ENABLING COASTAL ADAPTATION

USING CURRENT LEGISLATIVE SETTINGS FOR MANAGING THE TRANSITION TO A DYNAMIC ADAPTIVE PLANNING REGIME IN NEW ZEALAND

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Coastal

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Purpose

This report was prepared as part of the Coastal Environment Programme within the Resilience to Nature's Challenges National Science Challenge ("Resilience Science Challenge") funded by MBIE. It contributes to Pillar 3 Coastal Adaptation: Enabling proactive coastal adaptation in a changing climate risk environment and informs the policy and practitioner community and decision makers addressing coastal hazard risk reduction in a changing climate.

We examined how current planning and related legislation can be used to transition to adaptive planning practice based on Dynamic Adaptive Pathways Planning (DAPP) to help avoid further lock-in of developments in areas at risk from coastal hazards including sea-level rise, given the development pressures for affordable housing and before the RMA reforms are implemented.
We examined the impact of changes made to the regulatory regime since the publication of Coastal Hazards and Climate Change – Guidance for Local Government (MfE 2017), and companion advice issued by the Department of Conservation (Section 4) using a high-level review of planning practice, illustrating with examples where councils have used some of the current planning instruments and applied them to reduce ongoing risks at the coast to avoid creating further risks (Sections 5 and 6).

Building on Tables 25 and 26 in the Guidance that set out the types of plans, plan making processes, planning methods and techniques, we investigated progress on the uptake of these measures using examples from statutory and non-regulatory documents. We discuss adaptive management and the opportunities and difficulties of applying DAPP under the present planning regime (Section 7).
We identify critical practice risks in the coastal environment and how greater use of existing legislation can reduce and avoid these risks before the RMA reforms are implemented (Section 8).
We highlight critical issues that require specific attention in the RMA reforms to remove barriers and to facilitate adaptation to climate change effects in coastal settings and make some suggestions as to how the Strategic Planning Act and the Climate Change Adaptation Act might include the DAPP planning steps and the supporting arrangements for its implementation (Section 8).

The Problem

Observations and research confirm that developments continue to be located and intensified in areas prone to coastal erosion and flooding. This includes areas of new development and areas where existing development is being infilled and intensified. Furthermore, current planning and development practice is attempting to manage these risks, for example by raising houses and filling land above extreme coastal flood levels at the land parcel level. These practices at and near the coast are virtually certain to have only temporary or localised effect, exacerbate drainage issues, result in maladaptation (e.g., create harm and generate future demand for hard protection) transfer large costs to future generations and exacerbate inequities between different groups in society.
Current council policies and plans and their implementation are not providing the means by which ongoing sea-level rise, rising water tables, and increased coastal or compound[1] flooding can be managed. Councils and infrastructure agencies are giving scant regard to how housing and infrastructure developments function as an inter-connected system within the wider regional

[1] Compounding of coastal, fluvial (river/stream) and pluvial (rainstorm) flooding.

context of ongoing functioning and sustainable communities. Several factors are compounding this problem, in particular:

- there are many legacy consents not yet implemented
- there is a low level of attention being given to the seriousness of the impacts of climate change during the lifetime of the decisions being taken, given their permanence
- there is little evidence of NZCPS Policy 24 (1) (g) being considered
- there are ongoing compounding factors from the development process and COVID-19 funding, for example for stopbanks to enable new urban development in a context where the Government is trying to accelerate housing and its affordability, and
- a wide preference for "mitigation" of climate change effects over the alternatives of "avoid" or "remedy" in decision-making on resource consent applications.

Common current responses are increasingly relying on practices to accommodate the risks, without consideration of cumulative risk, the wider flow-on effects, accessibility issues and the community expectations being set for defence and hard protection measures to protect the investment that are temporary at best.

Furthermore, coastal properties are marketed as "desirable" and there is a lack of buyer awareness of the risks and the limitations of such practices and an automatic preference to utilise hard defences or beach nourishment to enable existing development to remain. This raises expectations of further protection for ongoing redevelopment in coastal areas—a recipe for ongoing exposure and legacy effects that entrench higher risks. The net effect of this common practice is to delay the implementation of effective adaptive action in the short-term that result in social, cultural, and economic challenges now and for the long-term.

Greater use of Existing Legislation for Adaptive Planning

Coastal hazards and sea-level rise present a challenge for planners working with largely static planning instruments in a changing risk context for decisions that have long lifetimes and long-term uncertainties, and where imminent risk is becoming increasingly obvious (Section 2 and 3). We conclude that more can be done using the existing legislation (Section 8) which in summary include:

- regional and district councils clarifying their respective responsibilities and embedding them clearly within the RPS, so that sea-level rise that will impact land use activities within their lifetime does not "fall between the cracks".
- regional and district councils developing consistent approaches to collecting and applying hazard information, and, where councils are currently not using best practice, finding means of accessing and updating such information.
- regional councils taking the responsibility for land use management and decision-making in hazard areas, including the application of regional rules to control land use change and development.
- regional councils undertaking vulnerability assessments using consistent methodologies to prioritise areas where DAPP planning should be undertaken, and the results embedded in strategic spatial plans with effect over district planning.
- strengthening policy that supports risk reduction from sea-level rise over the lifetime of affected land use activities in RPSs and, where relevant, in regional and district plans.

- reviewing the status of subdivision, land use, building and infrastructure rules so that decisions on new activities in hazard areas are subject to a relevant policy lens and removing any presumption that development is appropriate in such areas.
- greater use of section 86D RMA that enables application to the Environment Court to request that new rules which are intended to reduce exposure to coastal natural hazards have immediate effect (rather than being deferred until the plan or plan change becomes operative).
- effective use of section 106 RMA where best practice information indicates subdivision should not be consented [NZCPS Policy 24 (h) viz "taking into account national guidance and the best available information on the likely effects of climate change on the region and district"].

Issues for the RMA Reform to Address

We have concluded that the current planning system (RMA) and associated statutes (LGA, Building Act) and current practice does not facilitate adaptive (DAPP) planning through the regulatory processes to reduce the risks from ongoing and changing sea-level rise. We consider the following issues require urgent attention and potentially national direction, to ensure that current risks are identified, and future risks are managed and reduced to an acceptable level for the benefit of present and future generations.

- *Definition of "significant risk" lacking for coastal hazard risk.* Changes to the RMA (s6(h), s106) since 2017 have shifted the planning focus to management of significant risk (matter of national importance) which is undefined with no case law and being interpreted to mean, at scale and imminent, rather than planning to address harm from risks that will manifest at scale over the longer term, despite the NZCPS precautionary policy.

- *NPS on Urban Development.* The strongly directional language of the NPS-UD, plus its processes, means that it is likely to trump the requirements of the NZCPS and further entrench exposure to coastal hazard risks.

- *Urban planning.* The increasing urgency placed on providing for urban growth and intensification to address current housing pressures are conflicting with due consideration of the hazardscape; climate change effects and future risk (to all well-beings); and the future of urban form required for changing behaviour to achieve the national climate change emissions budgets.

- *Legacy subdivisions and current practice.* Implementation of adaptive planning is exacerbated by legacy decisions, community expectations of further 'protection' and the use of poor accommodation practices such as land filling and raising floor levels, which give a false sense of security to property owners. The drive to provide for intensification and re-development in hazard prone areas is not being adequately addressed through planning documents.

- *Planning hierarchy and tiered approach* land use/development planning responsibilities under the RMA primarily lie with territorial authorities and the opportunities for regional urban development strategies are not being taken up except where this is identified as a regional issue in an RPS. This tiered approach creates mixed and confused mandates and can result in decision inertia.

- *Missing enablers for adaptive planning.* There are several missing enablers for adaptive planning including statutory alignment for the Building Act, infrastructure planning, adaptation funding and new property constructs to address existing uses where risks progress spatially between the Marine and terrestrial areas.

Specific provisions for inclusion in the Strategic Planning Act and the Climate Change Adaptation Act to enable effective coastal adaptation

- Put on hold changes in use and existing unimplemented consents (with the exception of infrastructure designations for managed retreat) within the "area of interest" (definition to be developed but defined as a set distance or modelled IPPC worst-case 100- or 150-year sea-level rise scenario or sea-level rise increments from present shoreline) until the DAPP process is undertaken with the potentially affected community in any area and the outcome is included in the plan.

