

COASTAL CONVERSATIONS

A wide-angle photograph of a coastal landscape. In the foreground, a dark, pebbly beach stretches from the bottom left towards the right. The ocean is a deep blue with white-capped waves breaking onto the shore. In the background, a prominent cliff face with light-colored rock and patches of green vegetation rises from the beach. The sky is a clear, bright blue with a few wispy clouds near the horizon. The overall scene is bright and clear, suggesting a sunny day.

GORE BAY

Summary

Phase 1

- **WHAT IS HAPPENING?**

Phase 2

- **WHAT MATTERS MOST?**

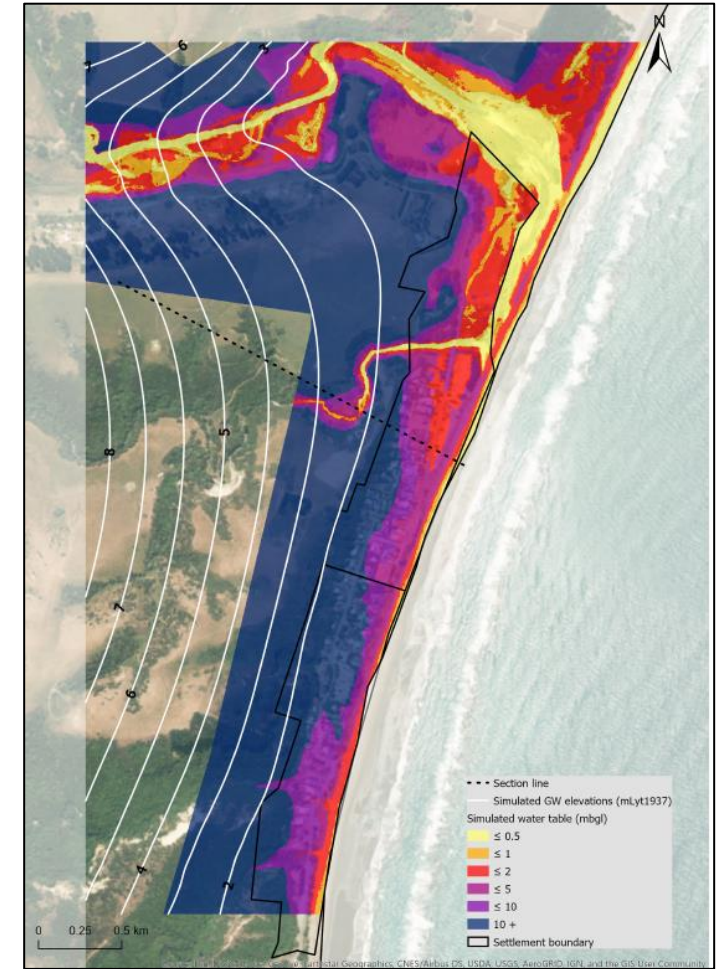
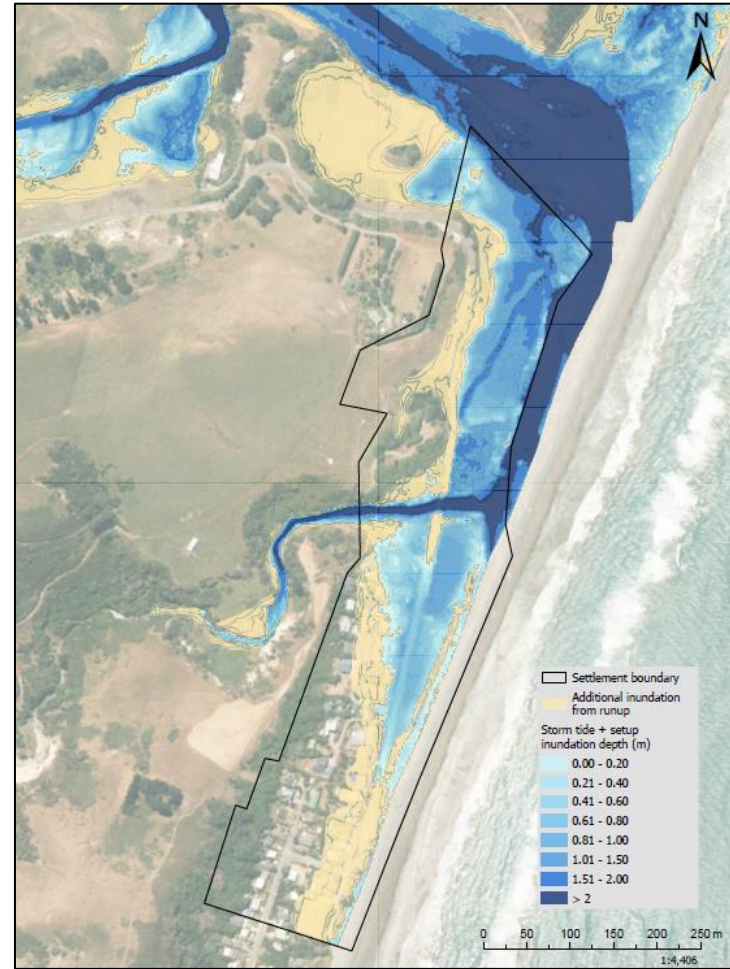
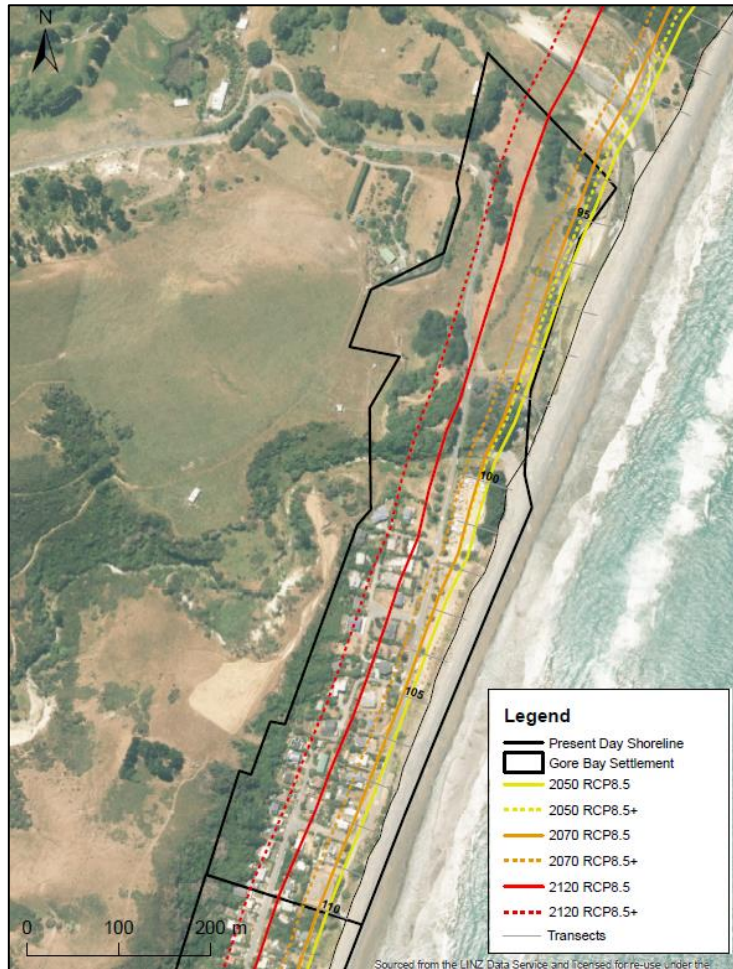
Phase 3

