

Designing with nature

Managed retreat is part of the design with nature approach that can reduce natural hazard risk and build community resilience and sustainability. It's contentious but should be considered in some areas.

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EXTREME EVENTS, the projected impacts of climate change and trends in urbanisation mean that more people are being exposed to natural hazard risks in the 21st century.

We can protect communities against some perils in the short to medium term, by building seawalls and improving early warnings. However, longer-term resilience and sustainability goals can only be achieved if we design with nature.

Managed retreat to become mainstream

The starting point is to avoid putting people and the things they value in harm's way. But when historical development is in high-risk localities, a design with nature approach highlights that we can move at-risk buildings, neighbourhoods and even towns.

This policy of relocation or managed retreat is not widely used and is highly contested. Given legacy development patterns and 21st century trends, we can



Shoreline erosion, Cape Palliser, in the Wairarapa.

PHOTO – JAY BAKER

expect managed retreat to become a mainstream policy approach soon.

Consequently, we must investigate the circumstances in which managed retreat becomes an option and determine how it can be implemented in a way that works for the communities at risk.

Natural hazard risk in New Zealand

In New Zealand, natural hazards are actively managed, but growing populations, land use change, development intensification and climate change impacts mean natural hazard risk appears to be increasing faster than it is being managed.

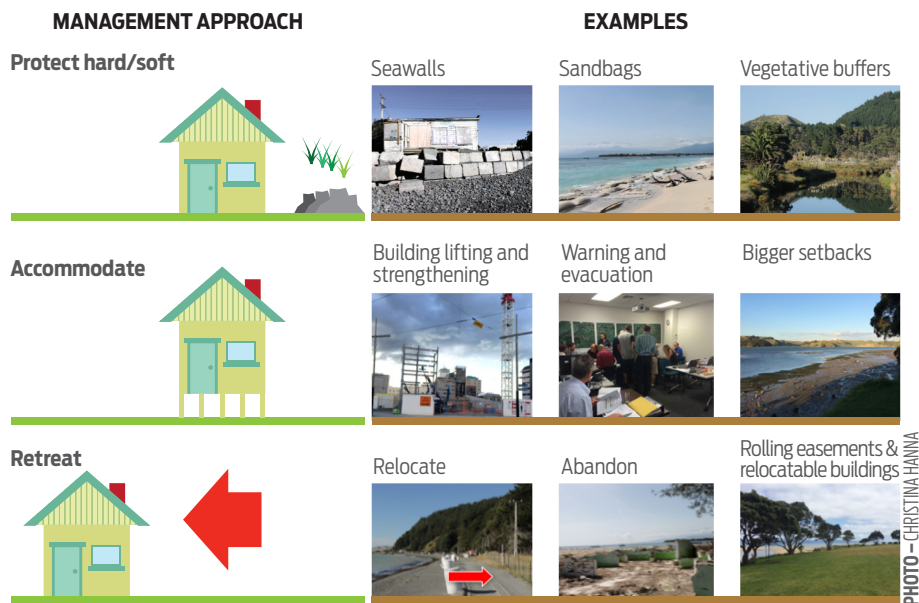


PHOTO – CHRISTINA HANNA

Figure 1: The suite of hazard management approaches.

According to the Ministry for the Environment, the anticipated impacts of climate change include:

- increased storm intensity
- small-scale wind extremes
- more thunderstorms
- stronger ex-tropical cyclones
- more frequent and intense winter rainfalls.

This will increase the potential for flash floods, and rising sea levels will increase the risk of erosion, salt water intrusion and coastal flooding.

Given these trends, many New Zealand communities will be progressively confronted by the perils natural hazards pose.

Protection measures have been common

In the past, the most common approach to managing natural hazard risk was to defend people and assets against the ravages of nature. However, in many circumstances protection works cannot provide environmentally acceptable, resilient or long-term economically viable solutions, especially when the effects of climate change are considered.