- Unless resolved in the Strategic Planning Act, the provisions of the Climate Change Adaptation Act should over-ride all other statutes that provide for use and development in the "area of interest" (except for the Marine and Coastal Areas Act), including existing use.

- If significant risk is to be retained in the reformed legislation, that it be defined to include risks that are known but not yet fully manifest and will impact decisions on activities taken today that have permanence e.g. building and infrastructure which will be affected by coastal flooding from sea-level rise within their lifetimes, with the objective of risk reduction.

- Each council to provide the central government or supervisory agency with a report identifying coastal communities, their priority vulnerability, and a programme to undertake DAPP within a binding timeframe aligned with the Climate Change Response Act timelines for the monitoring of the NAP and the next NCCRA.

- DAPP guidance within or outside statute (e.g. in a RMA Schedule with process or checklist of steps) that includes provisions for the integrated management of land use, subdivision and development, asset management and building.

- Each council to undertake a rolling programme of DAPP on a timetable agreed with central government or supervisory agency and implements DAPP by including the outcome in its statutory plan.

- The DAPP outcome with preferred pathways to be included in the statutory plan complete with agreed preferred pathway(s), signals, and triggers with limited opportunities to oppose due to the community engagement in their preparation.

- The plan must be able to move forward on the basis of the signals and new rules and actions implemented when the triggers are reached based on the DAPP process previously undertaken with the affected community.

- Mechanisms under the Strategic Planning Act to enable forward planning of infrastructure or utility services that may not be required for decades as part of a managed retreat option under an adaptive plan using DAPP.

- Mechanisms to address ongoing change in the Coastal Marine Area jurisdictional and cadastral boundary for forward planning that adaptively incorporates projected sea-level rise over at least 100 years.

- Rules to have immediate effect, and new/replacement rules developed when signals are reached (or earlier) and become effective when triggers are reached and the path changes, with limited opportunities for public input on new rules since they would have been socialised with the community previously based on the DAPP process.

- The regional council to establish a dedicated fund for land/property purchase/other works, and with a process and criteria agreed with central government for sourcing, securing, and using the funds on an equitable basis to avoid moral hazard.

1 PURPOSE AND SCOPE

This report has been prepared as part of the Coastal Environment Programme within the Resilience Science Challenge funded by MBIE. It contributes to *Pillar 3 Coastal Adaptation: Enabling proactive coastal adaptation in a changing climate risk environment* and informs the policy and practitioner community and decision makers addressing coastal hazard and risk reduction in a changing climate.

We set out to examine how current planning and related legislation can be used to transition to adaptive planning practice based on Dynamic Adaptive Pathways Planning (DAPP) as set out in the publication "Coastal Hazards and Climate Change - Guidance for Local Government" (MfE, 2017) (the Guidance). We provide examples of available planning practice that can help avoid further lock-in of developments in areas exposed to sea-level rise, given the development pressures for affordable housing and before the RMA reforms underway are implemented, which could be a few years.

First, we set out the nature of the problem that sea-level rise presents to planners working with largely static planning instruments in a changing risk context for decisions that have long lifetimes and long-term uncertainties, and where coastal hazards are becoming increasingly obvious in low-lying areas and risks are ongoing and increasing in severity (Section 2 and 3).

Second, we examine some changes made to the regulatory regime since the publication of the Guidance that have increased the complexity within which DAPP is being applied in the coastal environment (Section 4).

Third, we present a high-level review of practice where councils have used some of the available planning instruments in the current planning regime and applied them to avoid increasing or exacerbating coastal-hazard risks, in the knowledge that legislative reform will take time to be implemented in practice. We use practice examples for illustrative purposes (Sections 5 and 6).

Fourth, we use Tables 25 and 26 of the Guidance that sets out the types of plans, plan making processes, planning methods and techniques, as a basis for investigating the uptake of these measures. We include examples of implementation where we have been able to identify them. We also provide commentary on adaptive management generally and the difficulties of applying DAPP under the present regime (Section 7).

Lastly, given the RMA reforms underway, we have identified some issues that require specific attention to remove barriers to adopting adaptive planning approaches to facilitate adaptation to climate change effects (Section 8).

2 THE PROBLEM

Development pressures at the coast are progressing largely unabated under the current statutory regime while reform of resource management law is underway and climate change advances. This creates some urgency to explore how planning practice under the current regime can at least not add greater exposure of developments in low-lying coastal areas. The issue we address in this report is how the current legislation can be better used to manage a transition from static and reactive planning practice, to the new normal of anticipating the risks using dynamic adaptive planning and thus support practice under the new legislation when it takes effect, to better prepare New Zealand for the inevitable committed and ongoing effects from sea-level rise.

Climate change effects at the coast are already being observed and will be ongoing for centuries due to past and ongoing global warming and the long lag in the warming response of the deep oceans and polar ice sheets. We know the accelerating sea-level rise out to around 2050 for New Zealand with near certainty, which will be in a narrow range of 0.23–0.37 m (MfE, 2017). Our knowledge of physical processes causing rising seas(including ice sheet tipping points) is improving all the time, but the likely pace and magnitude of that rise in sea level becomes increasingly uncertain beyond about mid-century, as it depends for the most part on how global emissions track in coming decades(MfE, 2017, IPCC, 2021).

Mean High Water Springs (MHWS) migrates landward as the sea-level rises and more frequent coastal flooding from wave overtopping occurs. Under current planning settings consents for land use activities and development are granted on a permanent basis locking in an expectation of their permanence. Developments and structures in the coastal marine area such as coastal protection structures are only consented for a maximum of 35 years. This creates a tension for ongoing investment in these structures with consequential adverse effects.
Given the dynamic character of sea-level rise and other coastal hazards it is certain that ongoing adaptive management is necessary. What is uncertain is the exact timing and lead time needed for the adjustments to be made and how *fast* the changes manifest. This means that planning must continue to adjust to the changes and increasingly outside what we have already experienced and for *at least 100 years* as required under the New Zealand Coastal Policy Statement.

Furthermore, cities and settlements at the coast, and infrastructure that supports them, have permanency over long lifetimes which are locked in and will be increasingly expensive and disruptive to “protect”. The global evidence shows that the scale and cost of hard protection is limited by physical practicalities and affordability, and that nature-based approaches (to buy time), and planned relocation (to avoid the risk) are increasingly being contemplated as pre-emptive adaptations (Haasnoot, et al 2021; Lawrence et al 2020).

The largely static planning methods used (e.g., hazard lines on maps and short planning timeframes- 10 years for Regional/District Plans and Long Term Plans, and 30 years for infrastructure strategies) and the associated inertia for plans to become operative, have resulted in increasing exposure of people and assets at low-lying coastal localities, to increasing and more frequent coastal flooding on the back of rising seas. Flooding will be further exacerbated by increased intensity of storms and waves, more nuisance flooding on top of high tides and associated rising water tables (Kool et al 2021). Legacy development, ongoing intensification of cities and settlements and escalating property values in such areas, exacerbate the size of the problem for planning now and in the future (Paulik et al., 2020). These consequences are being increasingly revealed globally in deltas, inland low-lying

areas and at the coast (Nicholls et al 2019; Kulp & Strauss 2019) and have led to an increase in vulnerability and long-term risks from climate change.

Effective planning for such circumstances means that the institutional mechanisms and governance frameworks have to 'fit' the problem. However, most planning responds to the societal expectation of certainty in space and time that enables governments, businesses, and people to make investment decisions and undertake activities with some stability (Ruhl, 2010). The scale of the impacts will increase (Oppenheimer et al,2019; Paulik et al. 2020) necessitating planning and monitoring frameworks that can anticipate and adjust to those impacts early, to avoid lock-in of people and assets that expose them to avoidable damages and costs over many decades.

Planning approaches that can avoid increasing such effects are required to guide practice. These are set out in the Guidance which has the dynamic adaptive planning approach and community engagement at its core. By using dynamic adaptive pathways planning (DAPP), spatial and temporal uncertainty can be addressed over time through adjustments to the chosen options and pathways using signals to warn and triggers to decide, ahead of the impacts and with lead-time to implement, thus avoiding lock-in of unsustainable development pathways and inevitably, expensive reactive decisions in the near future. This approach, although relatively new, is well aligned with Policies 25 and 27 of the operative NZ Coastal Policy Statement (NZCPS) (DoC, 2010) and consistent with advice issued by the Department of Conservation (DoC, 2017), for managing subdivision and developing strategies to avoid increasing the risk for existing development (including Policy 27(1)(e)"*identifying and planning for transition mechanisms and timeframes for moving to more sustainable options*").

