

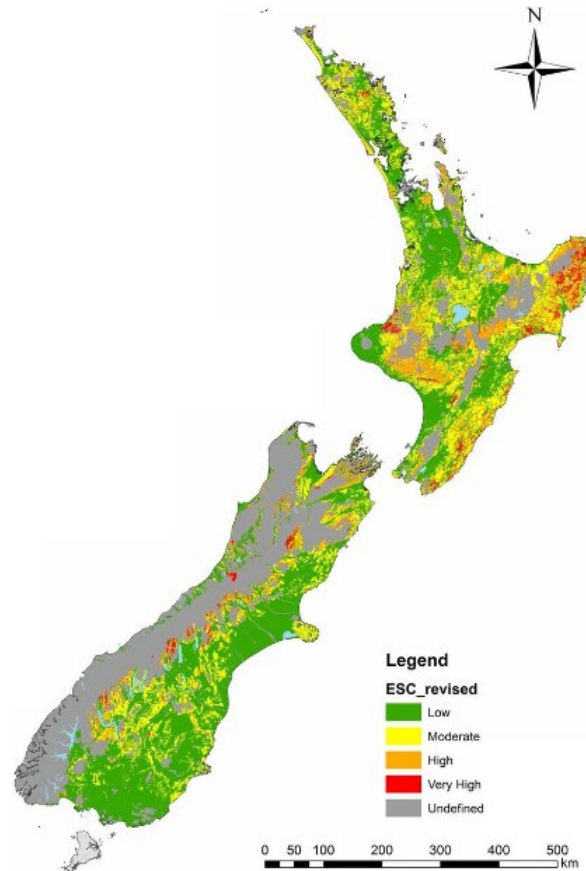
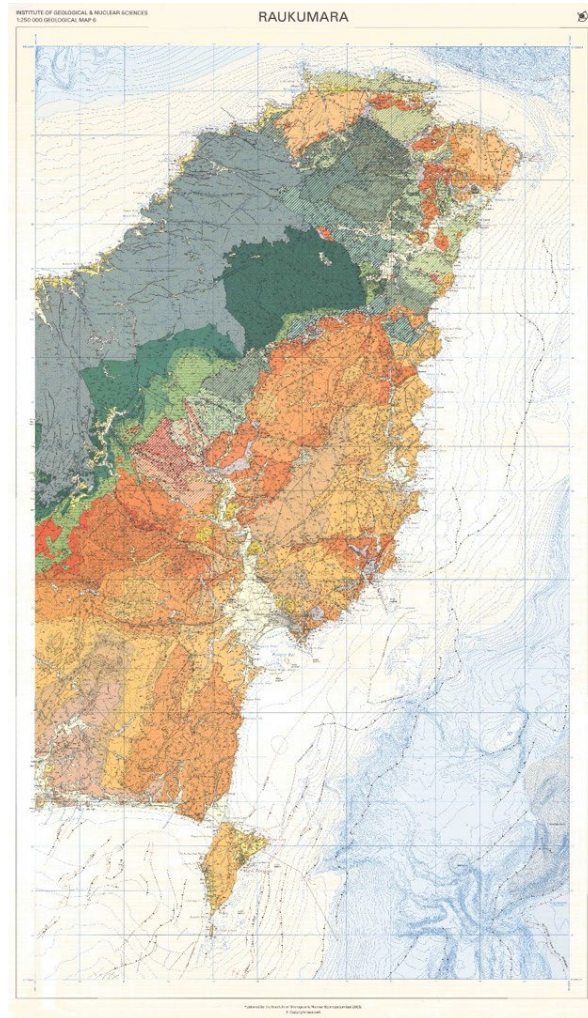


