wind blows across the sea, it transfers some of the energy to the water surface. The longer it blows and the stronger it is, the larger the waves.*" If this is combined with a high "king tide", this can create an additional wave hazard risk on the New Zealand coastline. According to the US National Oceanic and Atmospheric Administration, "*king tide*" is a non-scientific term often used to describe exceptionally

high tides. Higher than normal tides typically happen during a new or full moon, and when the Moon is at the closest point to the Earth during its orbit of roughly 28 days. That closest point is known as the perigee, and when it happens, the gravitational pull of the Moon on the Earth is at its strongest, and during those periods there is a slight increase in the average range of tides.

Also, during full or new moons - when the Earth, Sun and Moon are nearly in alignment - average tidal ranges are also slightly larger. These happen once a fortnight. About three or four times a year, when the new or full moon coincides closely with the perigee, the tidal range is even bigger, although not by much. But at these times coastal flooding from a storm could be significantly worse than it otherwise would have been.

**Potential consequences of wave hazards.** Rough seas and large swells create dangers to boating, damaging or capsizing vessels at sea, while also damaging wharves, jetties, oil rigs and other structures, and contributing to coastal flooding and erosion. They can be particularly dangerous on exposed coastlines, making bars impassable, and creating strong rips at beaches, leading to a drowning hazard. The combination of storm surge on top of high tides can cause coastal flooding which damages property and impacts on coastal infrastructure (e.g. by blocking roads). When waves are present as well, an additional rise in sea level due to wave setup can exacerbate this inundation, while also allowing the waves to cause coastal erosion and damage to coastal infrastructure (e.g. seawalls) they normally wouldn't reach.

In a 2012 NIWA Report - prepared for the Greater Wellington Regional Council (GWRC), Kapiti Coast District Council (KCDC) and Wellington City Council (WCC) - provided an assessment of the exposure to inundation from storm-tide and wave hazards for coastal margins in the Wellington Region. This report assessed total storm inundation along the Wellington region's shoreline from storm-tide (a combination of high tide plus storm surge) and wave setup inside the wave breaking zone. The model simulations show that the coastline south and east of the Wellington Harbour (particularly the Wairarapa Coast) is exposed to the largest waves, with significant wave heights of over 6 m in places during some of the storm events simulated. The southern part of Cape Terawhiti is also exposed to large waves. In contrast, the Kapiti Coast receives smaller waves with significant wave heights less than 3 m in the storm events analysed.

NIWA's report mapped total storm inundation from simulations of two representative storm-tide events that, combined with the coincident offshore wave heights, had a 1% joint-probability of occurrence in any given year. A further factor to consider with sea-level rise is that more frequent but less severe storm inundation events are likely to become more problematic as they occur with increasing frequency relative to present coastal land elevations. By the same reasoning, coastal inundation is expected to be more frequent with rising sea level as the storm-tide required to inundate low-lying coastal land will progressively become smaller.

The report's closing observations noted that ocean waves are complex spectacles, subject to influences that range from atmospheric pressure to water depth. Many of the drivers of wave height will increase with global warming, leading to greater shoreline damage and erosion when waves reach the coast. Most of New Zealand's large cities are coastal and have vulnerable areas of land that are less than five metres above mean high water level. One of the ocean threats of climate change is increased wave run-up—the surge of water associated with breaking waves that can overtop barriers and undermine natural defences such as dunes.

**Combination of factors that create the greatest wave hazard.** For the Wellington South Coast the greatest wave hazard threat is created by a combination of the following factors:

- a. A La Niña phase<sup>7</sup>.
- b. A storm surge of high winds and low air pressure that combine to create a bulge in the level of the sea that is driven on to the coast.
- c. Huge swells, generated by the above storms, that are able to travel a significant distance and have enabled the waves' energy to build up and are unimpeded by land until they hit the South Coast.
- d. All the above occurring on a king high tide.
- e. Rising seas levels, which are gradually but inevitably rising, and the risks therefore incrementally worsening as the sea level gets higher.