However, planning practitioners are increasingly struggling with how to use the current planning tools and measures at their disposal to address ongoing changing risk profiles and uncertainty related to existing coastal hazards, and to those exacerbated by sea-level rise. Detailed analyses of New Zealand's decision-making frameworks in the context of climate change and natural hazards have revealed inadequacies of current settings in such contexts (Lawrence 2015; Rouse et al. 2017; Hanna 2019; MfE and Hawke's Bay Regional Council, 2020).

Some progress is being made since the Guidance was issued in 2017. A government working group undertook a stocktake of issues around climate change impacts and adaptation and recommended a package of changes to better enable anticipatory planning and the monitoring of climate change impacts and risks (CCTWG 2017, 2018). The first national Climate Change Risk Assessment completed in 2020 highlights the risks to the built, social, and natural environments, the economy and to our governance domain, with 9 of the top 10 priority risks linked in some way to the coast. A comprehensive review of New Zealand's resource management legislation (Randerson 2020) recommended new legislation for planning and adapting to climate change in a more strategic and coordinated manner that can address dynamic and changing risks - via a Natural and Built Environment Act, a Spatial Planning Act, and a Managed Retreat and Adaptation Act that can address and fund a wide range of adaptation action, including managed retreat. The Government has now embarked on drafting these Acts, including a renamed Climate Change Adaptation Act.

Any transition would emphasise the use of best available information, appropriate policy development processes, community education and engagement and the halting of practices that provide only temporary respite from hazards or are maladaptive and close off the ability to adapt in the future.

Here we critique measures based in current law and practice that can help support the introduction of a risk-based and adaptive planning regime that is better connected across the various relevant

statutes; the purpose being, to embed adaptive practice from which it will be difficult to resile, and which enables flexibility over time to shift options and pathways without locking in further legacy costs. Understanding the context within which the current legislation was promulgated gives us some insight into addressing this question.

3 CONTEXT

3.1 The Legislative Context

New Zealand's Resource Management Act (RMA) was ushered in, in the early 1990s, as a document of great mana[2] and significance, and with bi-partisan political support. Its fundamental philosophy, in part driven by the country's economic reforms of the late 1980s, relies on managing the natural and physical environment through "effects management" within broadly defined "biophysical bottom lines". The preparation and administration of plans by local authorities was at the heart of the legislation, but planning itself was not a widely accepted activity, and most early plans were ambivalent in terms of future direction. Market-led development has been the norm for the last 30 years, and increasingly this has confronted some of the 'effects management' concepts, which have come to dominate both planning practice and law, such as landscape and amenity values and enabling development unless there was a legally based reason not to.

Integrated forward planning to provide for future urban development capacity[3], for infrastructure to support future needs, and to ensure that future communities are not put in harm's way by development in places and in forms that are unsuitable and contribute to future risk[4] has been a casualty of the system. The split in responsibilities for control of the use of land in relation to "*the avoidance or mitigation of natural hazards*" between regional authorities and territorial authorities[5], has led to uncertainty and compounded the lack of forward planning to address natural hazards. This especially applies to the coast across the landward demarcation of the coastal marine area and the management of "coastal environment" (e.g., defined in Policy 1, NZCPS). Only in relatively recent years have many local authorities under growth pressure, taken the first steps towards strategic or spatial planning due to governance constraints between regional and district councils. This was followed by the local government reforms that resulted in the Auckland Plan (prepared under separate legislation), and the more recent central government initiative to use its National Policy Statement powers under the RMA to require local government to undertake growth planning[6].

The RMA identified the coastal environment, including estuaries and wetlands, as areas of particular value and growing pressures, and required as a matter of national importance that its natural character must be protected from "inappropriate" subdivision, use and development[7]. Nevertheless, growth and development pressures have continued, especially in areas close to the coast. A feature of the RMA when promulgated, was a requirement on central government[8] to develop and continue to maintain a National Policy Statement – the New Zealand Coastal Policy Statement – which must state objectives and policies to achieve the purposes of the Act in relation to the coastal environment. The 2010[9] version of the New Zealand Coastal Policy Statement contains specific

[2] Its mana came from the very wide national and iwi consultation that was involved in its development, and its acceptance by all political parties. Despite this, recognition, and reflection of the principles of the Treaty of Waitangi in practice is now generally considered problematic and inadequate.

[3] The "effects management" basis of the RMA meant that local authorities by and large did not plan ahead for urban growth. There were exceptions – e.g. Napier City for-saw the pressures of growth on its attractive urban area as early as 1992 and undertook what would now be recognised as spatial planning - "Napier City Urban Growth Strategy", Environmental Planning and Assessment, 1992, Napier City Council.

[4] There were exceptions – for example, Wellington and Lower Hutt District Plans' recognition of the Wellington Fault trace.

[5] RMA ss 30 and 31. "Natural hazards" has always been widely defined in s 2.

[6] The 2016 National Policy Statement for Urban Development Capacity.

[7] RMA s 6.

[8] Through the Minister of Conservation.

[9] The initial 1994 version also contained such policies, including recognition of the potential for sea-level rise.

policies relating to coastal natural hazards, which has subsequently underpinned national guidance for local government[10], including implementation guidance for the natural hazards objectives and policies (DoC, 2017). Other National Policy Statements are mandated in a general sense "at any time" and after having left local authorities to develop their own approaches, are now increasingly being used by the Government to address issues where council policy has not delivered on expected outcomes. National environmental standards are also being used by the Government now where nation-wide rules are considered desirable to address negative outcomes consistently.

The RMA post-dated the IPCC process but predated any wide understanding of climate change and its potential impacts[11]. It contains no specific barriers to recognising changing circumstances and growing threats[12] to wellbeing. It requires consideration of cumulative and compounding effects[13], and the effect of high probability and of low probability but with high potential impacts. While it is capable of enshrining long-term policy directions, in practice the RMA is not particularly agile in responding to or correcting progressively worsening situations. More recent changes to the RMA, which have emphasised the management of significant risk even while having particular regard for the effects of climate change, have drawn focus away from the implications of high probability but currently relatively low hazard effects such as sea-level rise, intermittent coastal erosion, and rising groundwater levels.

The Randerson Report[14] recommended that the RMA be replaced with three new statutes – a natural and built environments statute to continue the management of natural and physical resources; a strategic planning statute which would require the forward planning (on at least a 30-year basis) of resources through spatial planning on a regional basis and through all levels of government and iwi; and a statute to deal with climate change adaptation and managed retreat. This latter statute would be a "nuts and bolts" approach to the current implementation difficulties of managed retreat from exposed coastal areas (extinguishing existing uses and funding), but the areas to which and the circumstances in which it would apply, would rely on the other two statutes – particularly the strategic planning statute. However, local authorities will be working or transitioning under current legislation for several years ahead, hence the focus of this report on what can be done under the current context to avoid further exposure of developments to coastal hazards.

3.2 The Coastal Context

In a coastal context the ability to adapt to climate change effects relies upon an understanding of how sea-level rise will propagate and affect the land and land uses, how humans' value that land and land uses, and how they choose to respond. New Zealanders have a long-standing and traditional regard for access to the coast[15], and coastal natural character, biodiversity and habitat protection are matters of national importance under the RMA. Considerations of public access, natural

[10] A 2016 review of the 2010 NZCPS by the Department of Conservation of the effect of the NZCPS on RMA decision-making found that the implementation of coastal hazard policy was, at that time, "challenging and very controversial for some communities". It concluded that guidance and support for planning at the national and regional levels should lead to better outcomes and focussed on three difficulties – lack of an agreed risk identification and mapping methodology, poor alignment with the Building Act and lack of national guidance.

[11] It predated the 1992 United Nations Framework Convention on Climate Change. While work was already well underway by the Government, it was not widely known or understood at the level at which the RMA was to be implemented.

[12] In its recognition of the applicability of the precautionary principle and cumulative effects.

[13] Compounding of coastal, fluvial (river/stream) and pluvial (rainstorm) flooding.

[14] June 2020, Report of the Resource Management Review Panel.