- **WHAT CAN WE DO ABOUT IT?**

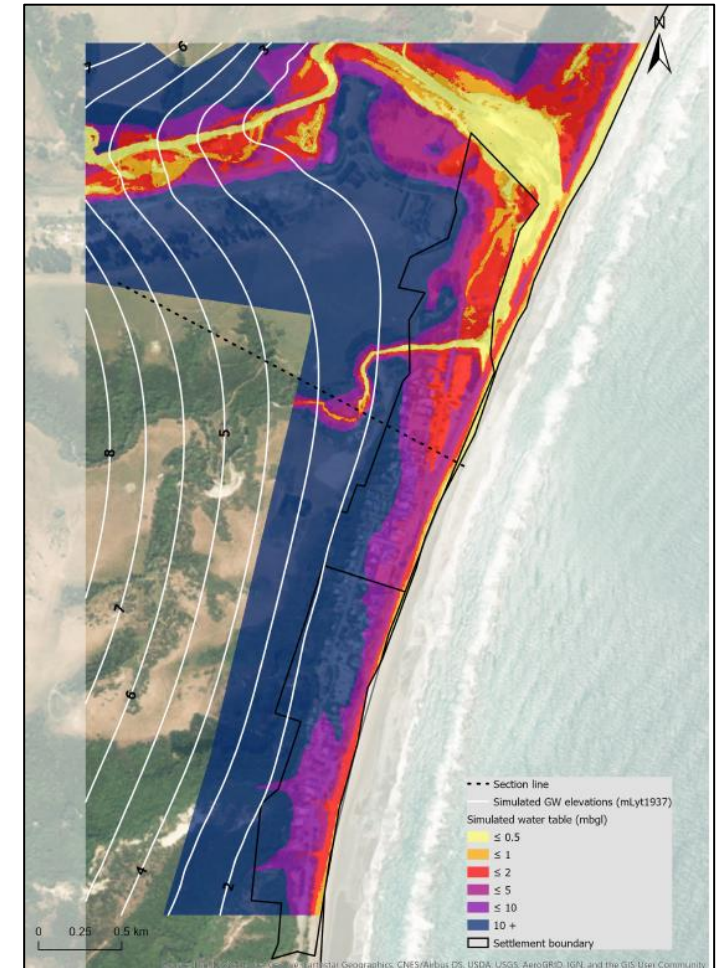
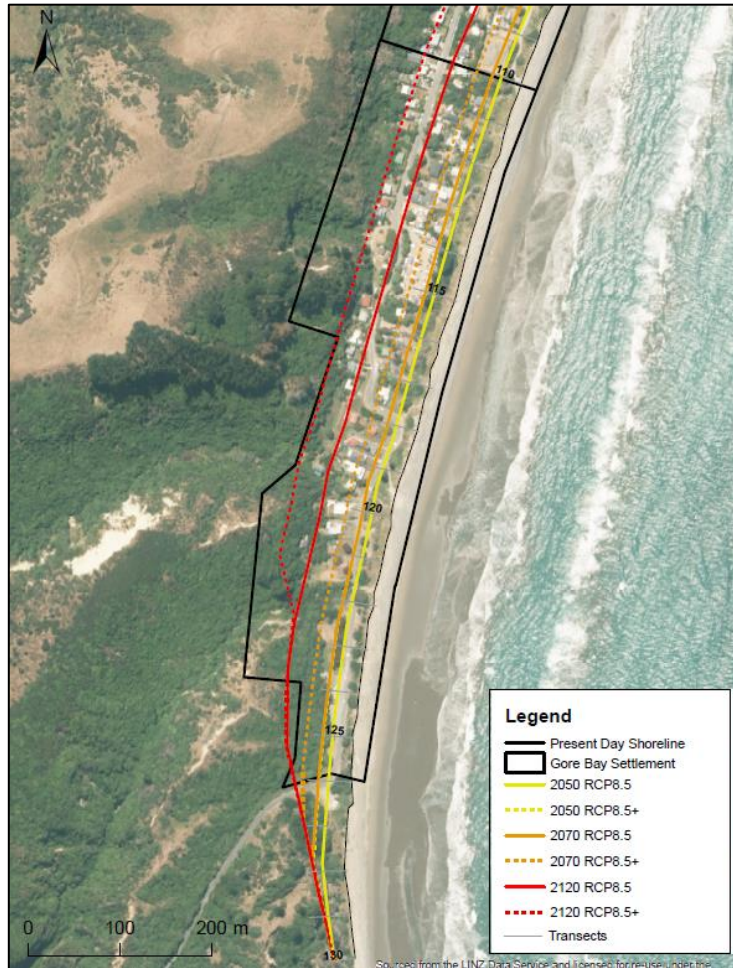
Phase 4

- **HOW CAN WE IMPLEMENT THE STRATEGY?**

Phase one: What is happening?