### Impact of Rising Sea Levels

The significant swell event of 15 April is not something new or something that hasn't happened for a long time. In 2013 large waves also struck Wellington's South Coast (see below). In June 2013, the Wellington City Council released a report<sup>8</sup> as a first step in a process of understanding and adapting to climate change induced sea level rise in the Wellington area. The report found that, taking into account cultural, economic, environmental and social values, Makara Beach would be worst affected by a 60cm sea level rise, followed by the exposed South Coast suburbs and Seatoun. However, with a 1.5m rise, central Wellington would be hit hardest.

In June 2013, Wellington experienced a severe '100 year' storm comparable to the Wahine Storm of 1968. Large waves and storm surge damaged a section of the Island Bay seawall immediately in front of Shorland Park. This event triggered work to explore alternative options to simply repairing the damaged seawall. The long-term solution identified was to replace the wall and coastal road with sand dunes as a more effective buffer against the swells. However, as a short to medium term solution, the wall was rebuilt with some additional wave-fending design features below.<sup>9</sup>



<sup>7</sup> The El Niño Southern Oscillation (ENSO) is the movement of warm equatorial water across the Pacific Ocean and the atmospheric response. It occurs every 2–7 years, typically lasting 6–18 months. ENSO has three phases: neutral, El Niño, and La Niña. In New Zealand an El Niño phase in summer can bring increased westerly winds, more rain in the west, and drought in the east; in winter it can lead to cooler southerly winds. During a La Niña phase we may experience more north-easterly winds, wetter conditions in the north and east, and higher sea levels.

<sup>8</sup> Tonkin & Taylor Ltd; Report for Wellington City Council - *Sea Level Rise Options Analysis*; T&T Ref: 61579.002.R6; June 2013

<sup>9</sup> Extract from WCC Environment Committee meeting minutes dated 16 December 2014.

In 2015 Parliamentary Commissioner for the Environment (PCE) Jan Wright produced a report on sea level rise - Preparing New Zealand for Rising Seas. The report predicted that, in Wellington, high tide peaks of the magnitude seen in that 2013 storm will happen once a year with a 30cm sea level rise. With a jump of 70cm, they will happen at every tide. The capital has one of New Zealand's highest rates of sea level rise - about 2mm a year. But, in the past 15 years, it has been more like 4mm a year because tectonic plate boundary subsidence is dragging the region downwards. Across the region, the most risk-prone areas to rises in the sea levels include Palliser Bay, Wellington's South Coast and road and rail infrastructure, the Hutt River floodplain, the Eastbourne road, Pauatahanui Inlet and Porirua Harbour.

The 2015 report by PCE is quite certain that **the level of the sea around New Zealand is rising and will continue to rise for the foreseeable future.** What is uncertain is the rate of rise, especially later this century and beyond. New Zealanders are familiar with the power of the sea. Living with risks of flooding and erosion are part and parcel of living near the coast. However, these risks are changing. As the sea rises, coastal floods will become more common, erosion will increase, and groundwater will rise.

What this rise in sea level means is that king tides, storm surges, and waves will now reach higher up shores than they used to. As the sea continues to rise the frequency, duration, and extent of coastal flooding will increase.

