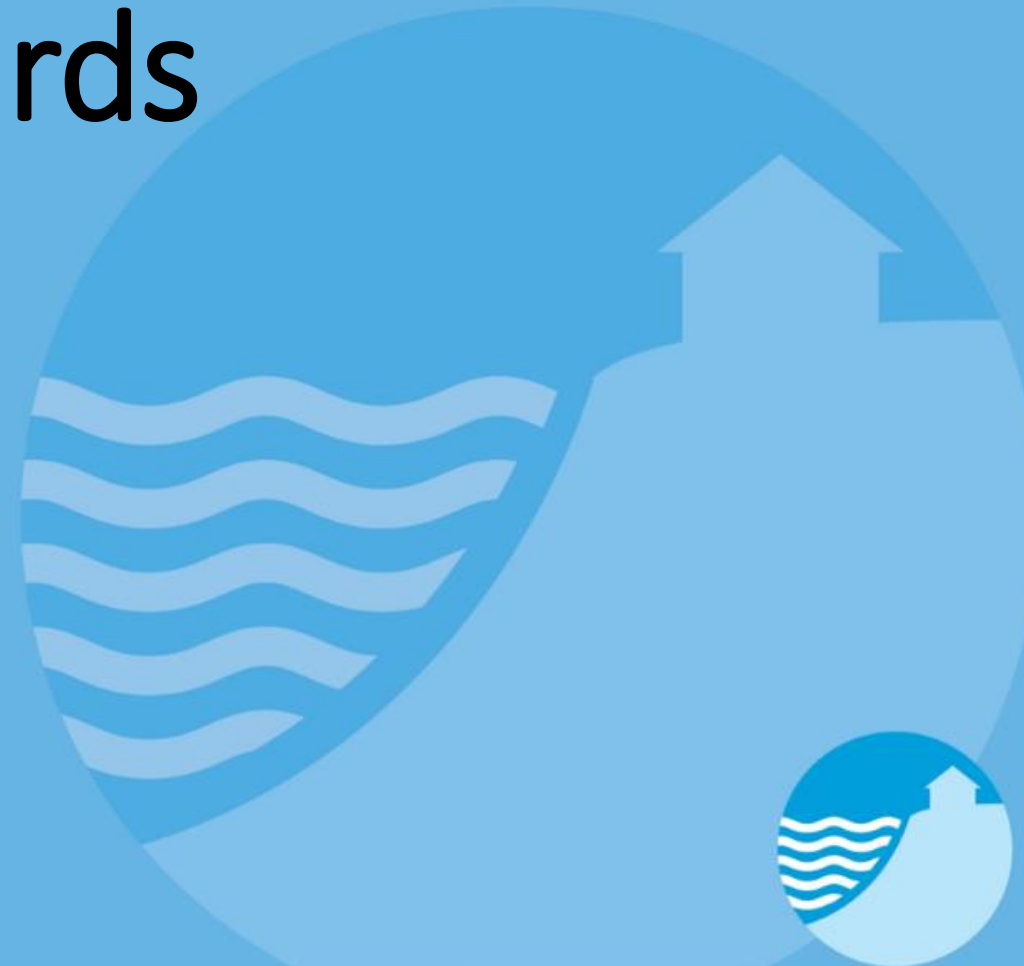
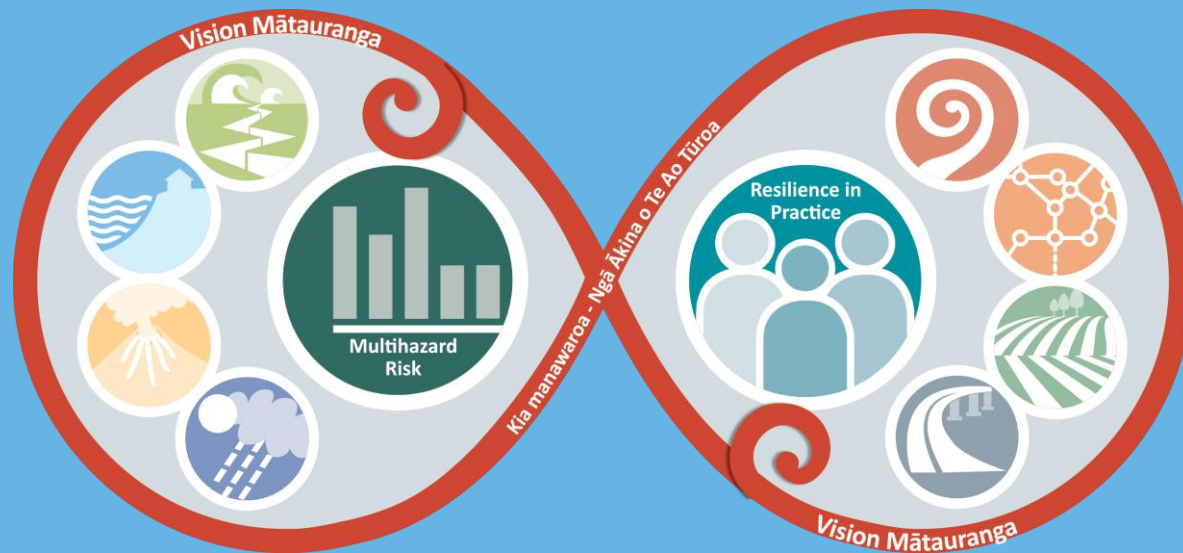


