

Coastal adaptation and managed retreat

Attention is being given to how managed retreat from the coast can be achieved as rising seas will make some coastal communities unliveable

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SINCE 2010, the New Zealand Coastal Policy Statement has directed central and local government to identify coastal hazards and to avoid growing risk from them over the next 100 years. This requires councils to take a precautionary approach to coastal erosion and flooding from sea-level rise and storms.

Exposed to accelerated sea-level rise

However, there is a huge legacy of buildings, infrastructure and people located at the coast as sea-level rise advances and our climate changes. The regions most exposed in the near term from accelerated sea-level rise includes Hawke's Bay, Wellington and Canterbury, while in Auckland, Waikato and Bay of Plenty, exposure increases at a constant rate in response to sea-level rise.

The pressure to supply more housing stock comes on top of these existing pressures, and many more houses have been built in low-lying areas near the coast. These are



King tide at Ohiwa Harbour, Bay of Plenty.

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increasing in value as the sea continues to rise and as wastewater, stormwater and water supply services are becoming threatened.

Managed retreat given serious attention

Planning approaches to date have focused on structural protection such as seawalls or other adaptations such as removable

buildings, which are likely to become ineffective in many locations due to physical and financial constraints. Further, such protection has entrenched risk by enabling an increase in assets and people exposed because of the false sense of security given to developers, councils, house purchasers and insurers.

Managed retreat is an adaptation option being given more serious attention. It can be planned over time to remove risk. However, it needs support and coordination to avoid inequitable outcomes, which is being addressed by the proposed new Climate Change Adaptation Act.

Managed retreat by whom and how?

New research from the Resilience Challenge's Resilience in Practice programme - *Managed retreats by whom and how?* - describes the spectrum of governance approaches to managed retreat and recommends an approach most likely to reduce risk and promote justice.

Authors Dr Christina Hanna and Professor Iain White of the University of Waikato and Professor Bruce Glavovic of Massey University say the proposed new legislation presents a significant opportunity 'but, as we have seen in Canterbury, Matatā and elsewhere, the way managed retreats are handled matters greatly to the people affected. For obvious reasons, retreats require difficult sacrifices for individuals, families and communities.'

At present, locally managed retreat interventions are risky - professionally, politically, financially, culturally and socially. 'The necessary planning frameworks and resources are seldom available to support effective and equitable outcomes.'

The research describes three approaches to policy for a spectrum of possible retreats:

- Government control - using legislation, standards, policies and regulations, central or local government to restrict certain developments or compulsorily acquire property to enforce retreat.
- Cooperative managed retreats - collaborative decision making and negotiation between government agencies and affected parties, using instruments such as opt-in buyouts, relocation subsidies or land swaps.
- Unmanaged retreats - individual choices influenced by factors such as loss of insurance cover and other market changes, decisions not to invest more in a property

or to sell it (potentially at a loss) or to remain in place and face the risk.

Which approach is best?

The authors conclude that facilitating cooperative managed retreats is preferable, meaning people and communities are embedded in the retreat strategy design, decision making and delivery.

A pioneering example demonstrating aspects of such an approach is the Clifton to Tangoio Coastal Hazards Strategy 2120, which trialled Dynamic Adaptive Pathways Planning (DAPP) - an assessment tool for developing adaptation options. This plan to manage Hawke's Bay's coastal hazards risks over the next 100 years was developed by local authorities, local stakeholders and mana whenua representatives.

A significant challenge for a cooperative approach is the question of who will pay for it. The authors advocate for a nationally consistent framework of cost allocation principles, clarity of cost-sharing responsibilities and funding support at the local level, concluding 'managed, co-operative and unmanaged retreats each have a role to play. But their associated practices and policy interventions must be strategically planned. To promote public safety, justice and equity, co-operation must be a central focus when managing the relocation of people.'

What about infrastructure?

Much of the public discussion on managed retreat has been about relocating buildings and people from areas of high risk, but what about infrastructure?

New research from the Resilience Challenge - *Preparing for sea-level rise through adaptive managed retreat of a New Zealand stormwater and wastewater network* - sets out a framework for mapping options to manage retreat of wastewater and stormwater infrastructure. It was led by master's student Rick Kool and supervised by Dr Judy Lawrence of Te Herenga Waka Victoria University of Wellington and Dr Rob Bell, formerly of NIWA.

'In many low-lying coastal areas, wastewater and stormwater infrastructure is located underground at the coast and is at risk from sea-level rise and increased frequency of heavy rainfall events,' says Kool. The research team used DAPP to understand how a retreat of the infrastructure could be managed by councils faced with maintaining levels of service as climate impacts worsen.

The decision-making framework was developed during a case study project at Petone, Lower Hutt, which is now available for use in coastal communities around Aotearoa New Zealand. This is said to be the first study to develop a framework for staging the pre-emptive retreat of stormwater and wastewater infrastructure, where ongoing sea-level rise is the primary driver. It was based on the research of another Victoria University of Wellington master's student, Sam Olufson, which deconstructed the components of a managed retreat for planning with DAPP.

What's next?

The Resilience Challenge's Coastal Adaptation project, led by Dr Lawrence, is now investigating how DAPP can be implemented under current legislative settings before new legislation is in place. This includes providing targeted guidance on how to use assessment tools that can support the long-term view required by the New Zealand Coastal Policy Statement.

These include economic assessment tools and monitoring frameworks and tools to alert decision makers of impending risks using signals and triggers.

The team of planners, economists, coastal geomorphologists, adaptive planning practitioners and social scientists are tackling this challenging research endeavour in association with central and local governments so that research outputs can be timely, targeted and relevant. ◀

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