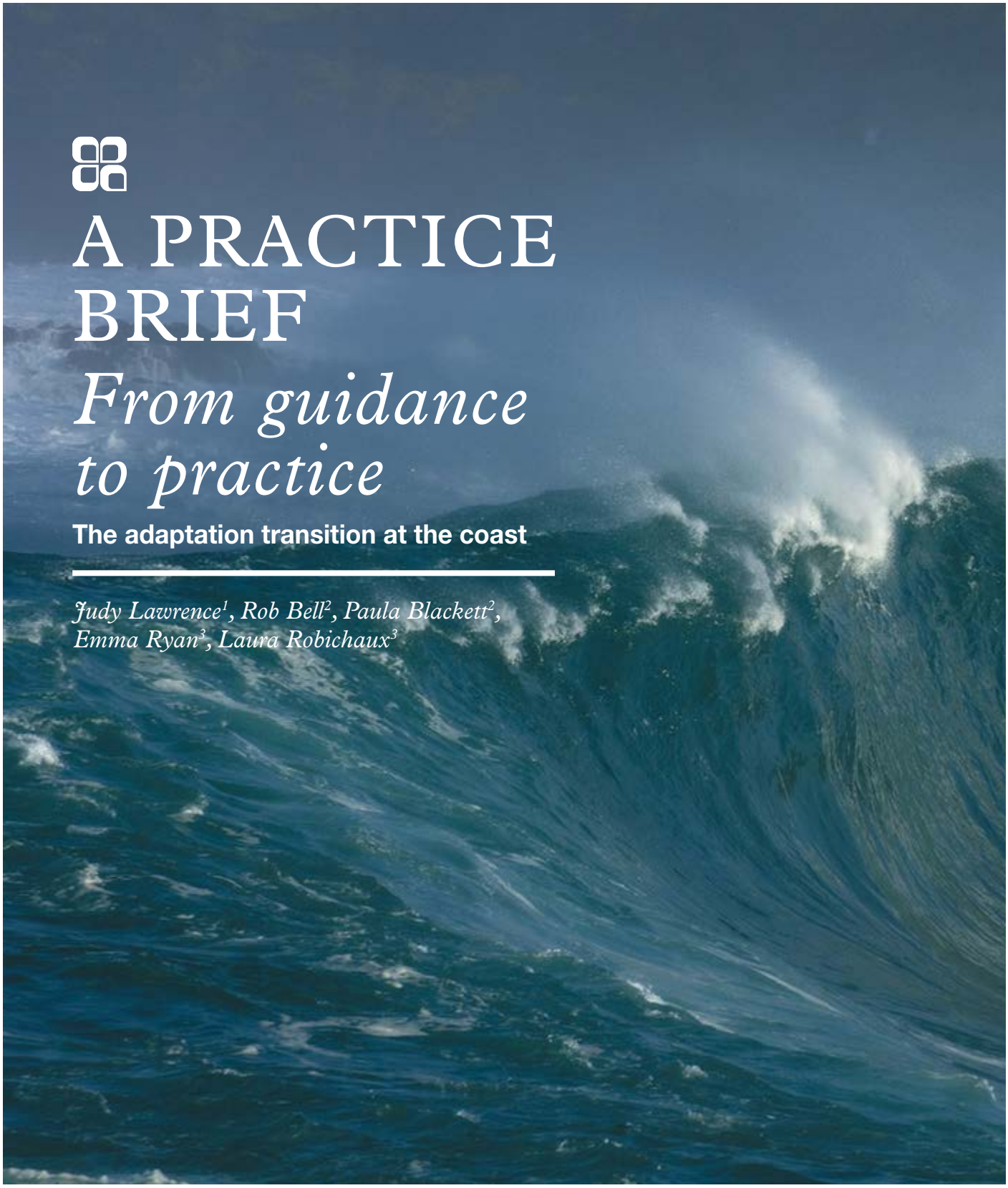