Adapting to New Zealand's Dynamic Coastal Hazards

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Coastal

Our Goal, in the context of slow onset coastal hazards from SLR



To construct a national approach to adaptation by developing new coastal hazard/risk science solutions - partnering with stakeholders nation-wide



Coastal

Our work programme

1. NZ's Changing Coastline

Smart coastal change detection

- National-scale analysis of physical coastline change
- Semi-automated shoreline change detection
- Erosion hotspots identified
- Publicly accessible data

Understanding NZ's coastal change

- Resolving coastal change drivers (sea level, sediment budgets, human impacts, vegetation)

Supporting coastal change projections

- Right model for the right location
- Quality data inputs
- National-scale resolution

2. Coastal Flooding

Estuarine flooding predictors

- Machine-learning flood predictions where monitoring & modelling not easily available

Human-climate interactions and flood risk

- Resolving the influence of structures and eco-defences on storm surge and flooding
- Numerical modelling, including human behaviour
- Technical guidelines

Compound risk

- NZ's first integrated coastal modelling framework for multiple hazards (erosion, inundation, rising groundwater)

3. Coastal Adaptation

Coastal risk and vulnerability exposure

- National-scale exposure analyses of coastal erosion and flooding
- Demographics & marae

Coastal vulnerability assessment

- Framework to assess vulnerability (including adaptive capacity)

Proactive implementation of adaptation

- Planning policies/rules
- Guidance for monitoring changing risk
- Governance enablers for managed retreat
- 'Fit for purpose' economic evaluation tools for coastal adaptation options

Versatile adaptation of coastal infrastructure (e.g. road networks)