Adapting for climate change post Cyclone Gabrielle

PIANC APAC 2024

Marty Bayley - GM Infrastructure & Commercial

Tairāwhiti has always been on the move



Erosion susceptibility of Gisborne and Wairoa districts

Erosion Susceptibility Class

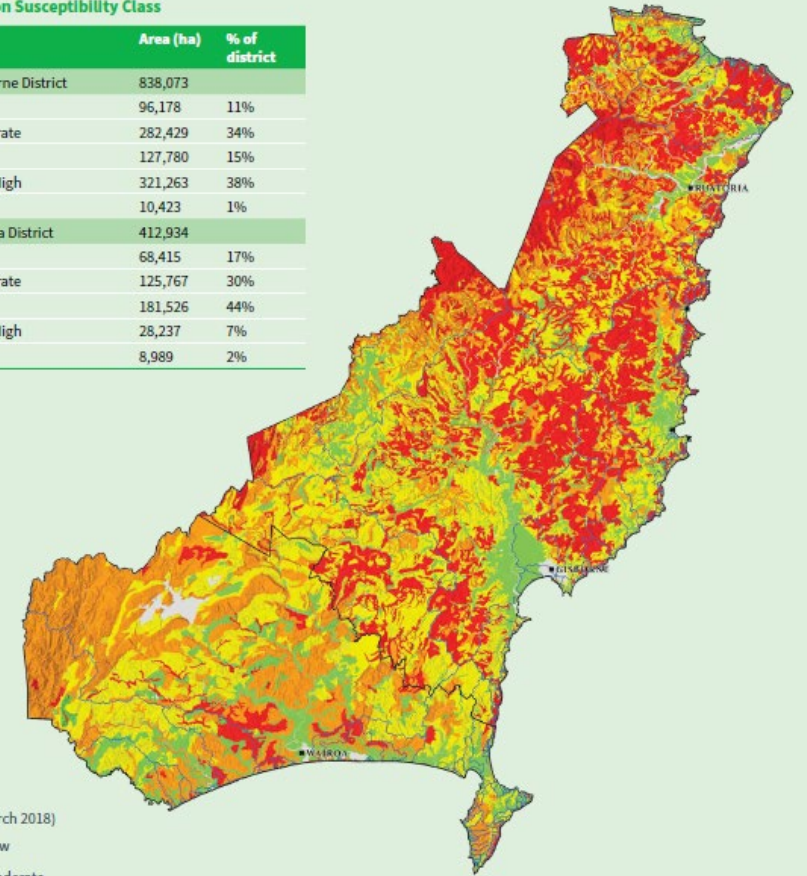
	Area (ha)	% of district
Gisborne District	838,073	
Low	96,178	11%
Moderate	282,429	34%
High	127,780	15%
Very High	321,263	38%
other	10,423	1%
Wairoa District	412,934	
Low	68,415	17%
Moderate	125,767	30%
High	181,526	44%
Very High	28,237	7%
other	8,989	2%

ESC (March 2018)

- Low
- Moderate
- High
- Very High
- Other

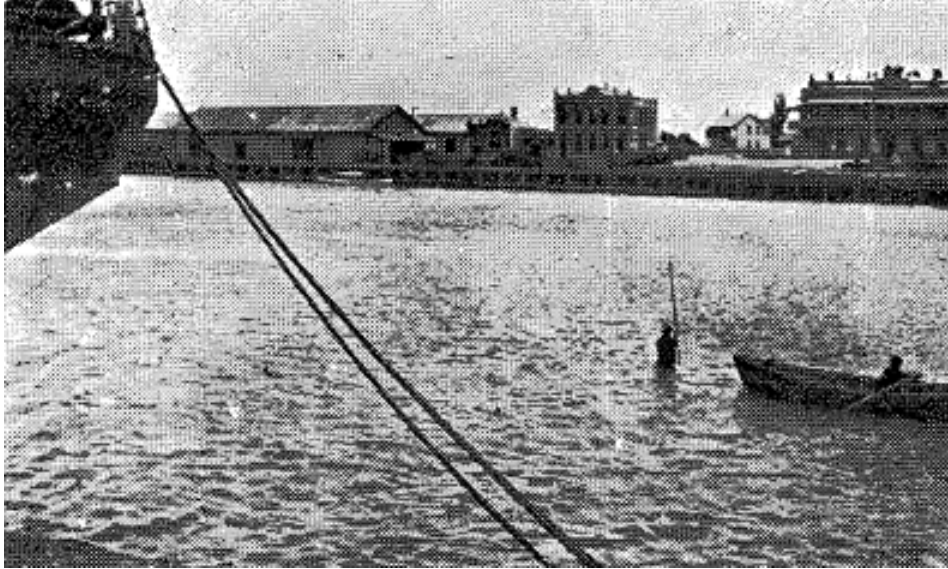
NZ Territorial Authorities

Major Sea Draining Catchments



This map uses data sourced from LINZ, Stats NZ, Manaaki Whenua – Landcare Research & NIWA under CC-BY