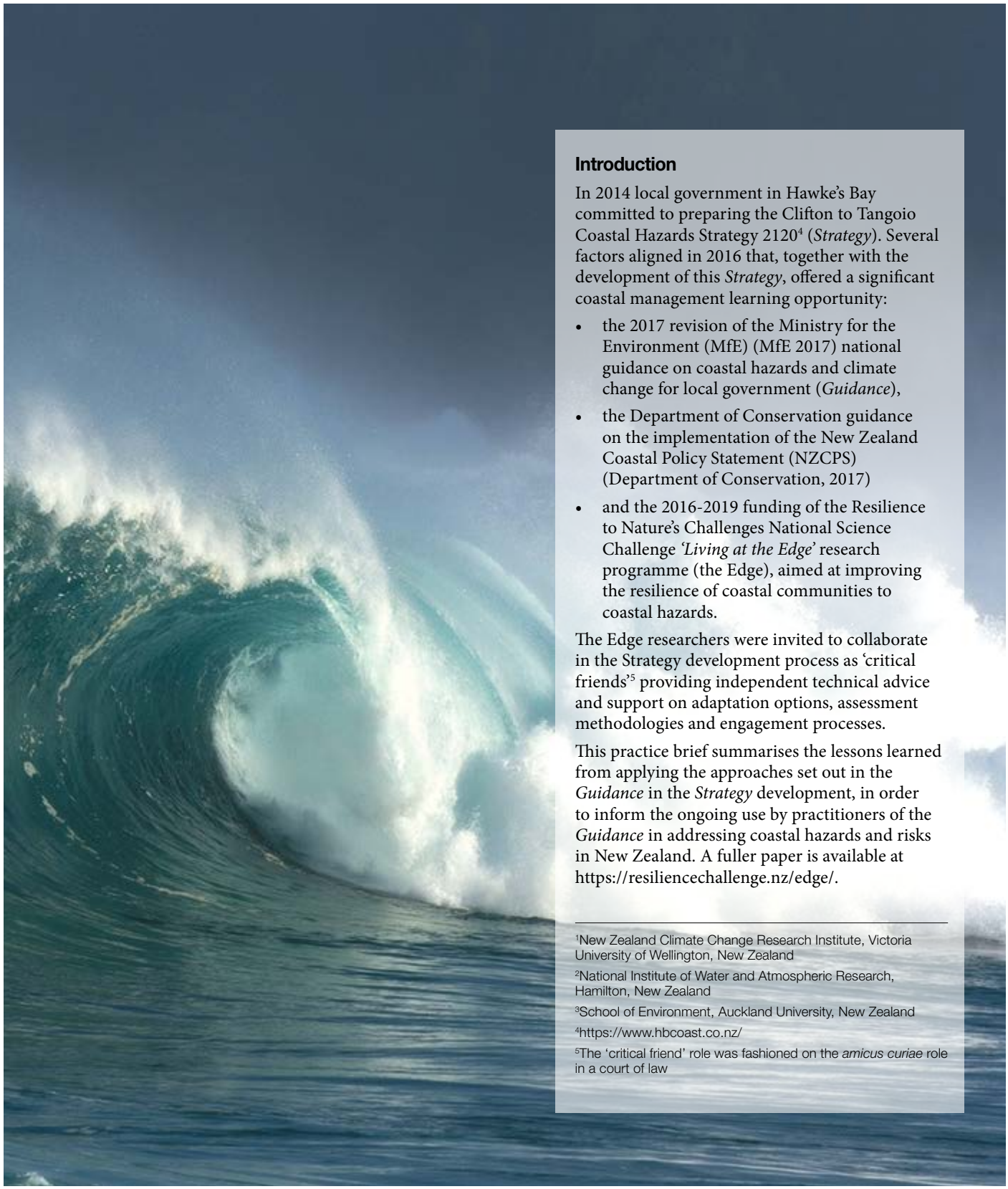