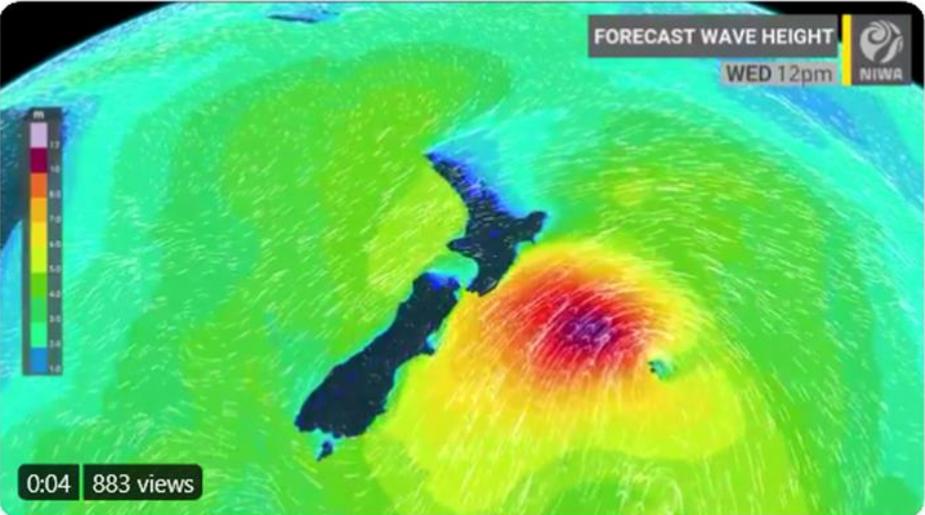
Coastal cities and towns have been developed over time with a stable sea level in mind. Buildings, roads, airports, wastewater systems and other infrastructure have all been built based on an historical understanding of the reach of the tides and occasional flooding during storms. **As the level of the sea continues to rise, areas of low-lying coastal land that currently flood during storms or king tides will experience more frequent and severe flooding. This is something that needs to be adjusted to going forward.**

**Appendix Two:** Social Media Coverage of Significant Sea Swells on Wellington’s South Coast on 14 and 15 April 2020

 **NIWA Weather** @NiwaWeather · Apr 14

A deep area of low pressure will pass near Chatham Island on Wednesday...

Significant wave height, or the highest third of the waves, is forecast to be as high as 12 metres (~4 stories!) in the open ocean between the mainland & Chatham Island via our regional modelling 



0:04 883 views

1 6 26

 **Wellington Region Emergency Management Office (WREMOz)**

Published by Nae Steinhardt Blanchard [?] · 15 April at 10:20 · 🌐

**⚠️ ⚠️ LARGE SWELLS ⚠️ ⚠️**

Important information for our Wellington South Coast & Eastbourne residents

Kia ora everyone,

Metservice has advised that large sea swells in the Cook Strait are impacting roads around the Wellington South Coast and Eastbourne. Residents are advised to avoid using footpaths or roads near the coastline for the rest of the day. High tide is at 11.10 am and swells are expected to peak between midday and late afternoon today.

It's really important not to go near beaches or coastal reserves in this area to observe the waves and to beware of rogue waves.

Be safe and stay at home.

Scott

34,349 People reached      3,340 Engagements      [Boost Post](#)



Wellington City Council

15 April at 10:59 · 🌐



**\*UPDATE - SOUTH COAST SWELL\***

A big swell on the South Coast is causing large waves to crash onto the road between Breaker Bay and Owhiro Bay.

The section of Breaker Bay Road and Moa Point Road between Mantell St (Seatoun) and Cochrane St (Lyal Bay) and the Esplanade between Owhiro Bay, Island Bay and Houghton Bay is now closed.

Please avoid the entire South Coast and stay safe at home in your bubble.

Police and contractor are working to keep the area safe and a clean-up crew will remove the debris when the tide recedes.



👍 🤔 🙄 175

35 comments 66 shares



Wellington City Council



15 April at 12:47 · 🌐

**\*UPDATE SOUTH COAST SWELL\***

Police have evacuated around 14-20 people from 5 houses. They are family groups and are staying in their bubbles.