[15] The concept of the Queen's Chain ensured that early surveyors set aside a strip of public land around the coast, lakes, and rivers, however, its implementation was patchy. Esplanade reserves or strips are now taken when land adjacent to MHWS is subdivided.

character, and the need to maintain habitats for coastal and estuarine species often find common cause with issues of exposure to natural hazards and receding coastlines. In a coastal environment sensitive to sea-level rise, changes in sea level, coupled with a changing climate, will affect our most densely populated urban areas, our infrastructure, our heritage (built and cultural) and shape our natural coastal landscapes and biodiversity which we value, enjoy, and rely on culturally, socially, and economically. The first New Zealand National Climate Change Risk Assessment (MfE 2020) has assessed these things we value.

In the near-term out to around 2050 we are committed to certain and measurable sea-level rise (within a narrow range of 0.23–0.37 m) from the warming effect of greenhouse gases already emitted (Mfe 2017). Because there is a long lag time in the response of ocean warming and even longer lags for responses of polar ice sheets, there will be further sea-level rise due to the emissions we are responsible for from today onwards. Further out, the sea levels are projected to continue rising for centuries, but the rate and levels are uncertain and highly dependent on how fast greenhouse gas emissions are reduced and whether tipping points are reached for polar ice-sheet instabilities (thought to be warming at or below 2°C above the pre-industrial era). Nevertheless, there is a range of projections available and planning guidance on how to adaptively plan around those uncertainties (Mfe 2017).

Sea-level rise scenarios are used to give decision makers, communities, and individuals the opportunity to stress test adaptation options they are considering today for their:

- path dependency and lock-in potential.
- unintended consequences including inevitable flaws.
- their sensitivity to different timeframes and sea-level rise increments.
- costs over the lifetime of the option.
- ease of shifting between options and pathways as the seas advance.
- acceptability, tolerability, and adaptive capacity of governments at all levels, communities, investors, and other stakeholders.

This provides us with the opportunity to think ahead to how we may need to adapt, and to consider when we may need to revisit choices and change pathways based on both changing scenarios of sea-level rise and changing societal, cultural, and economic values.

Sea-level rise has a footprint beyond the immediate coastal interface. It is linked to groundwater tables, lowland terrestrial and freshwater systems and biodiversity. Flooding will occur more frequently as the sea rises and will progressively impact some distance inland depending on the land topography, geomorphology, and habitat type (e.g., marshes, wetlands), which govern surface and sub-surface flowpaths (Swales et al., 2020). This effect is now observed in New Zealand at especially high (king) tides around the periphery of many estuaries and harbours disrupting mobility more frequently (Mfe 2017). Furthermore, sea-level rise varies in different places due to local vertical land movement, with land subsidence locally exacerbating the rise in ocean level (MfE 2017; Levy et al 2020).

The effects of coastal storm surges are exacerbated by the sea-level rise. Coastal underground infrastructure along roads next to the coast and low-lying coastal settlements are especially vulnerable. These are clearly identified across New Zealand (Paulik et al 2020). The effects already cascade from the coast and impact across regions (Lawrence , Blackett, Cradock-Henry 2020). This will intensify as critical thresholds are reached for the largely gravity-based stormwater and

wastewater systems we operate in New Zealand where sea-level rise impedes drainage at outfalls (Kool et al 2020). These are known significant risks identified in the National Climate Change Risk Assessment 2020 (MfE 2020).

The attractiveness of living at and around coasts and harbours engenders blindness to the known risks and there is evidence that planning practice has not used the available tools in the RMA to address development pressures (see section 7). Furthermore, there are compounding effects with other changing climate hazards, such as increased fluvial and pluvial flooding, land instability, coastal erosion, increasing susceptibility to ground liquefaction, decreasing low river flows (dry periods/droughts), salinization and subsidence. These effects raise issues for how we should be responding, and the planning tools and measures used by decision makers.

3.3 The Issue of Changing Risk for Adaptation

The changes and impacts on coastal communities, their assets, infrastructure services and dwellings are being experienced in more places and with greater frequency. These manifest as coastal flooding from storm surge and large waves, especially at 'king tides'. Our institutional arrangements address these effects largely in a post-hoc manner and often by resorting to hard engineering methods such as sea walls, revetments, and pumps, rather than more adaptive planning approaches. We continue to locate developments in known risky places on the assumption that the risks can be mitigated down the track. Increasingly, sea-level rise will dominate the impacts (Le Cozannet 2015), with coastal flooding becoming more pervasive compared to more-localized coastal erosion, and trigger reduced performance and possible failure of assets (buildings, infrastructure) with ongoing detrimental consequences. We are dealing with ongoing changing risk.

While we know the risks and seas are rising, there is deepening uncertainty beyond mid-century depending on how fast emissions are reduced and the pace of change from the major melting ice sheets and glaciers. At present, emissions reduction pledges by countries globally are unlikely to limit emissions to 1.5 degrees or even to 2 degrees[16] so accelerating higher sea levels will lead to an earlier emergence of disruptions and damages to our built environment, compared with a low-emissions scenario (Stephens et al., 2018). This in turn, means that in many low-lying areas, 'protection' adaptations are unlikely to be effective over the life of settlements and their infrastructure services making retreat inevitable, especially where it is impractical or unaffordable to provide protect, advance, or accommodate options to manage the rising risks. Staging that retreat through pre-emptive and adaptive planning is a credible adaptation option in such circumstances, consistent with the NZCPS and to be given effect in policies and plans by councils. This means pre-emptive planning for known sea levels out to mid-century can be carried out with high certainty, but only if the adaptation does not lock in a pathway that raises expectation of further development and ongoing reinforcement of protection (Haasnoot et al 2021). Rather, a strategy that enables adaptation before physical and coping thresholds are reached (Fig 1), will create flexibility and avoid lock-in of risk over the lifetime of the land uses (Lawrence et al 2020), and is aligned with "planning for transition mechanisms and timeframes…" in NZCPS Policy 27 (DoC, 2010, 2017).

[16]Refer to https://www.unep.org/resources/emissions-gap-report-2021

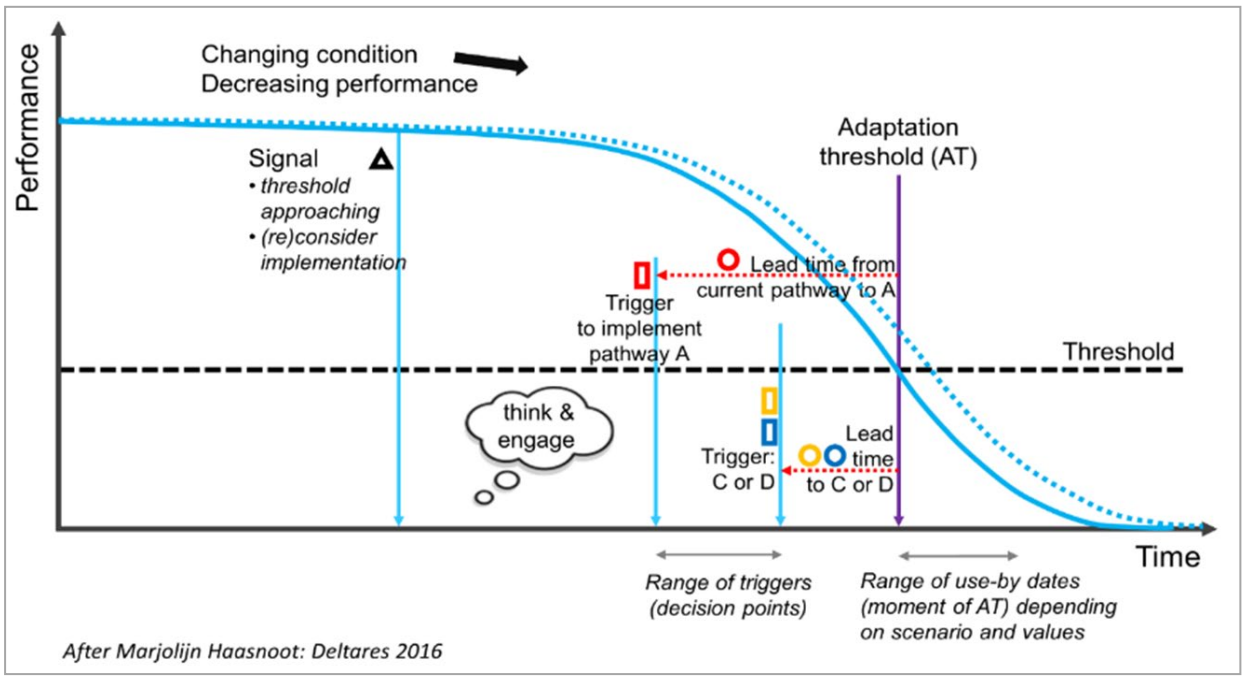

Figure 1: Loss of performance of existing built environment or adaptations over time as risks increase

The objective of coastal planning under a changing climate and rising seas is to avoid increasing the damages to assets, people and the environment at the coast and avoid locking in adaptation options that escalate the cost to communities over time (including future adjustment costs if a different type of option is needed). If development decisions are not flexible and adaptable, the risks are increased and transferred to future generations. There are, however, the competing drivers of managing short-term costs, high amenity values and short-term enjoyment, cultural ties to the land and cultural sites, and the uncertainty and challenge that change brings.