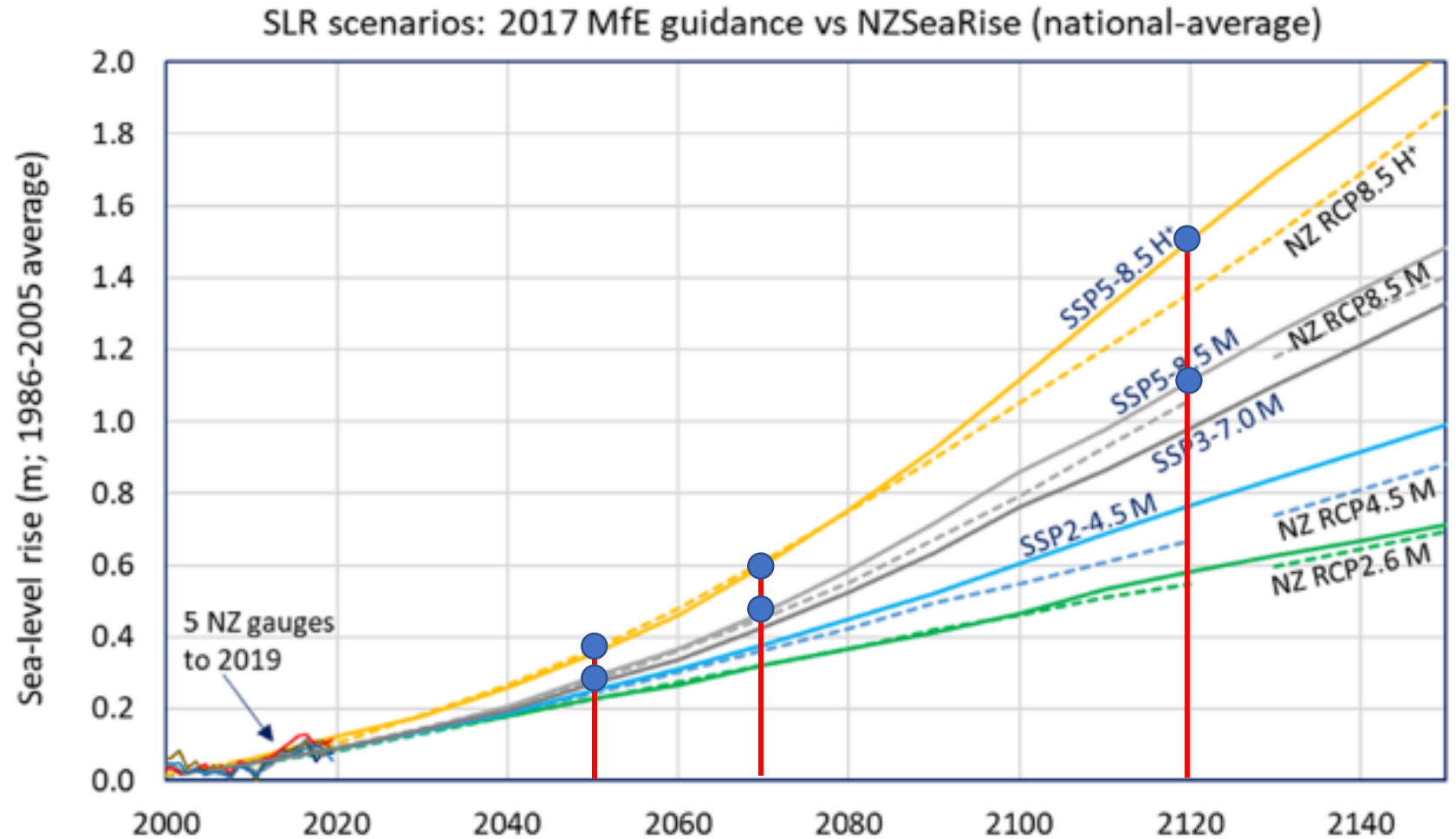


Phase one: What is happening?

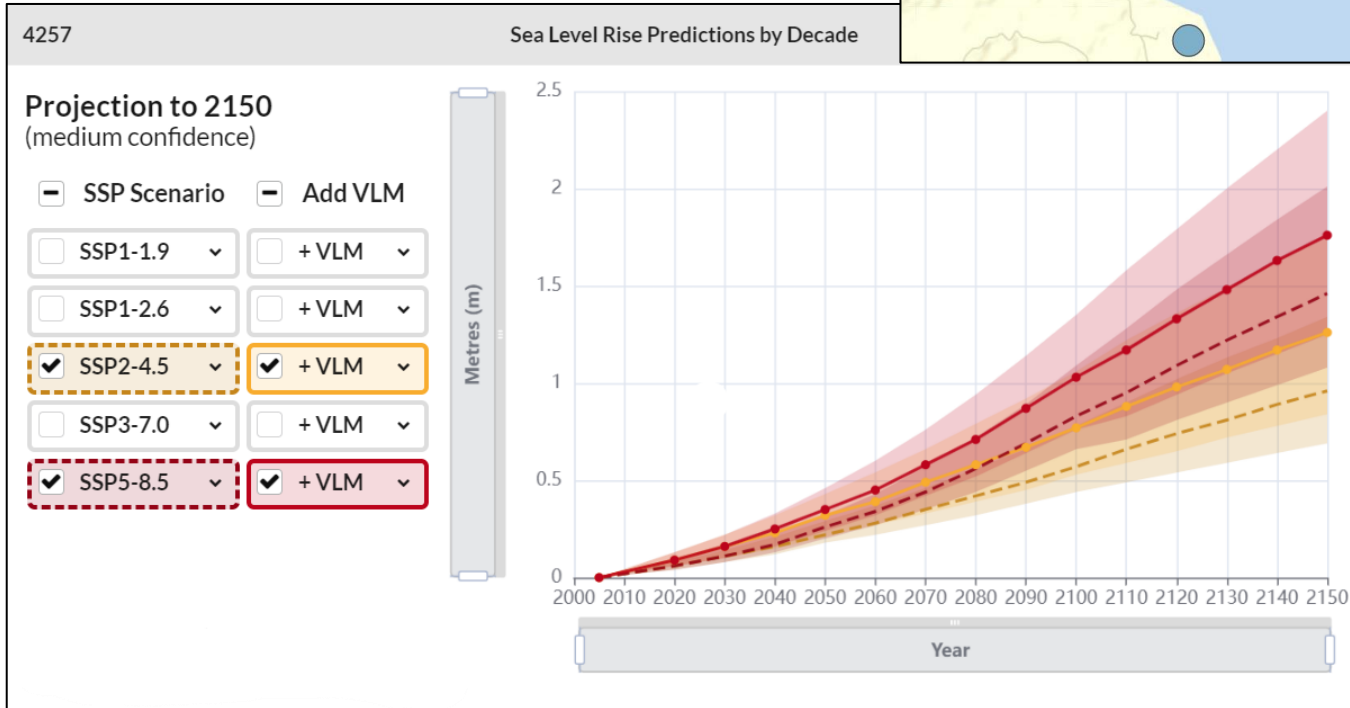
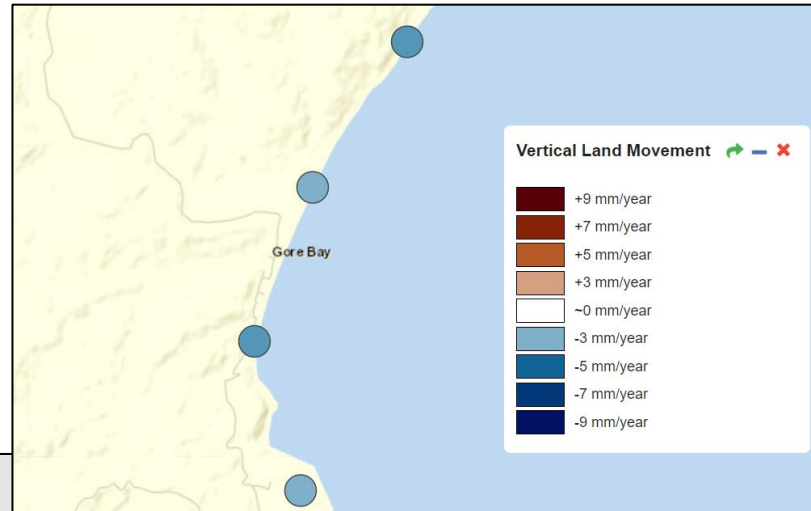