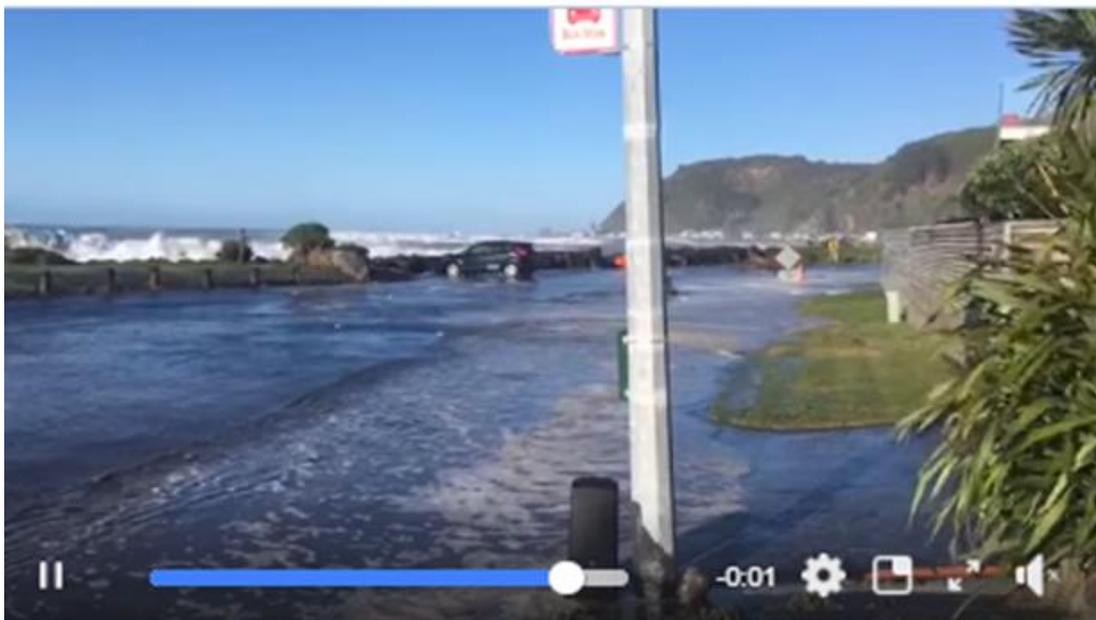
We are arranging temporary accommodation and transport for them now.

At this stage there is no damage to the houses, but some cars, garages and access ways are affected.

High tide was 11:10am and the waves are already settling down.

#kiakahawellington

Video sent in by Richard Nimmo this morning



👍 🤔 😞 100

12 comments 45 shares



Wellington City Council

15 April at 14:55 · 🌐



**\*UPDATE SOUTH COAST SWELL\***

The team at [Fulton Hogan](#) have started on the clean up which should take a couple days unless high tides create more issues in the next 12-24 hours. An alternative route has been cleared to allow sludge trucks to run. These photos show just some of the debris that the 5.5m waves washed onto the road.

Stay safe out there Pōneke!

For more info head to: <https://wgtm.cc/big-waves>

#kiakahawellington



Laura Unasa and 168 others

20 comments 44 shares

## Appendix Three: Actions Taken to Date

### Reduction

Taking steps to reduce the potential risks and impacts of hazards before a disaster.



### Research

Coastal cities and towns have been developed over time with a stable sea level in mind. Buildings, roads, airports, wastewater systems and other infrastructure have all been built based on an historical understanding of the reach of the tides and occasional flooding during storms. As sea levels continue to rise, areas of low-lying coastal land that currently flood during storms or king tides will experience more frequent and severe flooding. Areas a little higher will also begin to flood over time.

For Wellington's South Coast the greatest wave hazard threat is created by a combination of some or all of the following environmental factors (see Appendix One for more detail):

- A storm surge of high winds and low air pressure that combine to create a bulge in the level of the sea that is driven on to the coast.
- Huge swells, generated by the above storms, that are able to travel a significant distance and have enabled the waves energy to build up and are unimpeded by land until they hit the South Coast.
- All the above occurring on a high tide.
- Rising sea levels, which are gradually but inexorably rising, and the risks therefore incrementally worsening as sea levels get higher.
- A La Niña weather phase of the El Niño Southern Oscillation (ENSO)<sup>10</sup> which may also result in elevated sea levels in the New Zealand region (note: the current ENSO phase is 'neutral').