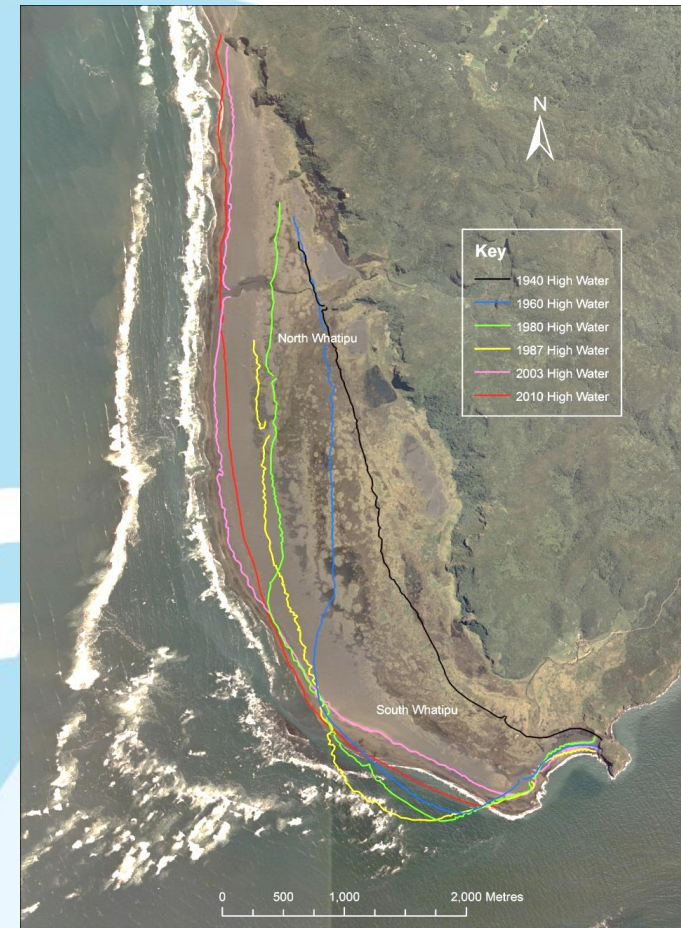
Fit-for-purpose enablers and guidance for adaptation

Strong linkages across RNC2 including: Mātauranga Māori (1-3), Urban (1), High Impact Weather (1-3), Multi-Hazard Risk (1-3), Built (1-3), Resilience in Practice (3).

Pillar One – NZ's Changing Coastline

Develop a national framework for assessing NZ's changing coastline

- Transform NZ's coastal change detection from small-scale, sporadic, manual and unselective monitoring, to **multi-scale, near real-time, semi-automated shoreline detection and change analysis**
- National coastal change database with erosion "hotspots"
- Explore the underlying **causes** of NZ's observed coastal change to support future projections of coastal change



Pillar Two– Coastal Flooding

Improve understanding of current & future coastal flooding hazard and risk

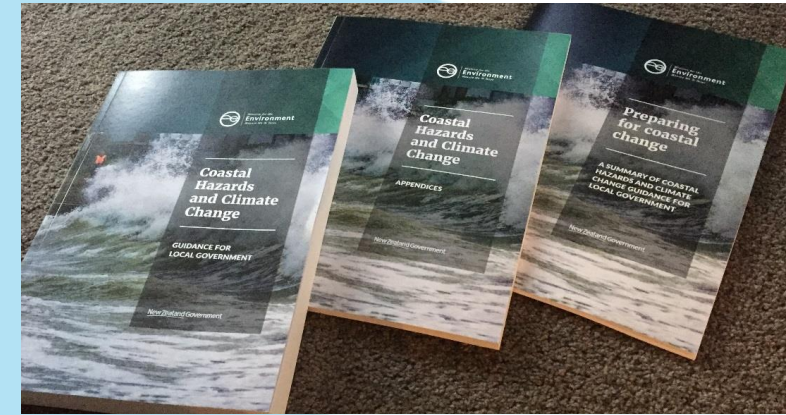
- Characterise **open-coast and estuarine/river flooding** now and in the future on a national-scale
- Understand the role of natural and human modifications to the coast on coastal flood hazard
- **Refine future flooding predictions** e.g machine learning approach
- Apply a multi-hazard modelling framework to account for combined hazard risk (erosion, overtopping, storm surge and groundwater)



Pillar Three– Coastal Adaptation

Enable proactive coastal adaptation in a changing risk environment

- Improve understanding of **coastal risk and vulnerability exposure**
- Develop a **future-focused vulnerability assessment framework** that deals with changing risk profiles
- **Develop a suite of adaptive approaches (plans, guidelines, governance enablers, DAPP tools) for implementing coastal adaptation options** tailored to local conditions
- Versatile approaches to proactively adapt coastal roading networks (with the Built Environment Theme)



Summary

RESILIENCE
TO NATURE'S
CHALLENGES

Kia manawaroa –
Ngā Ākīna o
Te Ao Tūroa

Working closely with end-users, this theme will develop and implement new, nationally consistent & useful approaches to tackle NZ's current and future coastal hazards and their rising risk