3.4 Adaptive Management underpins Dynamic Adaptive Planning

Adaptive management (AM) is defined by the US National Research Council (2004) as a process that *"…promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood."*.

Adaptive management enables actions or policies to proceed in the light of uncertainties about effects, impacts, and future conditions and comprises an element of learning or improved understanding of the system (Holling, 1978). It requires identification of clear and measurable management objectives to enable progress towards agreed objectives (or when they can no longer be met, for example, in the case of coastal adaptation) to be measured and to indicate when a change in direction is necessary. Early-warning indicators or signals, initiate further assessments, improved estimate of the time-to-trigger, pre-planning, and whether more intensive monitoring is required(see Appendix 1 of Lawrence et al., 2020[17]).

In reality, many of the subjects of adaptive management are highly contested, where probability distributions have large uncertainties and cannot be relied upon or have complex interactions that

[17] Accessible at https://deepsouthchallenge.co.nz/wp-content/uploads/2021/01/Supporting-decision-making-through-adaptive-tools-in-a-changing-climate-.pdf

are changing over time spatially and temporally; some quite quickly due to climate change. The resulting situations are considered to be "deeply uncertain" and for which current adaptive decision frameworks and tools are not fit for purpose (Lempert, Popper, Bankes 2003). Sea-level rise is one such problem, as impacts intensify and compound with high tides in the short-term and with increased frequency of heavy rainfall events, creating impacts that cannot be predicted and adjusted to until coping and damage thresholds have passed. This situation calls for a range of scenarios of the future to be used to stress test options and pathways in the decision-making context. This means that adapting after the impact, as traditionally applied in AM, will be too late to avert loss and damage to people and property.

In such situations and for such policy problems, DAPP has evolved to allow pre-emptive decision making that enables short-term decisions to be made that do not create path dependencies or lock in people and assets in hazard-prone areas. It enables flexibility to be retained for timely adjustment of options ahead of thresholds with enough lead time for the adaptation action to be implemented (see Figure 2). The underlying assumption is that adaptation options will have limits as the sea-level continues to rise; physical, technical, social, cultural, and financial limits. For example, there are limits to how high and wide a seawall can be built without creating greater risk due to the false sense of security engendered by them, and the side effects on aesthetic and environmental values. There are limits to how high a road or a floor level can be raised before the building cannot be accessed from the adjacent land or egress is increasingly compromised by flooded roads. There are also acceptability limits based on community amenity or cultural considerations, or where nature-based adaptation approaches maybe overwhelmed by sea-level rise at some future threshold depending on the location and type of approach used.

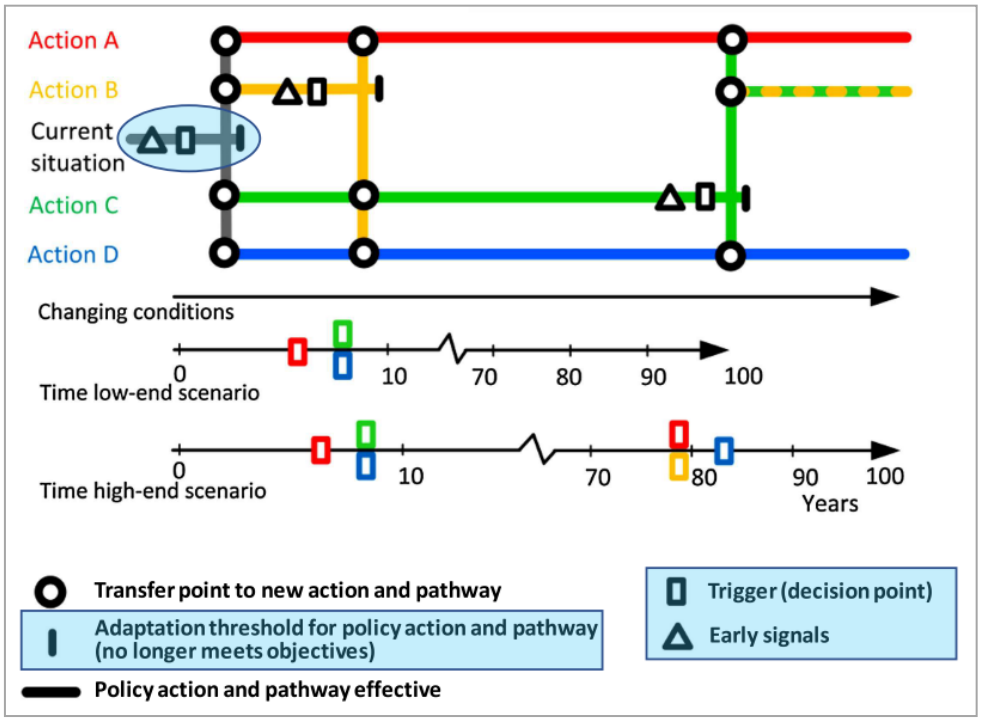

Figure 2: Dynamic adaptive pathways map

Note: Showing four alternative options (actions A–D) that could address decisions about the current situation which is approaching an Adaptation Threshold (small black vertical line). Two scenarios of the future are used here to stress-test the performance of the four pathways (red, yellow, green, and blue) under different conditions, which could be related to sea-level rise and/or number and frequency of disruptive or damaging events (Lawrence et al 2020).

A key characteristic of DAPP is its emphasis on avoiding path dependency, whereby choosing certain actions 'locks' the decision makers into a particular pathway thus preventing future adaptation to a different pathway (Haasnoot et al 2013). For example, taking all 4 sea-level rise scenarios in the Guidance, where an adaptation threshold of 0.8 m is agreed on for a locality, there is an entire century (100yrs) over which that sea-level rise can occur. Using DAPP it is unnecessary to develop a work programme for the earliest (worst case) scenario – monitoring progress and taking heed of signals enables pre-emptive decisions to be made ahead of thresholds.

The question this report examines is whether and how the DAPP process can be codified into law and implemented through statutory plans and planning processes. Plans made under the RMA shape both urban and rural environments and set expectations around risk, design, and the ability to use land for certain purposes, in many cases in perpetuity (e.g. subdivisions, reclamations). As such, the RMA is an integral policy tool and provides, for now, the framework to support the DAPP process, setting expectations for land use, informing design considerations, and providing context for regional and area specific outcomes.

The planning timeframes specified in the RMA include "at least 100 years" in the NZCPS, and more recently the 30-years' urban growth provisions under the National Policy Statement for Urban Development (see Box 1)). There is a focus on the near-term due to the 10yr review cycle for RMA policies and plans. Under the LGA the 10-year timeframe for LTPs and 30-year infrastructure strategies can support the medium-term elements of DAPP. The RMA also interacts with the Building Act (and associated Building Code e.g. E1: Surface Water) and the Local Government Act, where timeframes reflect funding cycles and a historic nominal design life, rather than the realistic life of built structures and infrastructure. Successive Building Acts have persisted with a nominal building life of only 50 years, whereas many buildings are reaching or exceeding 120 years, with redevelopment now driven by intensification, rather than replacement of existing stock. New coastal development in many places will not have this lifetime under rising seas. Similarly, cities are grappling with urban infrastructure that was laid down 100 years ago for much smaller populations and lower sea levels and that are now seeing the need to retreat from coastal areas over time or to move to pumped systems (Kool et al 2020).