A PRACTICE BRIEF

From guidance to practice

The adaptation transition at the coast

Judy Lawrence[1], Rob Bell[2], Paula Blackett[2], Emma Ryan[3], Laura Robichaux[3]



Introduction

In 2014 local government in Hawke's Bay committed to preparing the Clifton to Tangoio Coastal Hazards Strategy 2120[4] (*Strategy*). Several factors aligned in 2016 that, together with the development of this *Strategy*, offered a significant coastal management learning opportunity:

- the 2017 revision of the Ministry for the Environment (MfE) (MfE 2017) national guidance on coastal hazards and climate change for local government (*Guidance*),
- the Department of Conservation guidance on the implementation of the New Zealand Coastal Policy Statement (NZCPS) (Department of Conservation, 2017)
- and the 2016-2019 funding of the Resilience to Nature's Challenges National Science Challenge *'Living at the Edge'* research programme (the Edge), aimed at improving the resilience of coastal communities to coastal hazards.

The Edge researchers were invited to collaborate in the Strategy development process as 'critical friends'[5] providing independent technical advice and support on adaptation options, assessment methodologies and engagement processes.

This practice brief summarises the lessons learned from applying the approaches set out in the *Guidance* in the *Strategy* development, in order to inform the ongoing use by practitioners of the *Guidance* in addressing coastal hazards and risks in New Zealand. A fuller paper is available at https://resiliencechallenge.nz/edge/.

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[4]https://www.hbcoast.co.nz/

[5]The 'critical friend' role was fashioned on the *amicus curiae* role in a court of law

Coastal risk and planning context in New Zealand

Low-lying coastal communities face intensification and acceleration of coastal hazard and financial/insurance risks from ongoing sea-level rise (SLR) (Rouse et al., 2016). A high-level assessment of coastal risk exposure by the Parliamentary Commissioner for the Environment (PCE, 2015; Bell et al., 2015) identified substantial exposure of buildings, people and infrastructure on land less than 1.5 m above mean high water spring tide. A recent, more-detailed national assessment in a Deep South Science Challenge project started with present extreme storm-tide levels (a 1% annual exceedance or 1/100 year event) and added on 0.1 m increments of SLR up to 3 m. Results show much of New Zealand's risk is within the first metre of SLR, with 125,602 buildings and population of 177,646 potentially exposed to extreme storm-tide flood level once a 1 m SLR is reached (Paulik et al., 2019).

This ongoing level of exposure will result in escalating losses and disruption to property owners, wider communities and associated services and have flow-on effects across the economy into cultural, social and financial domains. This will increasingly challenge the ability of our governance systems to address the uncertainty of risk from climate change (especially SLR) and the funding of adaptation and disaster recovery (Boston & Lawrence, 2018). Higher premiums or excesses and withdrawal of insurance from property owners in areas of near-term foreseeable risk are the first signals that risk is being embedded into our institutions. These signals will flow quickly to the banking sector and could precipitate home loan defaults due to the maturity mismatch between residential insurance and mortgages (Storey et al., 2017) and limit access to finance for purchasers.

SLR is ongoing and is thus a different type of problem to extreme, discrete events (e.g. a storm or flood event at the coast), where unceasing adaptation action across NZ will be required for centuries. SLR is already creeping up on communities and is compounded by rising groundwater, intense rainfall and the impacts of coastal storm events, affecting property and infrastructure, including stormwater and wastewater systems (White et al., 2017). We already see the effects of the rise during king tides in many low-lying coastal and estuarine locations around the country e.g. Tamaki Drive (Auckland) and Marine Drive (Eastbourne). Damage and losses from such coastal hazards are not covered by the Earthquake Commission (except land damage from storms), and local authorities and their insurers could increasingly find themselves facing large liabilities and potential court proceedings for inaction on adaptation (Hodder, 2019). An anticipatory fund for climate change adaptation to address the foreseeable rising risk in coastal areas has been mooted (Boston & Lawrence, 2018),

Box 1: Statutory context for coastal adaptation

Coastal hazards management and planning in New Zealand is governed through the objectives and principles in the Resource Management Act 1991 (RMA) alongside several other statutes—the Local Government Act 2002 (LGA), the Local Government Official Information and Meetings Act 1987, the Building Act 2004 and the Civil Defence Emergency Management (CDEM) Act 2002. The statutory New Zealand Coastal Policy Statement (NZCPS) and guidance on the implementation of its policies (Department of Conservation, 2017), together with the national *Guidance* direct and frame how coastal hazards can be managed and implemented through policies, plans and rules set by regional and district councils through their Regional Policy Statements, Regional Coastal Plans, District Plans, Long Term Plans, Infrastructure and Asset plans and CDEM Group Plans.

The RMA embeds natural hazard management requirements as part of sustainable management. Thus councils must address management of significant risks from natural hazards as a "matter of national importance" [s6(h) RMA] including "the effects of climate change"[s 7(i)]; on current and future generations (s5 Purpose of the RMA). The RMA has provisions for Māori values, traditions and culture in the management of natural and physical resources to guide council decision-making with Māori as Treaty partners. Statutory requirements for stakeholder and community consultation are set out in the LGA and define responsibilities for resilience in the face of natural hazard risks and long-term infrastructure plans.