### Risk Reduction

The significant swell event of 15 April is nothing new. In 2013 coastal inundation also impacted Wellington's South Coast. In June 2013 WCC released a report<sup>11</sup> as a first step in understanding and adapting to climate change induced sea level rise in the Wellington area. The 2013 report found

<sup>10</sup> The El Niño Southern Oscillation (ENSO) is the movement of warm equatorial water across the Pacific Ocean and the atmospheric response. It occurs every 2–7 years, typically lasting 6–18 months. ENSO has three phases: neutral, El Niño, and La Niña. In New Zealand an El Niño phase in summer can bring increased westerly winds, more rain in the west, and drought in the east; in winter it can lead to cooler southerly winds. During a La Niña phase we may experience more north-easterly winds, wetter conditions in the north and east, and higher sea levels.

<sup>11</sup> Tonkin & Taylor Ltd; Report for Wellington City Council - *Sea Level Rise Options Analysis*; June 2013

that, taking into account cultural, economic, environmental and social values, Makara Beach would be worst affected by a 60cm sea level rise, followed by the exposed South Coast suburbs and Seatoun. However, with a 1.5m rise, central Wellington would be hit hardest. Together with the local community, WCC implemented the Makara Beach Project<sup>12</sup> to look at the impact of sea level rise on the Makara community.

In June 2013, Wellington experienced a severe '100 year' storm comparable to the Wahine Storm of 1968. Large waves and storm surge damaged a section of the Island Bay seawall immediately in front of Shorland Park. This event triggered work to explore alternative options to simply repairing the damaged seawall. The long-term solution identified was to replace the wall and coastal road with sand dunes as a more effective buffer against the swells. However, as a short to medium term solution, the wall was rebuilt with some additional wave-fending design features. This is in spite of the fact that rising sea levels mean that the likelihood of similar events occurring in the future is only going to increase.

## Readiness

Taking action to prepare for the potential impacts of hazards before they happen.



**Self-help**



**Response and recovery**



**Specific programmes**

## Community Resilience

One of WREMO's primary roles in the readiness space is to work with communities to help build resilience and prepare for the impact of natural hazard events. WREMO Community Resilience advisors work directly with local community groups across the region, and Wellington's South Coast is no exception.

### Recent engagements around the South Coast of Wellington include:

- Island Bay Hub Exercise – 30 March 2019
- Ōwhiro Bay Plan & Prepare Session - 1 May 2019
- Houghton Bay Plan & Prepare Session – 9 September 2019
- Houghton Bay Hub Exercise – 24 September 2019
- Ōwhiro Bay Coastal Community Session – 10 November 2019

A key message of these workshops is that an emergency can happen at any time. The emphasis is on helping communities to understand hazards and how they can help each other before, during and after a significant emergency - highlighting the importance of personal ownership in preparing for and responding to an emergency.

<sup>12</sup> Makara Beach Project

(<https://wcc.maps.arcgis.com/apps/MapSeries/index.html?appid=57e797777a96430c8074182984622a6a>)

One example of a positive outcome from WREMO’s community engagement around Wellington’s South Coast has been the roll out of the Tsunami Blue Lines initiative. This was led by the Island Bay Resident’s Association with support from WREMO and the local council. Blue Lines has now been implemented across the Wellington region and beyond.

### Engagement across agencies

In preparation for an emergency event the Wellington CDEM Group develop and maintain trained and prepared people to be able to respond. WREMO provides training and exercise opportunities to enable Council personnel to maintain a level of preparedness to respond to various likely hazards within the region. The Wellington Emergency Services Coordinating Committee (ESCC) meets regularly during the year to maintain an overview of each response agency’s roles and responsibilities during an emergency within the WCC territorial authority area of responsibility. This includes the use of table-top exercises (TTE) to consider emergency scenarios, exercise collective response warning options and to better understand responders’ capacity and capability across their area.