However, the short (~10 year) lifespans and inertia of statutory plans (particularly district plans) prepared under the RMA mean that if the pace of change exceeds the renewal cycle of plans and policies, then they are unable to account for the pre-emptive decisions needed to change options and pathways arising from the DAPP process and in particular, enable building back elsewhere after large extreme or more frequent events (Barnett, 2014).

While near-term decisions that do not close off future options can be made, practitioners have struggled with how the subsequent decisions following signals and triggers (decision-points) being activated, can be implemented without a change to policy and rules in statutory plans. Such changes to plans must go through a formal, slow, and expensive plan change process, where new provisions can be publicly challenged and may not survive, even when they have been foreshadowed in non-statutory strategies or, for example, as deferred zones in plans. This potentially jeopardises the decisions and outcomes based on the DAPP processes.

RMA processes provide several entry points for integrating DAPP processes as set out in the Guidance and consistent with the 10-step decision cycle (Figure 3). For example, the assessment of hazards and risks (*what is happening* 1 &2); the integration of community values through engagement and agreement on objectives (*what matters most* 3 & 4); identification of the options available, their lifetime, feasibility, and effectiveness (*what we can do about it*) 5&6. These are also

necessary steps for preparing regional and district plans under the RMA and for developing alternative pathways to the future which can be stress-tested against different scenarios of the futures for sensitivity to change and sets up the input to the development and implementation of an adaptive strategy (how can we implement the strategy 7&8) and followed by monitoring and review (how is it working 9&10). This process thus embeds the flexibility for addressing changing hazard risks.

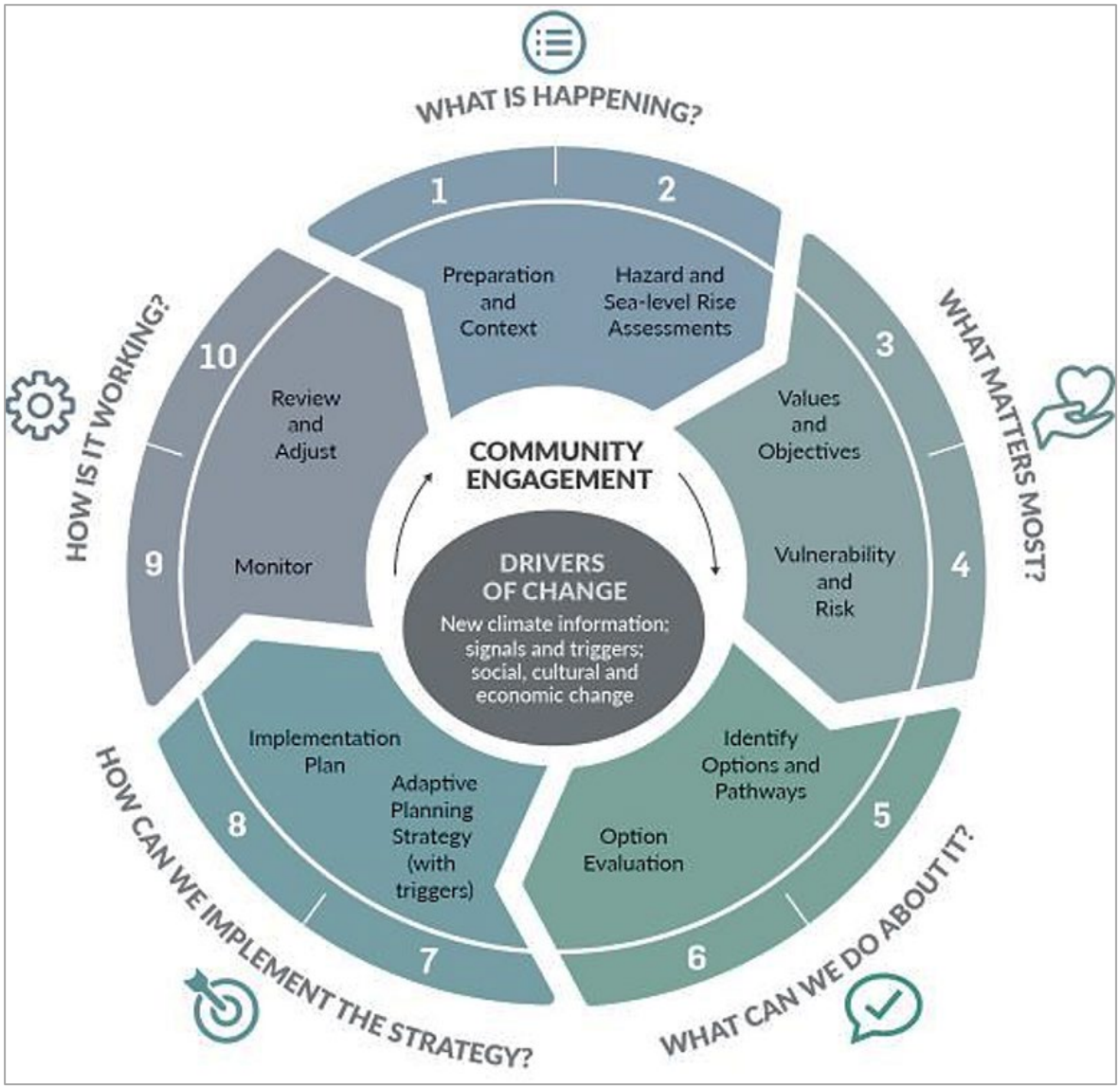

Figure 3: 10-step decision cycle for coastal hazard planning (MfE 2017)

4 THE CURRENT REGULATORY ENVIRONMENT POST 2017

Before looking in more detail at what is possible under the existing statutory regime, we provide a broad update of legislative and central government policy changes under the RMA, other legislative changes with implications for the built environment, and case law updates. These have mostly occurred since the Guidance was developed, although, where noted, some were earlier, but their implications have only become apparent in the last few years.

The changes in the operating environment indicated in the Tables 1 to 3 have added complexity for local authorities administering the legislation. Along with the rapidly moving review of the RMA, there is currently a greater level of uncertainty for local government when developing plans and using DAPP for adaptation to climate change, than previously. However, sea-level rise is locked in, and inaction now will only add to future complexities and costs.

4.1 Recent Changes to the Resource Management Act

The RMA is the key legislation for the management of the effects of climate change. These effects are a matter to which particular regard must be had when policy and plans are being developed and decisions are being made. Recent legislative changes have been limited in scope, but with the expectation of the now-proposed comprehensive review and restructuring of this legislation, they have had some profound consequences.

The changes affecting planning and decisions relating to sea-level rise are set out in Table 1.

Table 1: Changes to the Resource Management Act

Change	Nature/Implication of Change	Commentary
Addition of RMA section 6(h) (by legislative amendment, April 2017)	A new Matter of National Importance was added – the management of significant risks from natural hazards.	Because this addition occurred during final preparation of the 2017 Guidance, its implications in relation to coastal change were not covered. There has been little subsequent progress in practice or case law in determining how this clause impacts on planning for adaptation to climate change and the timeframes to be considered.
Rewrite of RMA section 106 (by legislative amendment, October 2017)	Changed the basis on which a territorial local authority can decline consent to a subdivision (including in circumstances in which a plan enables it).	While there was a growing body of case law providing clarity in terms of the natural hazard risk circumstances in which a subdivision consent could be declined, the wording changes now rely on "significant risk" being demonstrated – a term that at present has uncertain meaning in the context of sea-level rise and coastal retreat. The changes also set a high bar of assessment and analysis. It is likely that this change has made it more difficult for a council to decline a subdivision consent on the basis of risk associated with sea-level rise.

Changes to RMA sections 61, 66 and 74 (by legislative amendment, June 2020 – not effective until December 2021 and not shown in current legislation on-line)	Adds to the list of matters that councils must have regard to when preparing policy statements and plans - any emissions reduction or national adaptation plans made under the Climate Change Response Act 2002 will be required to be considered.	These changes (along with amendments removing the limitations on considerations when applications relate to greenhouse gases in sections 70A and 104E) will require councils to link to national instruments and particularly may require regional and district responses when area or circumstance-related provisions are promulgated by central government as part of an emissions reduction or national adaptation plan. The usefulness of this provision will be entirely dependent on government action and commitments under the CCRA.