There are gaps and misalignment in enabling statutes for adaptation to anticipate and control further developments in at-risk coastal areas (CCATWG, 2018; Stephenson et al., 2018), creating uncertainty of mandate between levels of government and a mismatch between planning timeframes, ability to address ongoing and changing risk and how to implement managed retreat. Regional inconsistencies in coastal hazard management and adaptation exist as a consequence. A National Risk Assessment, National Adaptation Plan and independent monitoring and reporting is included in the Climate Change Response (Zero Carbon) Amendment Bill 2019.

LOCAL GOVERNMENT AND FINANCIAL STAKEHOLDERS WILL NEED TO PROMOTE ADAPTIVE RISK REDUCTION *to minimise further exposure and plan over long timeframes, as the rate and scale of climate change impacts will increase.*

(Reisinger et al., 2014)

which is a significant barrier to adaptation (CCATWG, 2018).

Local government and financial stakeholders will need to promote adaptive risk reduction to minimise further exposure and plan over long timeframes, as the rate and scale of climate change impacts will increase (Reisinger et al., 2014). Box 1 sets out the existing statutory context for coastal adaptation in New Zealand. This ongoing and escalating risk exposure for coastal areas (Paulik et al., 2019) will pose substantial challenges to our planning, insurance, funding and infrastructure processes, as well as to residents and iwi/hāpu, who live with significant coastal place-based attachment.

Box 2: New central-government *Guidance*

The *Guidance* (MfE, 2017) has community engagement at the core of coastal adaptation planning and implementation. The *Guidance* contains adaptive tools for working with widening uncertainty and changing risk, improved hazard and risk/vulnerability assessment methods that include community values and recommends use of four SLR projections alongside dynamic adaptive policy pathways planning and monitoring of signals and triggers. The *Guidance* is framed around an iterative 10 step decision cycle (Figure 1) and includes case studies, case law, hazard factsheets and a summary document: *Preparing for Coastal Change*.

Complementary guidance on the NZCPS implementation for coastal hazards management (Department of Conservation, 2017) highlights several precautionary approaches for coastal hazard management and SLR. For example, Objective 5 (NZCPS) directs new developments away from risk prone areas; considers responses, including managed retreat, for existing development; and promotes protecting or restoring natural defences to coastal hazards. Policy 24(1) (h) (NZCPS) sets a timeframe of "at least 100 years" for identification of coastal hazards and climate change effects, taking into account national guidance and best available information. Policy 25 (NZCPS) focuses on avoiding increasing risk and encouraging land use change, including managed retreat, to reduce the risk of adverse effects and discourages hard protective structures, while encouraging use of natural defences. Policy 27(1) (e) (NZCPS) highlights the need to identify and plan for transition mechanisms and timeframes to move to more sustainable approaches. Figure B-1 shows how the NZCPS policies determine the type of adaptation to climate change at various junctures.

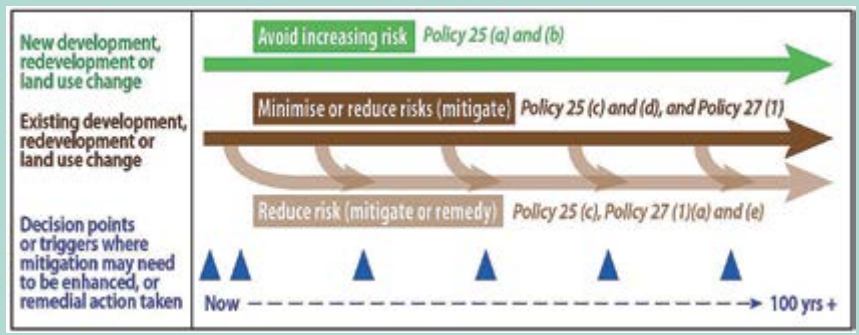

Figure B-1. New Zealand Coastal Policy Statement 2010 decision context for coastal areas exposed to coastal hazards and climate change. Note: uses terminology from RMA 1991 s 5(2)(c).