Phase one: What is happening?

Figure 1: Comparison of new NZSeaRise projections with 2017 coastal hazards guidance projections from 2000 to 2150



Phase one: What is happening?



Phase one: What is happening?



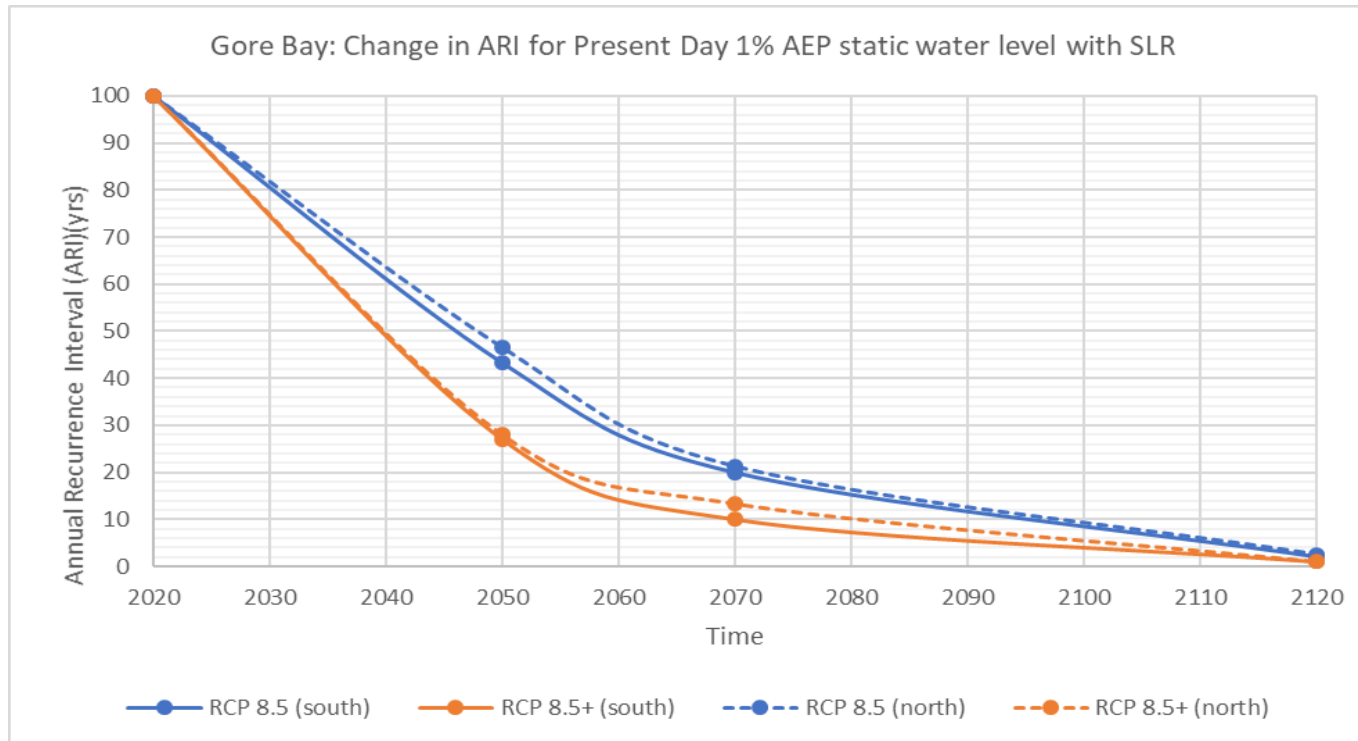
Looking north in the early 1930s



Looking south before the school was built

Phase one: What is happening?

Increase in Frequency of 1 in 100 Year Events with SLR



1 in 100 year event could occur every:

- 30-45 Years by 2050
- 10-20 Years by 2070
- 1-3 Years by 2120

Phase two: What matters most?

What I value most

1 — the most important to you.
2 — the nice to have but not essential to you.
x — the things that aren't that important.

Visual appearance of my settlement
 Cultural or historical significance
 Feeling of being on holiday
 No flooding on access roads
 Family connection with the area
 Existing trees and vegetation
 Recreation trails
 Fishing opportunities
 No flood water in my house
 No flood water on my property
 Ability to get insurance for my house

Who I live next to
 Smell or sound of the ocean
 Birdlife
 Drinking water security
 Community feel
 Physical access to beach
 Uninhibited vehicle access to my property
 Easy walking distance to beach
 Ability to dispose of wastewater
 Space on beach to play and enjoy

I also value... _____

COASTAL CONVERSATIONS
The environment is changing, how will you?