Gisborne harbour reconfigured

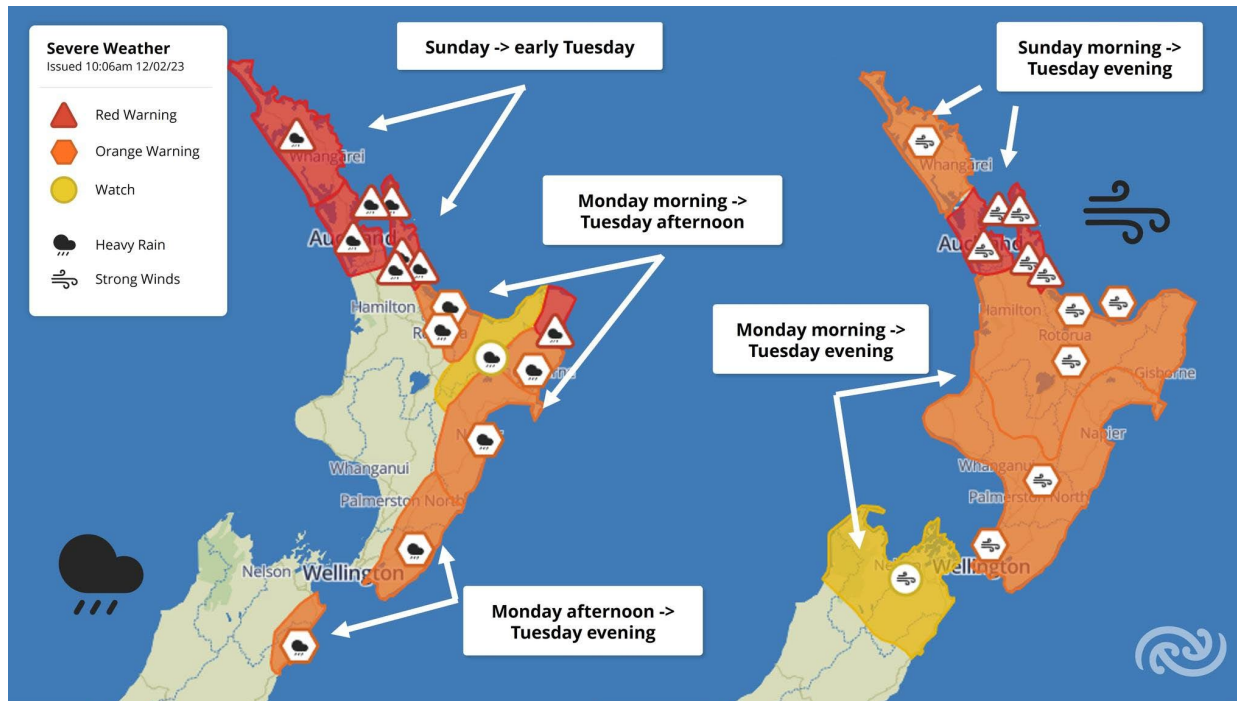


Attempts to hold the hills with forests



Cyclone Gabrielle arrived

- NZ's most expensive natural disaster ever.
- 12 lives lost
- Est \$13.5b in widespread damages across North Island focused on Tairāwhiti and Hawkes Bay.





“Nearly as much rain fell during the most intense 12-hour period of Cyclone Gabrielle as did during the most intense 24-hour period of Cyclone Bola”