Source: (MfE, 2017)

Lessons learned during development of the Strategy

The 10-step decision cycle in the *Guidance* (MfE, 2017) grouped around five questions (Figure 1) forms the framework for presenting the lessons learned from the Hawke's Bay coastal *Strategy* development process. The table right and a discussion paper (see link below) are intended to help others conducting similar decision processes elsewhere, at different spatial scales, using the recommended practice from the *Guidance*. The table shows how the *Strategy* has addressed the question and identifies lessons learned through the process. Relevant references are provided.

In conclusion, the lessons learned highlight;

- The critical importance of transparent and enabling governance arrangements (including Memoranda of Understanding with the parties) prior to starting strategy development
- The value of a regional/local government partnership for coastal strategy development
- The value of engaging collaboratively with communities by providing a 'safe space' for deliberation, resulting in social learning about the practical issues around resilience efforts
- The need for wider community engagement to encapsulate their views on managing the risk and side-effects of options
- The importance of early partnership with iwi/hapū to weave in Te Ao Māori perspectives
- The importance of considering a longer (at least 100 years) timeframe for the vulnerability and risk assessments (using narratives and scenarios) and distilling the emergence of adaptation thresholds (i.e. when agreed objectives around levels of service and risk would no longer be met)

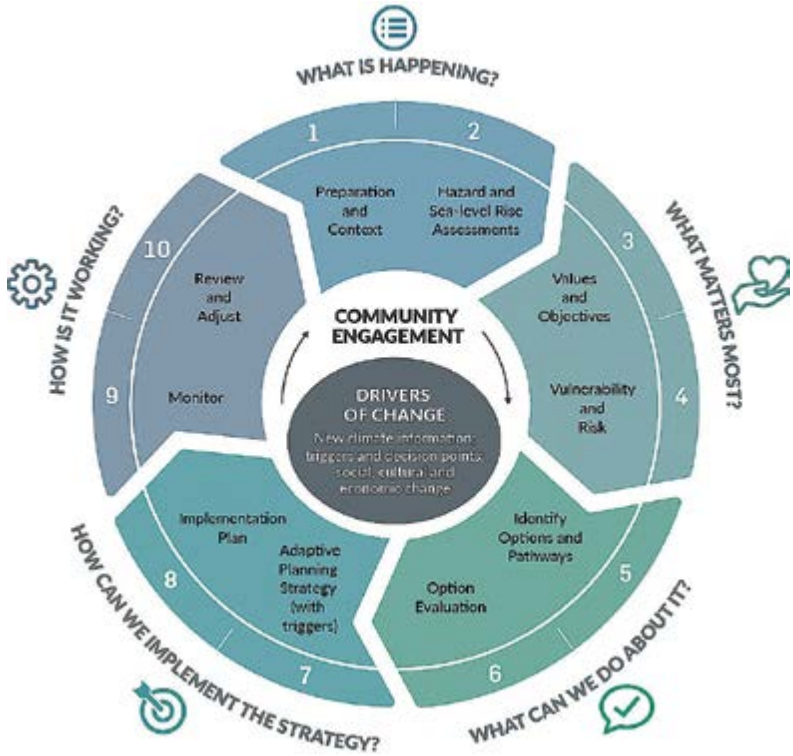

Figure 1 The 10 step decision-cycle formed around five key questions
(Source: MfE, 2017)

THE VALUE OF ENGAGING COLLABORATIVELY WITH COMMUNITIES BY PROVIDING A 'SAFE SPACE' FOR DELIBERATION, ***resulting in social learning about the practical issues around resilience efforts***

(Lesson learned)

- Understanding how coastal hazard and risk/vulnerability assessments and the options/pathways assessment process can be scaled, depending on the level of uncertainty and the planning situation
- The value of an adaptive pathways approach for shifting thinking from short-term protection strategies to a longer term focus on realistically managing the ongoing changing risks
- Not to underestimate the time needed for developing the implementation plan that includes regulatory planning, governance, funding, design and costings, triggers for monitoring and review.

These lessons can inform adaptation across a range of other domains of interest to planners and decision makers, at different scales and scope, using the principles and approaches in the *Guidance*. A fuller discussion paper is available at (https://resiliencechallenge.nz/edge/).