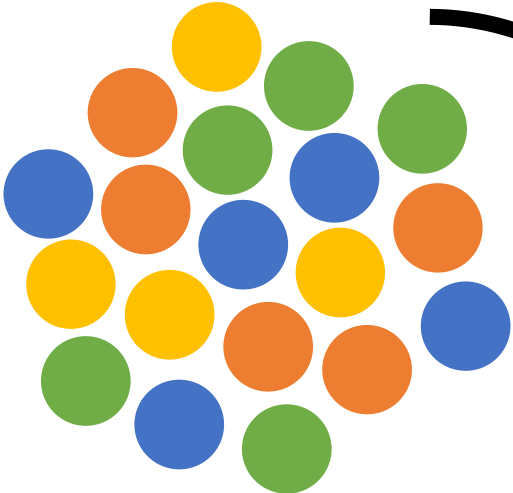
HURUNUI
District Council

Draft objectives:

- *Ensure houses remain insurable and serviceable.*
- *Protect the natural environment and biodiversity this supports.*
- *Maintain uninhibited vehicle access to the settlement and individual properties.*

Phase three: What can we do about it?

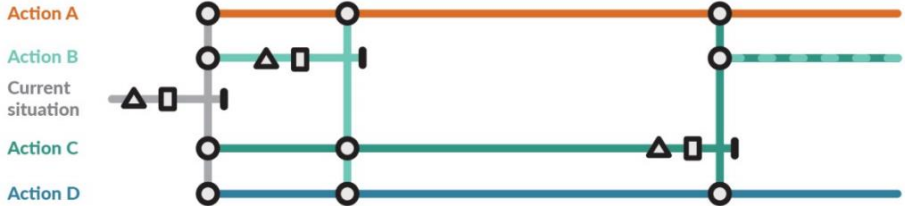
Long list of options



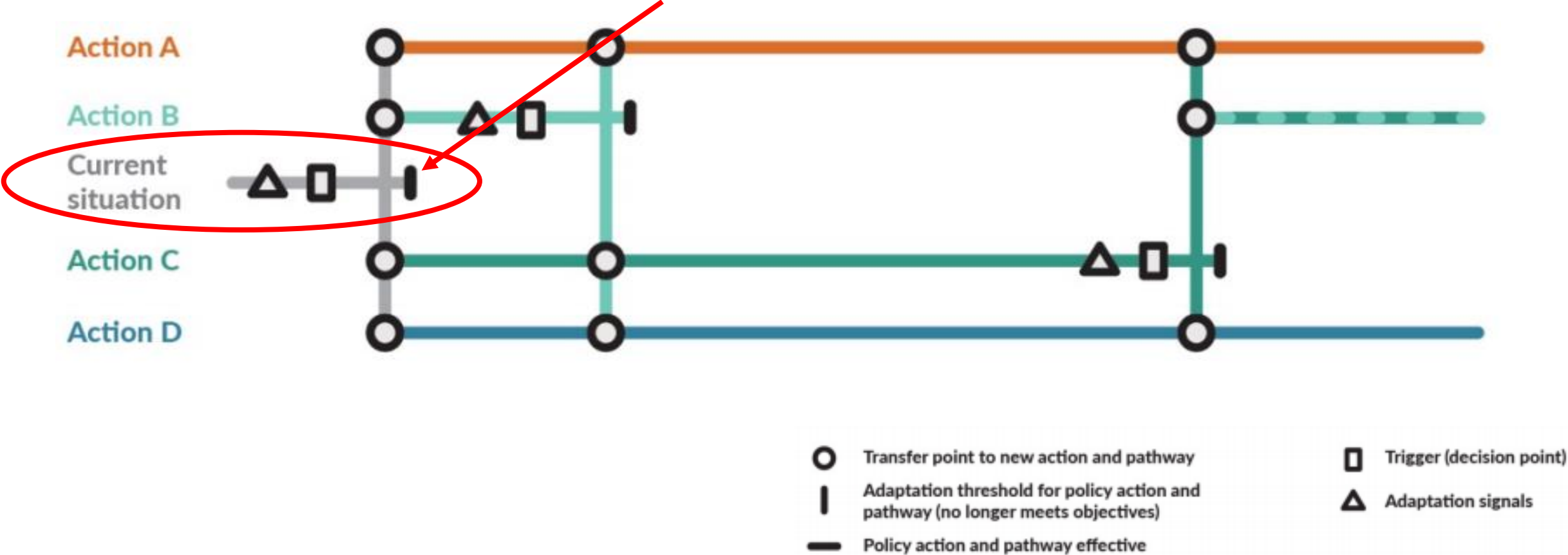
Short list of options



Proposed adaptive plan

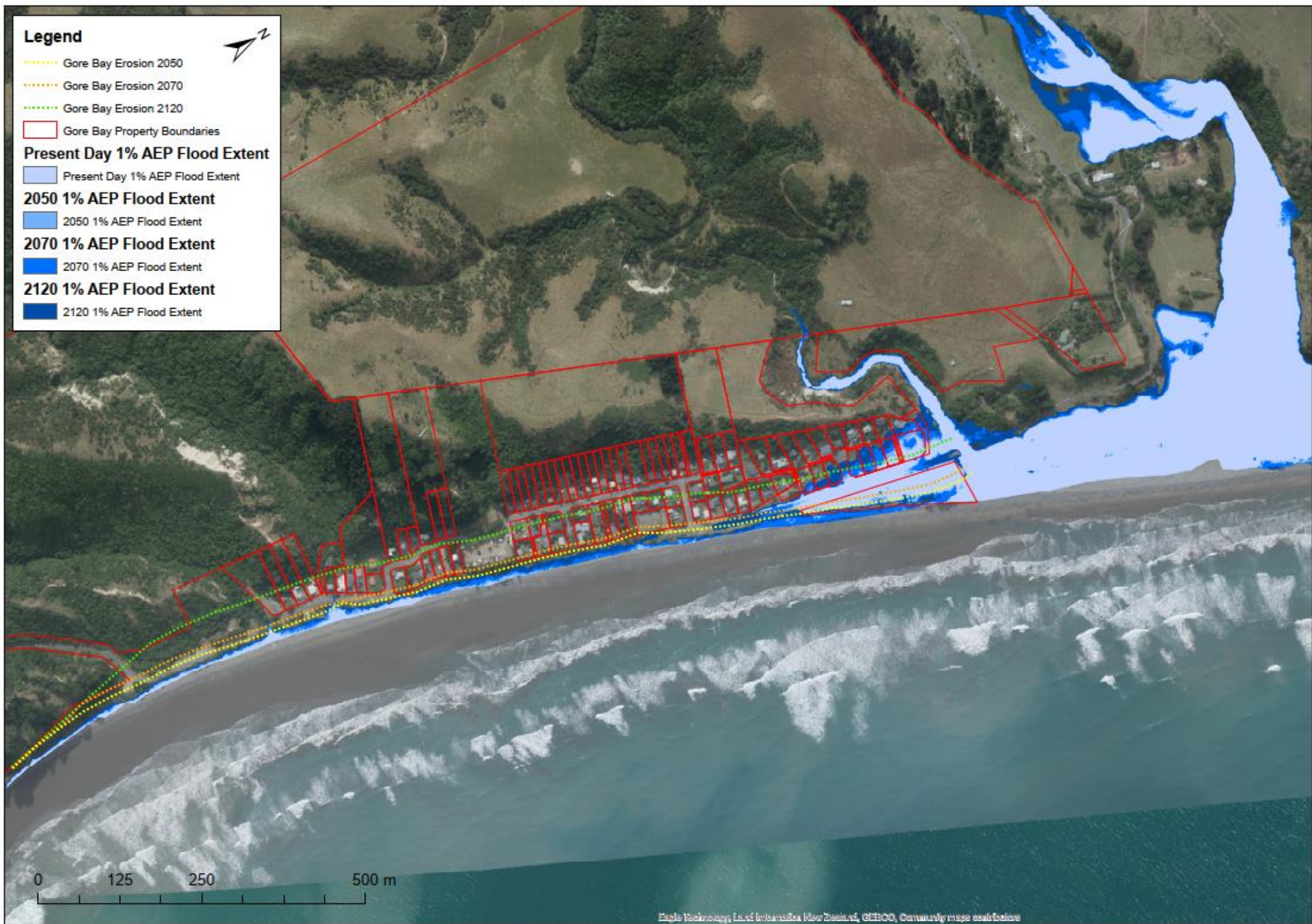


Phase three: What can we do about it?



Gore Bay Short-listed Protection Options

Engineering and Planning Options



Short-listed Options for Gore Bay

Engineering (hard/soft) Options:

1. Dune and behind beach vegetation enhancement – Northern Settlement (500 m)
2. Beach scraping on seaward side of beach (whole 1.3 km of settlement frontage)
3. Rock revetment (400 m along Cathedral Road and 300 m along Gore Bay Road)
4. Interlocking concrete seawall (400 m along Cathedral Road and 300 m along Gore Bay Road)