Interpine Report April 2023

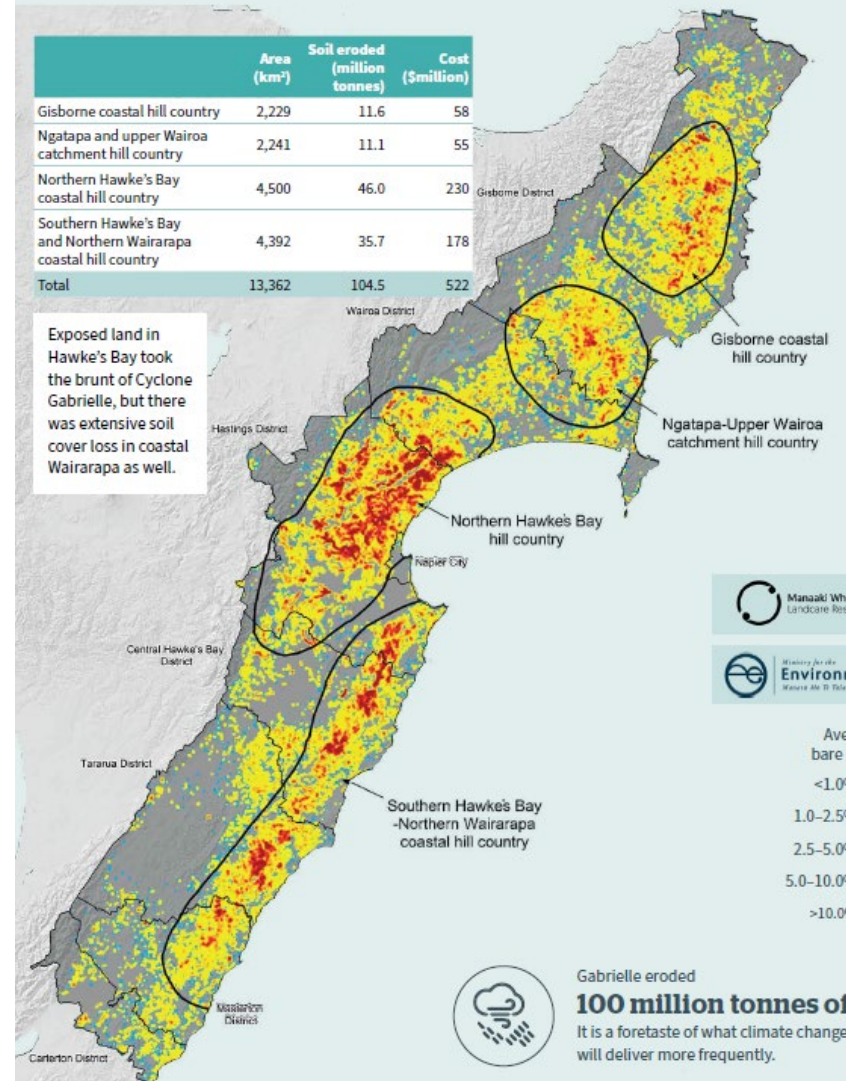
Accumulated precip, 13-14 Feb



Cyclone Gabrielle landsliding

	Area (km ²)	Soil eroded (million tonnes)	Cost (\$million)
Gisborne coastal hill country	2,229	11.6	58
Ngatapa and upper Wairoa catchment hill country	2,241	11.1	55
Northern Hawke's Bay coastal hill country	4,500	46.0	230
Southern Hawke's Bay and Northern Wairarapa coastal hill country	4,392	35.7	178
Total	13,362	104.5	522

Exposed land in Hawke's Bay took the brunt of Cyclone Gabrielle, but there was extensive soil cover loss in coastal Wairarapa as well.



- Average % bare ground
- <1.0% ■
 - 1.0–2.5% ■
 - 2.5–5.0% ■
 - 5.0–10.0% ■
 - >10.0% ■



Gabrielle eroded **100 million tonnes of soil**
It is a foretaste of what climate change will deliver more frequently.

Gabrielle was just the pinnacle

2022

2023

Wettest year here since 1977

by Roger Handford

THIS year has been one of the wettest on record for the Gisborne region.

For Gisborne city, 2022 to date is the sixth-wettest year since official records began at Gisborne Airport in 1937.

At the other end of the district, Waikura Valley has had nearly four metres of rain over the year.

locations have experienced multiple rain events, each of which has dumped two to three hundred millimetres of rain or more.