Table 1 Lessons learned from applying the 10 Step decision-cycle

	How the Strategy addressed the question	Lessons learned
Q1 What is happening?	• Preparation since 2014 • Coastal hazard, inundation, risk and cultural assessments, social return on investment • Governance comprised Joint Committee of 3 councils and 3 mana whenua agencies • Technical Advisory Group across 3 councils • Two community panels, social media and public meetings • Support from 'The Edge' researchers • Process comprised definition of problem and agreed framework for decisions	• Preparation and shared context building enable trust and respect between councils and community to be built • Collaborative, effective governance essential to provide public mandate and political commitment • Early partnering with iwi/hapū Māori to ensure Te Ao Māori perspectives integrated • Trusted and independent advisors/consultants participating and reviewing • Use a range of future SLR and flood scenarios to enable options to be stress-tested in • Use SLR increments for mapping coastal flooding and erosion for identifying adaptation thresholds and the shelf life of short-term actions in Q3 steps
Q2 What matters most?	• Values and objectives included in decision framework • Community values assessed • Asset and population fragility to hazard risk and social, cultural and economic values assessed • Survey of regional community values and perceptions (by 'The Edge') • Cultural assessment and 'hikoi' along coast for panel members and TAG	• Social impact and vulnerability assessments should be "fit for purpose" for slowly emerging hazard risk at the coast and address the long term (not just a 5-10 year horizon) • Use of serious games can enhance long term assessments by providing virtual experiences of future conditions • Effects on social, cultural and environmental values must be integrated with assessment of fragility of physical assets (risk) • Integration of iwi/hapū values and perspectives can prompt other community interests to view options differently • Wider regional interests need to inform the well-being assessment processes early
Q3 What can we do about it?	• A wide range of options considered across protection, accommodate, retreat types • Options were screened for feasibility • Short-, medium- and long-term options in 6 pathway sequences per coastal unit were developed for assessment • Pathways were evaluated using MCDA/DAPP/Real Options Analysis (for relative costs + loss and Value for Money)	• A clearly defined & transparent optioneering and assessment process with recording of reasons for choices ensures everyone is heard • A comprehensive set of adaptation options/actions ensures all possibilities can be canvassed, including a range of scenarios of the future • Use of serious games can help prime participants to think long term (at least 100 years) • Notional "timeframes" covering 100 years help unlock discussions about managed retreat • Important to discuss 'residual' risk associated with hard structural protection options and their temporary function • Useful to have at least a high-level feasibility costing of options or pathways before evaluation, to avoid perception that protection structures can be built and maintained in long term: affordable and consentable? • Important to include land use planning provisions that are consistent with managing the rising risk (NZCPS) and can signal hazard risk and the need to monitor coastal change as sea level rises • The assessment approach and participation by the community can be undertaken at any scale noting that regional scale can ensure consistency of processes and actions • Substantial increase in knowledge and awareness is gained through collaborative processes
Q4 How can we implement the strategy?	• Recommended actions in pathways were reported to the Joint Committee by the community panels • All 3 councils approved the Strategy report in principle for detailed costings, development of decision triggers, consenting requirements and planning changes • A costing model for allocation of costs via a council contributory fund was further developed for discussion with the community in 2020	• Implementation stage should not be under-estimated, including wider community views and consentability • Ongoing community deliberation is necessary and foundational to the MfE Guidance • It is essential to keep all councillors abreast of the Strategy process as it proceeds • A system and processes for monitoring of hazard risk as new information arises is essential
Q5 How is it working?	• This stage has not been activated yet in Hawke's Bay but preparation has started • Development of signals and decision triggers will enable the councils to judge how the Strategy is working once the final decisions on the initial actions are made, and when the next pathway would need to be implemented	• Successful pathways approaches rely upon anticipating a range of pathways and actions before untoward damage occurs and capacity to act is compromised • Having a monitoring system that tracks ongoing change is essential for decision making over time to enable councils to adjust the Strategy as the risks rise • The ability to monitor the chosen options against the Strategy objectives is the critical part of applying the DAPP approach • Further guidance on signal and trigger design is required • Sharing of learning between councils about coastal management in the face of sea-level rise is essential going forward

Acknowledgments: The Hawke's Bay Regional Council, Napier City Council and Hastings District Council, the Joint Committee, the Technical Advisory Group, Assessment Panels and consultants (Mitchell Daysh, Tonkin and Taylor, Maven and Aramanu Ropiha).

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