5. Raising floor levels
6. Waterproofing buildings

Planning Options

7. Maintaining District Plan
8. Avoid future development
9. Relocatable buildings
10. Managed retreat (incremental)
11. Managed retreat (community)

Dune and behind beach vegetation enhancement

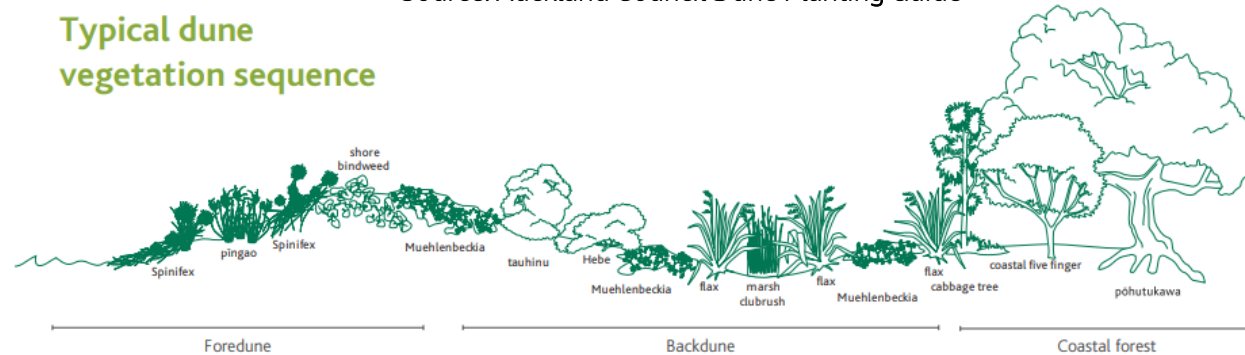


Description:

- Potential short-term option to reduce storm erosion at the northern end of the settlement and help protect the road.
- Not recommended along Cathedral Road at the southern end of the settlement as it is understood that community attempts to enhance back beach planting along this section has not been successful due to a lack of beach width and elevation resulting in plantings frequently being washed out by wave run-up.
- Potential to be a community-led project and reduce the cost.
- Approx \$40,000

Source: Auckland Council Dune Planting Guide

Typical dune vegetation sequence



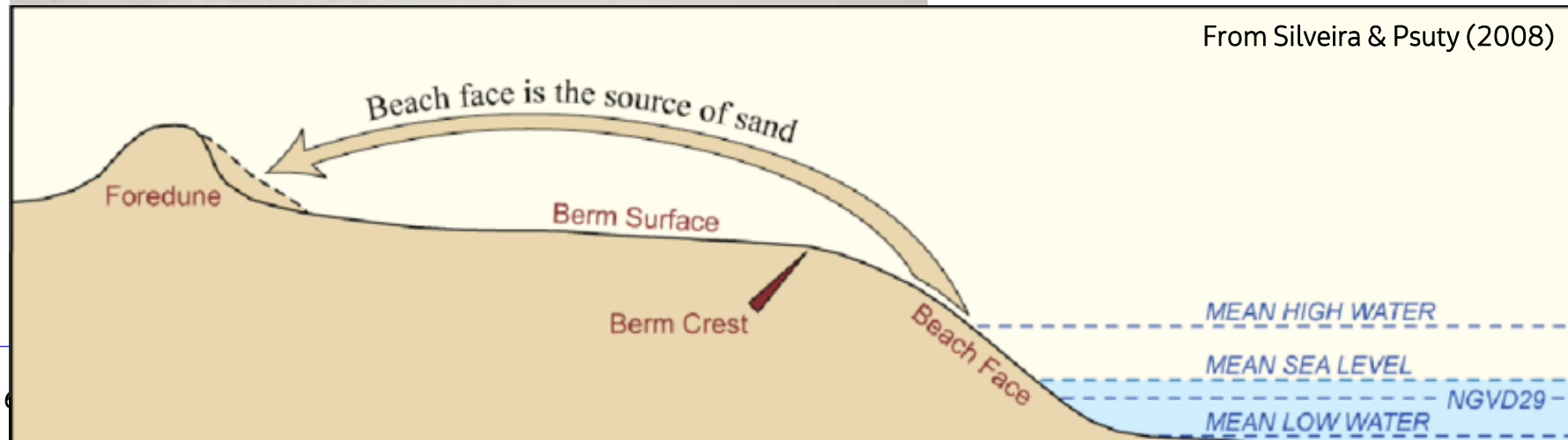
Beach scraping on seaward side of beach (whole 1.3 km of settlement frontage)