### Response

Taking action immediately before, during or after an emergency to save lives and property and help communities recover.



### Forecasting

MetService issues severe weather information and warnings to Regional Councils and Territorial Authorities, covering rain, wind, snow and swell warnings. Threshold levels for swell warnings are set by MetService based on requests from relevant Councils for specific parts of the coastline that are vulnerable.

MetService is the first rung in the warning and response action ladder, and its warning information is made publicly available through the organisation’s social media channels and email subscription service. These warnings communicate the type, severity, expected onset and duration of weather events. It is the role of WREMO and Territorial Authorities like WCC to communicate the impact of these severe weather events, including road/beach closures and evacuations.

### Notifications

On receipt of a warning notification from the MetService for a significant swell inundation event, the WREMO Duty Officer informs the WCC Emergency Management Advisor who in turn advises the

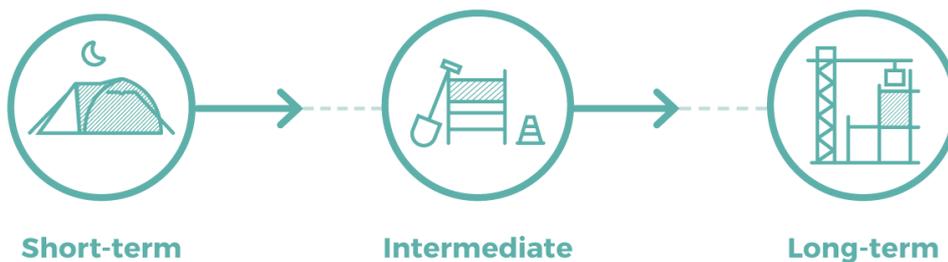
WCC Primary Local Controller. See Appendix Five for a current notification diagram, and Appendix Six for the proposed amendments.

## Official Response

Informing all communities who could be affected by a hazard is the first priority. Providing support to first responders from emergency service organisations is also paramount. Depending on the forecast wave height and likely inundation, the WCC Local Controller may decide to take additional response actions including, if a risk to public safety is likely, a decision to evacuate the low-lying coastal areas. Evacuations may require road transport management support, assembly points and potentially additional welfare support such as an emergency assistance centre to be established where needs assessment can be conducted and essential welfare needs are provided for (e.g. shelter and the provision of food and water and household goods and services).

## Recovery

Long-term community regeneration after an emergency.



## Coordination between local government and community

In a significant emergency where people's lives are disrupted, supporting a community with housing and other needed services to support and restore wellbeing are a priority. This could take weeks, months and possibly years of coordinated efforts by local government, affected residents, insurers, Non-Governmental Organisations (NGOs), central government agencies and the building sector. Because of local government's legislative role, it is the natural convener of these groups throughout the recovery process.

Communities lie at the centre of recovery. They have an important role in advocating for support and shaping positive changes for the future. Community-led initiatives are critical in providing a sense of local agency, ownership and wellbeing throughout the recovery process.

## **Appendix Four: Coastal Preparedness Plan**

### **Our vision and goal – Tā mātau matakitenga me te uarantanga**

To work with coastal communities to improve preparedness and enable residents to make informed decisions about how they will manage the risks of living along the Wellington Region coastline. To reach this goal, as a collective we will:

1. Develop clear and specific thresholds for sea swells & warnings
2. Communicate the process both in theory and practice to partners involved
3. Improve preparedness and help reduce risks for coastal communities

### **A resilient future – He anamata manawaroa**

The Wellington Region has one of the most physically diverse environments in New Zealand, with a mix of hill country areas and lowlands, large flood plains, and 500km of coastline, all of which sit across major faults.