Also, when protection measures are put in place, it may encourage investment that increases the residual risk when the design standards of protective works are exceeded. Under these circumstances, designing with nature is a compelling approach for reducing disaster risk and building resilience and sustainability in New Zealand.

Design with nature approach

Ian McHarg's ground-breaking book *Design with nature* outlined persuasive ecological wisdom and practical steps for living in harmony with nature. It was foundational for landscape architecture, land use planning and geographic information systems (GIS).

His design with nature approach can be applied to reduce natural hazard risk and build community resilience and sustainability. For example, Hurricane Sandy would have caused significantly less damage if McHarg's principles had been applied in developing Staten Island in the US.

The starting point is to avoid putting people in harm's way. But what are ➤

the options when historical development patterns have resulted in exposure to natural hazard risk?

Some older developments at risk

Improvements in natural hazard mapping allied to the planning system have informed better land use decisions, enabling communities to avoid putting new development in harm's way.

However, much legacy development is already at risk and faces an uncertain future.

Managing natural hazard risk

The idea of managed retreat within hazard management and planning fields has evolved in this context. It can be defined as making space for natural processes and is a strategy for relocating people, assets and activities away from harm in a strategic manner.

It aligns, therefore, with McHarg's design with nature philosophy. Figure 1 shows how 'retreat' is considered one of the three key approaches for managing natural hazard risk, alongside 'protect' and 'accommodate'.

Protect

Protection can be hard or soft. Hard protection involves armouring assets to reduce the physical impact of hazards. Soft protection involves the enhancement of natural features such as coastal dunes to reduce the severity of erosion.

Accommodate

Accommodation involves living with risk and using measures such as warnings and building strengthening or lifting to react to, and buffer, hazard events.

Retreat

In contrast, retreat is an adaptive form of resource management, enhancing resilience by removing people and property from areas at risk, rather than working against nature to try and hold the line.

This approach involves designing with nature to relocate buildings or even

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settlements and can be implemented in many ways and across varying time scales.

Managed retreat can be an advantageous adaptation strategy because it:

- lowers risk to life and infrastructure
- increases the resilience and adaptive capacity of vulnerable communities
- protects environmental and amenity values
- can be a cost-effective option for hazard management with one-off costs that may avoid ongoing future maintenance and emergency management expenses.

Both nationally and internationally, managed retreat is becoming recognised as an important approach for reducing disaster risk.

However, it is not widely used in practice because of its sensitive and contentious nature.

Research looking at policy options

PhD research is being undertaken at the University of Waikato to understand how managed retreat could be implemented as a policy option in New Zealand. This is part of the Resilience to Nature's Challenges National Science Challenge.

The research is looking at what kind of risk profiles managed retreat could be applicable to and how it could be implemented

to work for communities, assets and the environment.

Sensitive issue

The idea that people, buildings and sometimes entire settlements can be relocated is challenging to accept, especially for those directly impacted by such a strategy. This is one of the reasons why this policy is seldom used.

There is a fear that relocation may be imposed on communities or that it may be used instead of building protective measures. Consequently, it is a very sensitive issue.

Focus on repeatedly hard-hit communities

There will be some communities who may welcome the opportunity to consider the approach. They may have to cope with repeated extreme events or may be faced with an escalating and potentially devastating peril, such as relentlessly rising sea levels. Eventually, this makes hard defences impossible to sustain.

It is here that the research is positioned to better understand the key issues and work with stakeholders to ascertain how a retreat strategy may be successfully implemented.

Given the uncertain and escalating nature of some natural hazard risks, relocation or retreat will be a policy choice that will eventually need to be considered by certain people and communities.

Exploring the managed retreat option

Should people living in vulnerable locations suffer the trauma and cost of repeated extreme events? Or is there an opportunity to reduce disaster risk and enable resilience by working with these communities to undertake managed retreat over appropriate scales and times? If so, how?

Over the next 3 years, we aim to better understand when managed retreat is an appropriate management option and how it could contribute to the wider risk management portfolio in New Zealand. ◀