Commentary

The new matter of national importance relating to natural hazards was introduced in response to large hazard events viz., earthquakes[18]. While helpful in relation to such natural hazards, the introduction of the concept of "significant risk" is confounding when considering a slowly changing and ongoing hazard such as sea-level rise and undertaking long-term planning (for "at least" 100 years as the NZCPS requires) if it is interpreted to apply only to limited "worst case" coastal risk situations. At worst, it has become a major distraction diverting effort into discussion and analysis of "significance" in the near future only and not considering the significance of decisions taken today that have very long lifetimes in areas exposed to sea-level rise in the future. Until there is determinative case law or clear guidance on how significance is defined for sea-level rise, the uncertainty of the application of this matter of national importance in relation to sea-level rise and coastal retreat will remain (see also sections 4.5 and 8).

In contrast, settled case law relating on section 106 where subdivision has been able to be turned down despite zoning allowing for it, changes to the section introducing a "significant risk" test, for which there is as yet no case law, has brought into question its effect on the settled case law on section 106 for sea-level rise risks.

The final legislative change (to 61, 66 and 74) noted in Table 1, can be expected to alter practice considerably when it comes into effect, due to the link to government policy decisions on emissions reduction and adaptation.

4.2 National Planning Instruments

The RMA provides for a range of instruments to be promulgated by the Government - national policy statements and national environmental standards. There have been two such standards introduced since 2017. The Government has also promulgated new and amended direction, legislation and established new institutions with new mandates, all of which do or will alter the context of coastal planning and decision-making. This wide range of contextual changes is set out in Table 2 on the following page, along with their likely implications and a commentary.

[18] See First Reading of the Resource Legislation Amendment Bill, 3rd Dec 2015, Hansard, NZ Government

Table 2: National Planning Instruments - Recent Changes

Change	Nature/Implication of Change	Commentary
National Planning Standards – First set (November 2019)	In an endeavour to achieve greater consistency in the format and design of policy statements and plans, a set of national standards has been promulgated and timeframes set for the update of all plans. RPSs must have a chapter entitled Hazards and Risk, regional plans must have a Topic chapter called natural hazards, and district plans must have a section entitled Hazards and Risks, with a chapter entitled natural hazards. The standards contain a number of definitions that may be relevant to detailed natural hazards management (such as ground level, ground water).	The requirement for specific chapter headings is likely to force coastal planning into a "Hazard and Risk" context. As most current coastal planning is found in this context, this may not be a problem, however the comprehensive planning approach required for DAPP may require a more comprehensive framework. The requirements for the electronic accessibility of all planning documents, and adequate mapping on a GIS basis will be helpful for coastal management.
The National Policy Statement on Urban Development 2020 (effective from August 2020). This replaced the National Policy Statement on Urban Development Capacity 2016	The National Policy Statement on Urban Development Capacity required many territorial authorities to identify suitable land for projected growth requirements for the next 30 years. This basic requirement was replaced in August 2020 with more complex requirements, which are intended to include not just capacity but also affordability calculations and to integrate a number of stated physical requirements in relation to transport and geographic location. It also removes some of the freedoms to limit building height (as a form of density limitation) which have previously applied under the RMA. The concept of well-functioning urban environments is central to this NPS, and many councils are required to provide a future development strategy for their urban environments.	The main requirement is the preparation of a Future Development Strategy (FSD) by priority local authorities. The detailed and relatively heavy-handed requirements of this NPS have resulted in urgent searches for growth capacity by territorial authorities in larger and under-pressure urban areas and are bringing to the fore conflicts over areas subject to a range of environmental protections including hazards-based protection. While the NPS appears to contain a number of safeguards against "bad planning", these are yet to be worked out in practice. A positive element is that this NPS provides underpinning and support for systematic spatial planning processes. Box 1 provides a more detailed analysis of the issues that this new NPS raises in relation to coastal planning.
Amendment to Local Government Act 2002, section 101B, Infrastructure Strategy	The LGA was amended in 2014 to provide for councils to prepare and adopt an infrastructure strategy as part of a Long Term Plan (LTP) for a period of at least 30 years (for the first 10 years and subsequent 5-year periods). The purpose of the strategy is to identify significant infrastructure issues and the principal options for managing them, and the implications of the options. Assets included are water supply; treatment and disposal of sewage; stormwater drainage; flood protection and control works; roads and footpaths; and any other assets that the council decides. The following issues must be addressed: • renewal/ replacement of existing assets • response to growth or decline in demand	This isn't "new" legislation since the 2017 Guidance although its shortcomings have emerged since, as councils have been progressively addressing the requirements through their LTPs. The 30-year timeframe(which also applies to the national strategy -see next row) is at odds with the NZCPS approach of "at least 100 years" for the coastal environment. The amendment refers only to natural hazards and not climate change, thus leaving uncertainty as to the nature of the risks to be taken into account. It could be read to include only those climate change hazards that are regarded as causing potentially significant issues

	for services • planned changes in Level of Service • maintaining public health and environmental outcomes and/or improving or mitigating the effects of them • providing for resilient infrastructure assets by identifying and managing risks related to natural hazards and making financial provision for the risks. The local authority must identify the most likely scenario, and likely capital and operations and maintenance forecasts. Where there is uncertainty, they must identify the nature of various uncertainties, and include an outline of the potential effects of that uncertainty with regard to lifecycle, growth, decline, and level of service.	e.g. SEA-LEVEL RISE, heavy rainfall, drought, and other extreme events. Other risks in the NCCRA would be outside this e.g. fire, pest incursions on biodiversity, but may affect coastal hazards. There is a challenge in selecting the "most likely" scenario, as this is not necessarily well-aligned with DAPP planning or an adaptive approach.
NZ Infrastructure Commission Te Waihanga Act 2019	This establishes a new Crown entity, the NZ Infrastructure Commission. The main function of the Commission is, at national level, to co-ordinate, develop, and promote an approach to infrastructure that encourages infrastructure, and services that result from the infrastructure, that improve the well-being of New Zealanders, on a 30-year basis. The Commission is required to produce a series of strategy reports, identifying problems and priorities. This includes maintenance, decommissioning and removal of infrastructure. They "must have regard" to long term trends that impact and are impacted by infrastructure: • demographic changes • the emergence and availability of new technology • matters relating to mitigation of the effects of climate change (reducing emissions) and adapting to the effects of climate change • other matters.	The approach and strategy are the focus of the Commission's work, and coordination of projects is a support function. Consistent with the LGA, the infrastructure strategy has a 30-year focus, with a potential here to build in responses to long-term trends that have to be considered, such as climate change responses, including adaptation.
Urban Development Act 2020, Covid-19 Recovery (Fast-track Consenting Act) 2020	These two pieces of legislation provide for the "fast-tracking" of major development projects. The first is primarily focused on government-supported housing (largely through Kainga Ora - Homes and Communities agency). The second is primarily focused on fast-tracking a small number of specified large construction projects so that they can be undertaken speedily, with more able to be added.	The provisions of these two recent statutes aim to speed up processes and facilitate development in circumstances where the RMA has been seen as having overly complex and slow processes, and sometimes other components (such as multiple-ownership of land or cross-agency funding issues) have been seen as barriers. Note that the previous short-lived legislation, the Housing Accords and Special Housing Areas Act 2013 (HASSHA Act) was found to have considerable shortcomings due to its narrow focus, including enabling new areas for

		development likely to be subject to the effects of sea-level rise within 100 years. With this legislation there remains a risk that such processes do not involve adequate due diligence in terms of natural process implications, and/or involve land in areas where the benefits of availability trump long-term considerations (such as the implications of increasing densities in areas which will become subject to climate change/sea-level rise implications within their economic or practical lifetime).
Amendment to the Climate Change Response Act 2002, by additions of Part 1C, Adaptation, in 2019	This has required the preparation of a National Climate Risk Assessment within one year of enactment and updates to occur every six years or more frequently. There must be a National Adaptation Plan prepared within two years of a Risk Assessment, and progress reports are required every two years. The Climate Change Commission must monitor the progress and effectiveness of the national Adaptation Plan and hold the Government accountable.	The first Risk Assessment was produced in August 2020, and focuses on 10 major broad threats, including human risks to social cohesion from displacement of individuals, families and communities, risks to the economy from the costs of, *inter alia*, ongoing gradual changes, risks to buildings from a range of climate changes, maladaptation due to use of governance tools that do not account for change over long timeframes, and the potential to exacerbate known risks because institutional arrangements cannot deal with the needed action.