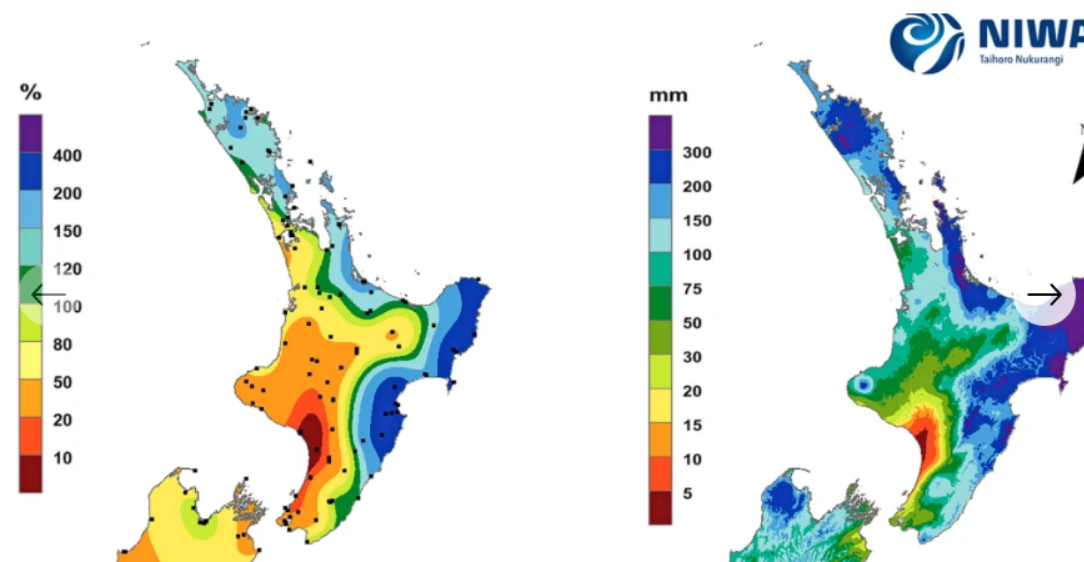
Waikura Valley recorded an event of just over 600mm in July while Te Puia had 622mm in the March event — its heaviest in five years.

Indicative of the increase in rain events in recent years is the 820mm that deluged Waikura

Gisborne's wettest June in 144 years, with rain on 20 of the month's 30 days

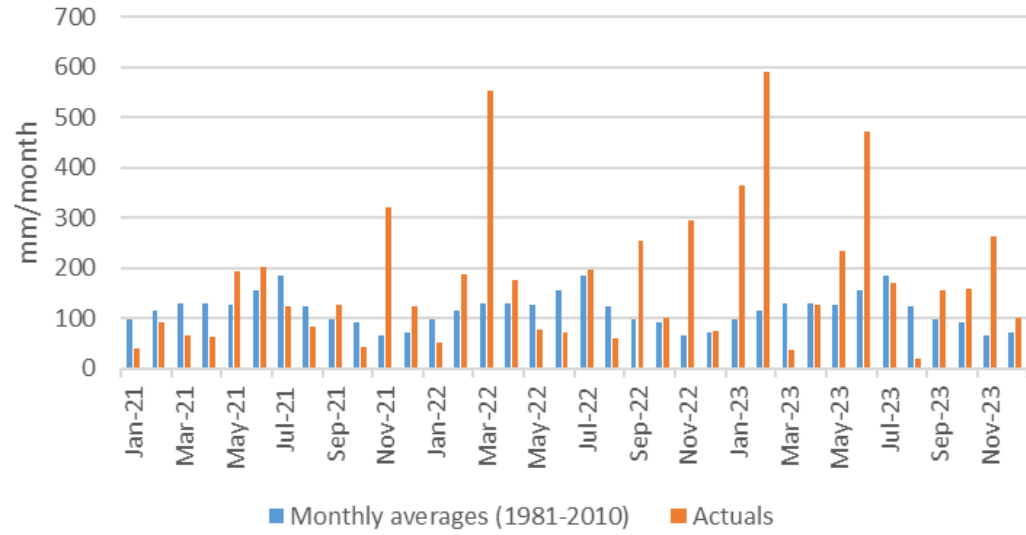
Jul 01 2023 | Updated July 5, 2023 • Roger Handford