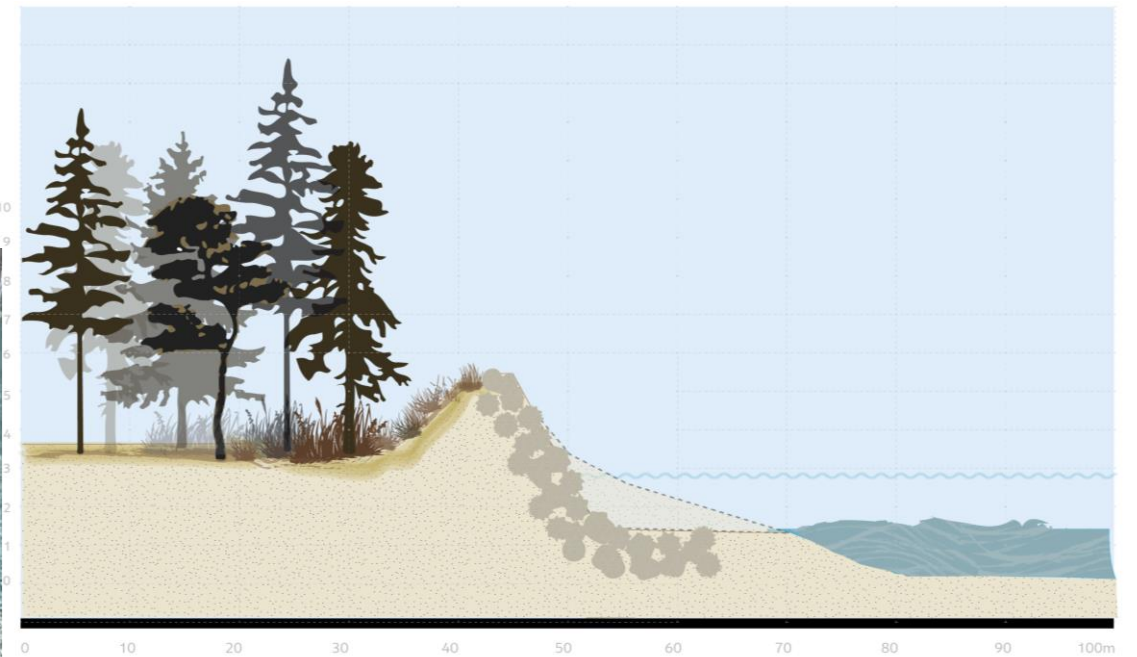
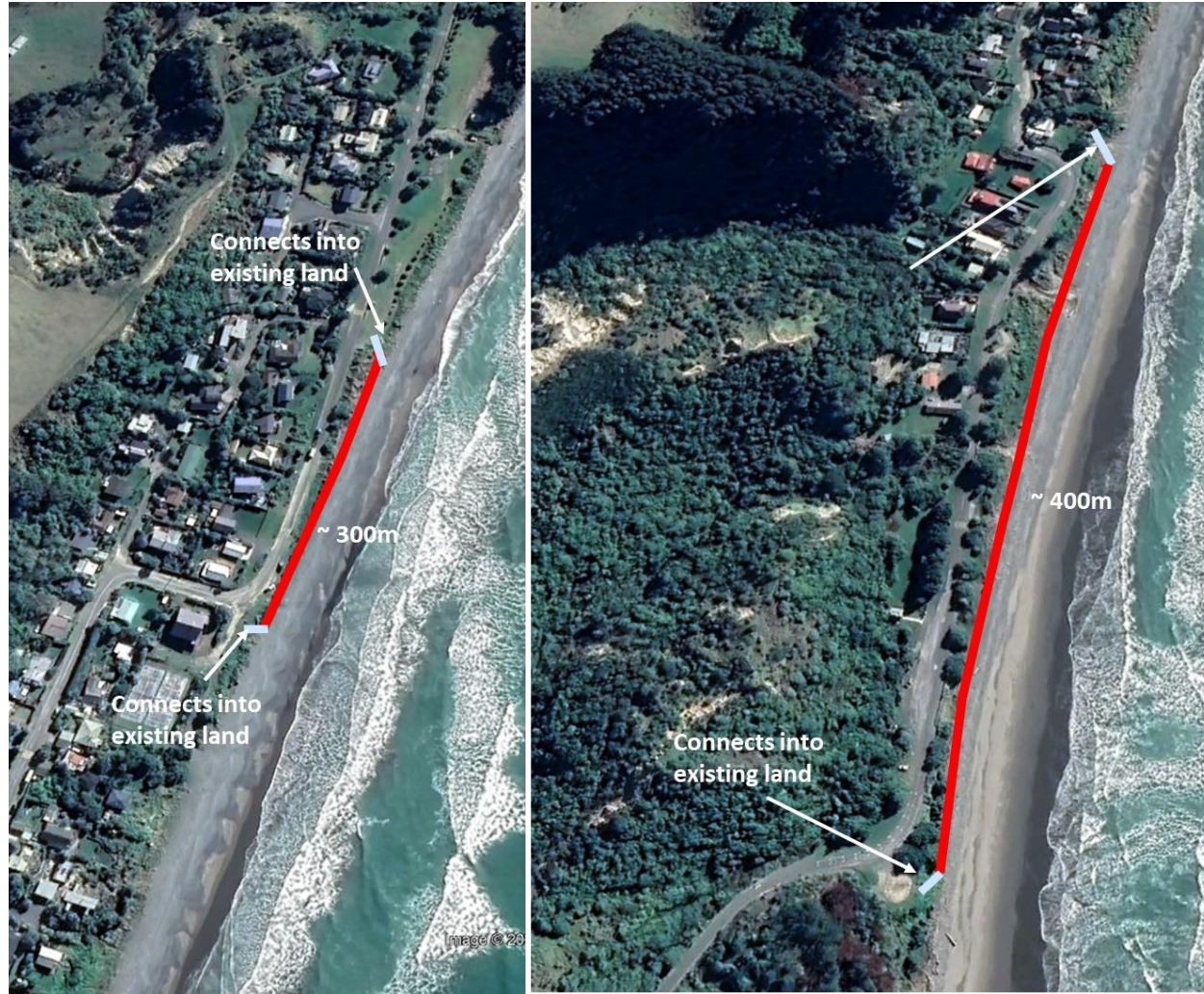
From Voice of Byron (2017)

Description:

- A short-term soft engineering approach of periodic beach scraping by bulldozer involving relocating beach sediment from the foreshore to the crest to build up the crest elevation and backshore volume of the beach profile to provide better storm protection.
- Could be applied to whole beach frontage of the settlement (1.3 km Cathedral Road to Buxton Creek) on an as required basis when there is a lack of volume on the upper beach, and a surplus of sediment on the foreshore.
- Approximately \$100,000 each time, likely to be needed every 5 years.