Ōwhiro Bay is one of many communities located along the region's coastline, with a population of approximately 2,000 residents (2018 national census). It overlooks the Cook Strait. If you drive north, you'll find pockets of residents as far north as Ōtaki and to the east in Castlepoint and Wairarapa who face similar challenges.

Much of the region's coastline is already subject to coastal erosion and inundation and the various councils and communities are already dealing with the existing coastal hazards (storm surge flooding, sea level rise). Through ongoing engagement, we hope to ensure that there is awareness across coastal residents of the risks involved in living in such areas and the importance of personal and community resilience.

For the purposes of this plan, resilience is defined as the ability to adapt well to change, to overcome adversity as and when it occurs, and to recover quickly afterwards.

For everyone to move forward and empower positive action we will engage on the following principles:

- **Manaakitanga:** Mutual respect. Work together with fairness, integrity and transparency.
- **Kotahitanga:** Unity. While people may hold diverse views, it is important to identify a shared sense of purpose that contributes to positive outcomes for all.
- **Kanohi ki te kanohi:** Face-to-face. Where possible, to engage in person, not just by letter or email.

### **Our priorities for improved resilience - Ā mātau kaupapa matua mō te whakapakari i te manawaroa**

In partnership with Metservice, WREMO, Wellington City Council and Coastal residents we will:

#### **Develop clear and specific thresholds for sea swells & warnings**

- Metservice will establish a series of sea swell height thresholds with descriptors detailing their likely coastal impact potential, to better inform notifications and warnings.

- Metservice will distribute information about sea swells & warnings through multiple channels of communication to ensure the public receive it in a timely manner.
- WREMO and Wellington City Council will share messaging that meets pre-defined risk thresholds to the public through their own channels. There are multiple ways that the delivery of this messaging can occur which need further exploration.
- WREMO and Wellington City Council will integrate lessons learnt from sea swell events & warnings into a Coastal Hazards Planning presentation to raise awareness and increase preparedness. These sessions can be delivered to coastal communities around the region.

### **Improve the preparedness and reduce risks for coastal communities**

WREMO, in partnership with supporting agencies, will develop and deliver a series of Coastal Hazards Planning presentations. This series will aim to:

- Highlight the risks associated with living in a coastal community and the importance of building relationships between households.
- Clarify the science behind the warning system process and how the public sign up to receive the warnings.
- Provide guidance on response actions to take in the initial stages of an event and subsequent actions to ensure personal and community safety.
- Discuss ways that people can make temporary or permanent repairs to their home to reduce the risk or impact of coastal inundation.
- Encourage and enable further community-led solutions that increase social connectedness and preparedness.