3 min read

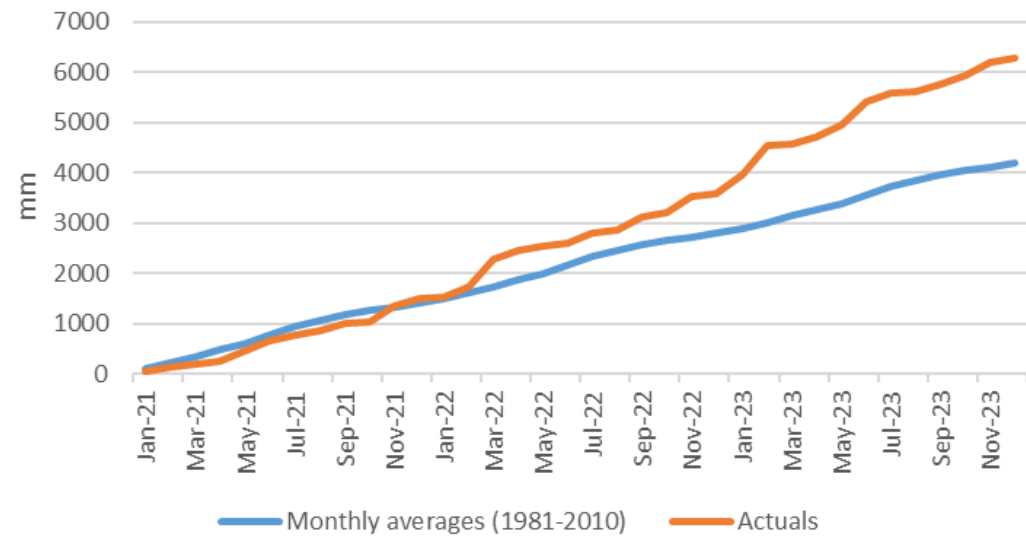


Excess of water . . . This shows the percentage-above-normal rainfall over the North Island - and on the right, the amounts. Niwa image