Rock revetment



Description:

- A medium-term protection option of placed armoured rock to a designed slope and crest elevation to (1) protect the elevated bank edge from erosion at its toe, and (2) reduce wave overtopping with SLR over a 50-year period (present day + 0.5 m SLR).
- The revetment would be sloped against the current bank, with sufficient rock size, core material and area of land behind to adapt the structure to increase the structure to protect for higher levels of SLR if required.
- The revetment restricted to protecting key access roads for 400 m along Cathedral Road and for 300 m along Gore Bay Road
- Approximately \$12 million

Interlocking concrete seawall



Description:

- A medium-term protection option of interlocking concrete units forming a vertical or tiered seawall up to a designed elevation which could (1) protect the elevated bank edge from erosion at its toe, and (2) reduce wave overtopping with SLR over a 50-year period (present day + 0.5m SLR).
- The wall would be located against the current bank, and could be adapted to protect for 100 years of SLR (present day + 1 m SLR) if required.
- Approx \$7 million



Raising Floor Levels



- Raising the floor levels of the house to protect the interior and its contents from damage in a flood event.
- It was estimated that the cost of raising a house may be up to the ratings cost of the house (Capital RV of the house)

Waterproofing Buildings



- localized bunds or walls, modification to stormwater networks, using waterproof materials (e.g. membranes), or providing on site storage around individual buildings.
- Approx \$50,000 per household



Planning Options

- **Maintaining District Plan**
 - Based on the natural turnover of houses being rebuilt to district plan flood levels
 - Low cost
- **Avoid future development**
 - Does not protect existing development, but prevents an increase in assets within the hazard areas.
 - Low cost
- **Relocatable buildings**
 - All new development must be built to be relocated in the future
 - Low cost
- **Managed retreat (incremental)**
 - Properties retreated as the hazard reaches their property
- **Managed retreat (community)**
 - All community is retreated together once threshold is reached (e.g. loss of road)

Coastal Hazard Adaptation Simulation

Gore Bay adaptation pathways

Aims of the simulation exercise for Gore Bay

- Arrange hazard response options over time to address changing coastal hazards at Gore Bay
- Explore different pathways of responses to achieve objectives
- Feedback on performance, cost, benefits and other impacts of options
- Promote discussion on how Council and community will develop adaption pathways
- Not intended that a preferred pathway of adaptation for Gore Bay be developed today

Overview of today's simulation exercise

- Outline of the changing flood and erosion hazards
- Overview of options available
- Choose a starting option and then subsequent options based on its performance
- Repeat and explore alternative pathways



Objectives for Gore Bay coastal hazard management

Council/community objectives for Gore Bay	Adaption simulation measurable objective
Ensure houses remain insurable and serviceable	Number of properties (land parcels) at direct risk of erosion at different sea level rise amounts over time Number of properties (land parcels) at risk of flooding in a 100yr flood
Protect the natural environment and biodiversity this supports	Not measured in simulation as more intangible – discuss through other criteria
Maintain uninhibited vehicle access to the settlement and individual properties	'Critical Roads' affected by erosion at different sea level rise amounts over time.



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Reinventing tomorrow.



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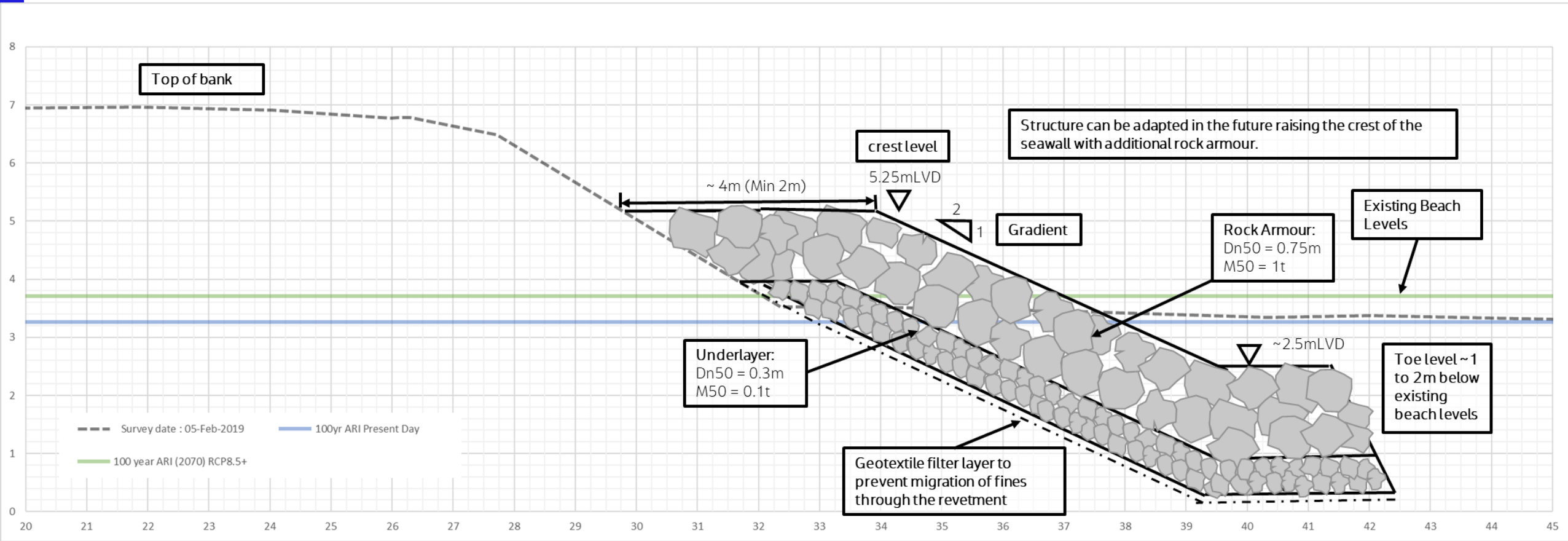
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Gore Bay Rock Revetment Concept – Southern Section



Crest height should prevent severe overtopping during future 50 year conditions, but could experience damaging overtopping as sea levels rise further into the future