### **Commitment to action – E paiherea ana mātau ki te mahi**

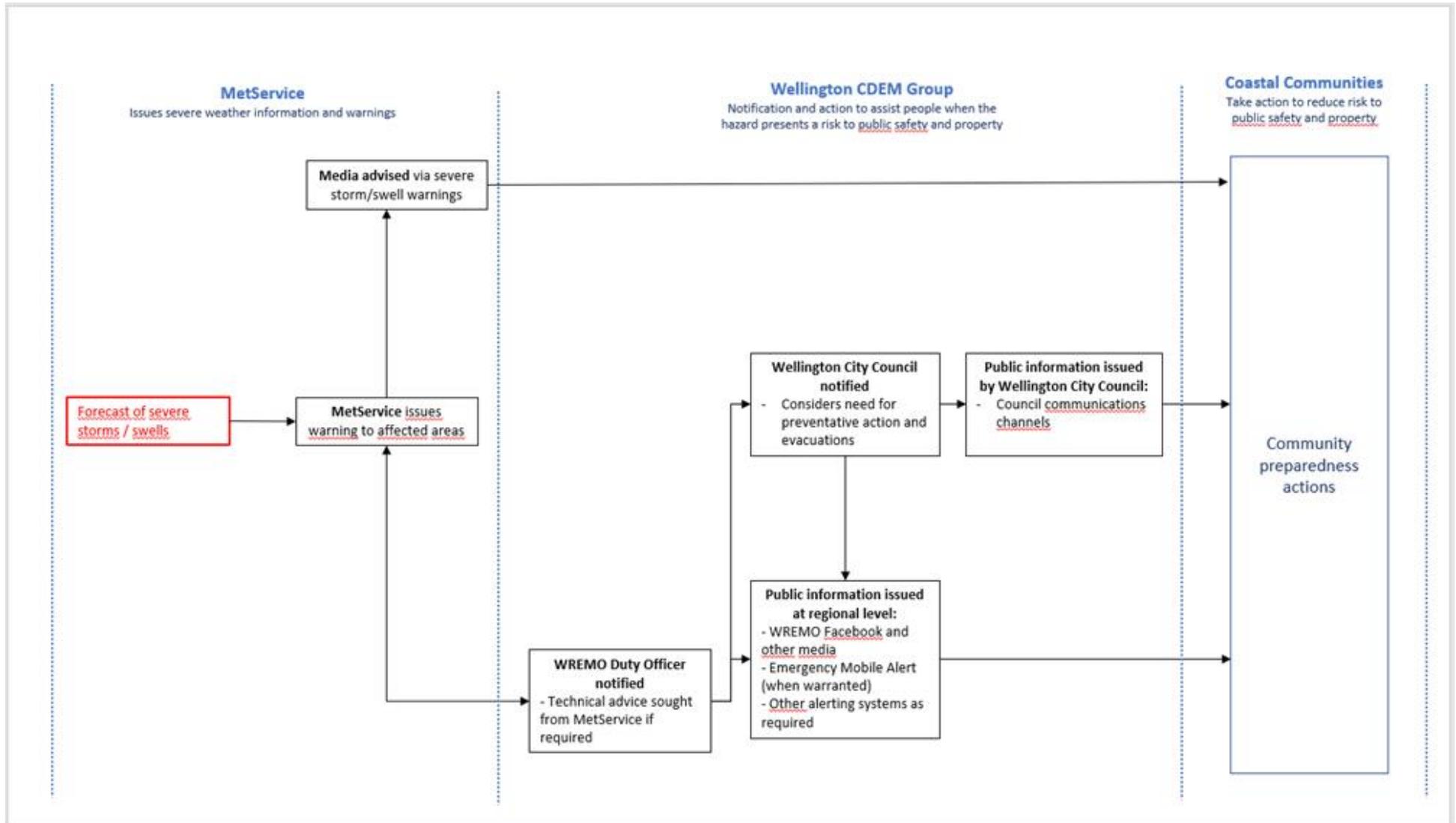
#### **Short-term actions (approximately 6 weeks from now, COVID-19 dependent):**

- Wellington City Council will be engaging with communities to debrief the event.
- Following the debrief, WREMO will engage residents to scope a pathway forward for household and community preparedness.
- Metservice will finalise the process for sea swell thresholds & warnings that will be communicated to coastal residents in subsequent engagements.

#### **Long term actions (next financial year and beyond):**

- WREMO's engagement initiatives will incorporate a focus on coastal communities for all hazards related to living along the coastline.
- Scope the involvement of experts in the field to support public talks for coastal communities across the Wellington Region.
- Continue to maintain a connection with coastal communities through all channels of communication, to keep them informed before, during and after an event.

## Appendix Five: Current Notification Process for Sea Swell Hazards



**Appendix Six: Amended Notification Process for Sea Swell Hazards**

This amended warning process has been developed in consultation with MetService, WCC and WREMO. It identifies the key actions to be taken by each group in receipt of swell hazard advice. (**Note:** The diagram is simplified to enable clear interpretation and does not go into the detail of each agency’s individual actions).