Hikuwai rainfall



Hikuwai accumulated rainfall





Roads

3,000 faults registered

250 major drop outs

650,000m³ of silt in drains, slips and roads



Bridges

8 bridges destroyed beyond use

10 with major structural issues

43 with major scouring



Slash

77 bridges with slash

9 significant storms since June 2021

June 2023 – State of Emergency

Feb 2023 - Cyclone Gabrielle SoE

Jan 2023 - Cyclone Hale SoE

Nov 2022 - Heavy rain event

April 2022 - Cyclone Fili

March 2022 - State of Emergency

Jan 2022 - Cyclone Cody

Nov 2021 - State of Emergency

June 2021 - Heavy rain event

How Gabrielle unfolded

Saturday 4th Feb

- Weather system that becomes Gabrielle first noticed

Saturday 11th Feb

- Port cleared. Vessels required to leave

Monday 13th Feb

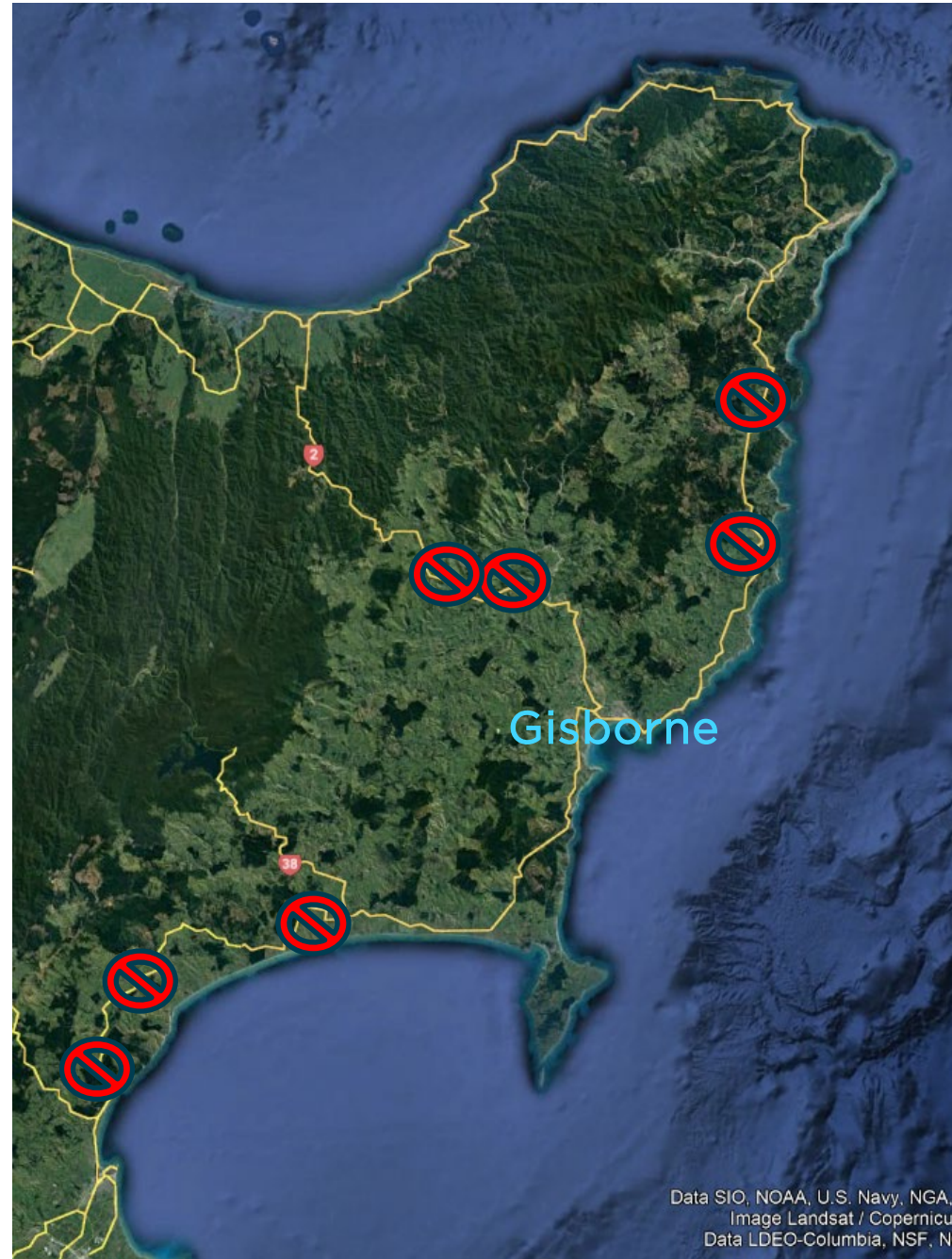
- Local State of Emergency declared
- First reports of flooding
- First sewer system overloaded in Gisborne city
- State Highways begin to close
- First power outages
- Local roads closed
- Widespread power outages
- Gisborne isolated, no road access
- Telemetry data beginning to fail
- Residential evacuations begin
- City water supply severed

Tuesday 14th Feb

- Communications cable severed, comms networks begin to rapidly fail
- Nation State of Emergency declared
- At 1100
 - no internet, cell phones, eftpos or landlines comms
 - Critical water issues remain.
 - Power out across wider region.
 - Supermarkets and service stations closed.
 - Region cut off from Napier and Opotiki.
 - Welfare centres quickly fulling up.....

Cut off.....

- 3x state highways into Gisborne were all closed by significant failures
- No way physically in or out of Gisborne by land and no quick fix to many of the failures
- No communications across region



SH2 - northwest



SH2 - south



SH35 - north



What did we learn?



1. He tāngata, he tāngata, he tāngata

- #1 look after your people
- Don't underestimate the emotional toll it will take on them
- Keep an eye on H&S
- Marathon, not a sprint



2. Empower your people

- Let them get on with getting your lifeline asset operational
- Give them permission to help their community
- Daily 8am meetings



3. Be ready to be agile

- First as a lifeline asset
 - Navy brought in fresh water and supplies
 - Chartered MV Rangitata to move containers
- And then, as a business keeping people busy with prolonged reduced trade



4. Maintain a level of self-sufficiency

- Fresh water reservoir
- Generators
- Starlinks aren't plug and play
- Cash is king \$\$\$\$
- Fuel reserves
- EV's??
- Battery radio's



5. Plan to recover quickly

- What are you likely to need to assess to get operational?
- Who is coming to help you that isn't affected themselves?



Final thoughts



Climate change will present itself through the local situations you are used to seeing and dealing with.

However, these situations will be worse and occur more often than you are used to.

Put processes in place to prepare for these and look after your people.