Box 1: NPS on Urban Development – is it a Threat to sound Coastal Planning for Sea-level Rise and Coastal Hazards? (See Table 2)

The newest national policy statement to be promulgated under the RMA – the National Policy Statement on Urban Development 2020 (NPS-UD)– applies to all planning decisions made by any local authority that affect an urban environment from August 2020. The terms "urban environment" and "planning decision" are both defined – the former as any area of land that is, or is intended to be, predominantly urban in character, or is, or is intended to be, part of a housing and labour market of at least 10,000 people; the latter means a decision on a policy or plan or other instrument prepared directly under the RMA, or any resource consent.

The NPS-UD is highly directive. Its primary purpose is to enhance urban capacity for residential and commercial activity through a concept of "well-functioning urban environments" aiming to ensure opportunity and diversity in location, function, and land cost along with accessibility in the short (3-year), medium (3-10-year) and long term (10-30-years ahead). This is to be achieved at the same time as supporting (and limiting adverse effects on) the competitive operation of land and development markets, supporting reductions in greenhouse gas emissions, and ensuring that urban environments are resilient to the current and future effects of climate change. The initial emphasis is on the country's larger urban areas, who have specific time requirements to implement the policies, but provisions such as those relating to consents apply in all urban environments from the operative date of the NPS-UD.

Amongst the specific policy provisions are the following.

- In city centre zones, enabling as much development potential as possible.
- In sub-regional (metropolitan) centres, enabling building heights of at least six storeys.
- Enabling building heights of at least 6 storeys within walking catchments of existing and planned rapid transit stops, the edges of city and metropolitan centre zones.
- Elsewhere, enabling building heights and densities commensurate with public transport accessibility and

relative demands; and

- All requirements for provision of car parks, other than for accessible ones, are removed.

These very specific requirements can be wound back in district plans only to the extent that a "qualifying matter" needs to be accommodated. A limitation in this provision is that density can be reduced "only to the extent necessary". Qualifying matters include all RMA section 6 matters (potentially relevant to this analysis, the management of significant risks from natural hazards), a matter necessary to give effect to any other national policy statement (relevant to this analysis, the New Zealand Coastal Policy Statement 2010), open space protected for public use, designated land, and any other "special character" aspects that may justify a reduction in height or density. The application of any qualifying matter is subject to a detailed analysis to be undertaken by the local authority (as part of a section 32 analysis), which explains why any area is subject to such a matter, why the matter means that the development capacity directions cannot be met and by how much and assesses the costs and broader implications of the reduced capacity.

When making planning decisions affecting urban environments, particular regard must be had to five specified matters. All but one of these matters are likely to relate positively and encourage widespread intensification. The final matter is "the likely current and future effects of climate change". There is an absence of weighting of these matters, and a current absence of guidance on this aspect.

The NPS-UD contains a large implementation section. This requires local authorities with larger urban areas to undertake Housing and Business Development Capacity Assessments (HBA) and then to prepare a Future Development Strategy (FDS) to provide at least sufficient development capacity to meet at least the next 30 years anticipated growth, and to achieve well-functioning urban environments. A FDS must have a spatial component (and may comprise a spatial plan) to identify where growth capacity will be met (in existing and future urban areas), the infrastructure needed to support the growth (including corridors and sites) and any constraints on development. FDSs must be prepared every 6 years and reviewed at 3-yearly intervals, to tie in with long term plans under the LGA. Each FDS must be supported by an implementation plan, which must be updated annually. To meet NPS-UD requirements for capacity, sufficient land must be plan-enabled and infrastructure-ready (i.e. sufficient land must be zoned to meet capacity requirements, and infrastructure must be available or included in the long-term plan). Time requirements for local authorities with larger urban areas are that height/density requirements must be changed in compliance with the NPS-UD within 2 years (i.e. by August 2022), and that the first FDSs must be prepared and publicly available in time to inform the 2024 long term plan.

Prior to preparing a FDS, there are consultation requirements including with infrastructure providers, the development sector and relevant central government agencies. The preparation and updating of FDSs are subject to LGA special consultative procedures. The NPS-UD contains monitoring requirements relating to the demand and supply of development land and affordability, but not to other aspects of local environments. If the anticipated rate of development is not occurring, then the statutory planning documents must be examined to identify any barriers to development, and to change the relevant district plan to address them. Insufficiencies to meet demand must be reported to the Minister for the Environment.

Once promulgated, the FDS then forms a matter which anyone preparing or changing an RMA planning document must have regard to. Local authorities are strongly encouraged to use them to inform long term plans, infrastructure strategies, regional land transport plans and any other relevant strategies and plans.

Commentary

There are many positive aspects of the NPS-UD. For the first time under the RMA, there is a national direction document that specifically mandates spatial planning, and that links infrastructure planning closely with land use planning. However, there are numerous potential negative consequences for planning to address the effects of climate change in coastal locations.

These can be summarised as follows:

1. The strongly directive nature of this NPS is likely to challenge the NZCPS provisions (which are couched in less directive language), and it is unlikely that capacity restrictions will be able to be maintained in most areas subject to sea-level rise effects that will not be experienced in the NPS-UD's medium to long term. This is despite the NZCPS requiring planning" for at least the next 100 years" (NZCPS Policy 25).
2. The FDS is development demand-driven, and not necessarily based on normal good-practice planning processes of constraints identification and mapping, followed by demand assessment and provision of

capacity in areas outside areas of constraint.

3. The slow and changing processes associated with climate change do not readily fit into strongly directive, demand-driven, planning processes, where updates must be considered annually and adjustments to RMA plans for short-falls in meeting demand are mandatory.
4. The monitoring required under the NPS-UD does not include monitoring relating to climate change or coastal change.
5. The qualifying circumstances provided for in the NPS-UD only relate to the provisions within the NZCPS which relate to coastal planning. Very rarely is it likely that the RMA section 6 matter of "the management of a significant risk from natural hazard" would be able to be used to justify a reduction in potential capacity (acknowledging that there is as yet no relevant case law)[19].
6. The short, two-year, time frame within which most local authorities are required to act to reduce development constraints in specified areas does not encourage investigation of risk exposure and considered responses, particularly where such work has not already been undertaken.
7. The short time frames within which most local authorities are required to act to reduce development constraints in specified areas are unlikely to allow for processes, such as the DAPP processes recommended in the government coastal guidance, to be successfully undertaken, particularly where a community may choose approaches that envisage retreat over time.
8. While the directive policy provisions of the NPS-UD apply to decisions on consent applications, it appears that qualifying matters don't apply to the consideration of applications for resource consents (unless they are already embedded in a statutory plan) – only to RMA policy and plans.
9. Similarly, FDSs don't appear to apply to the consideration of resource consent applications.

It seems likely that the actual and potential effects of climate change will become overwhelmed as a matter to be considered in the drive to provide for development capacity which is embodied in the NPS-UD, despite an objective requiring urban environments to be resilient to the future effects of climate change. This is likely to be the case particularly where the walking distance catchments around city and metropolitan centre zones, and the zones themselves abut the coast. The long-term planning necessary to manage the effects of climate change and to avoid the issues and cost of sea-level rise and coastal retreat, is not facilitated by the NPS-UD, particularly when such a short lead-in time is given. It is likely that the development capacity increases which the NPS-UD will lock in will thus escalate future risks. They will be difficult to address or change over time, as the ongoing encroachment of the sea, rising groundwater and salt-water intrusion advance. The implications of servicing such urban development are potentially significant.

Overall, the NPS-UD is likely to add pressure for future coastal development in urban settings, rather than reduce it.

4.3 Recent Relevant Case Law

Case law strongly influences practice, as it is the acid test for interpretation of the RMA. Previous case law relevant to the management of coastal development in the face of hazards and risks is listed in Appendix B of the Guidance[20]. A number of more recent cases have helped clarify matters such as how the requirements of different NPSs relate to each other, and how to interpret the forcefulness of language in different NPS policies or between different NPSs. Both have thrown light on the wording of policy components of the NZCPS. Relatively few cases relating to coastal structures are ever tested through the courts, but the first example of required retreat has been

[19]The Introductory Guide to the NPS-UD (MfE and Ministry of Housing and Urban Development 2020) has a section titled "interactions with other national direction". While this refers to four areas where new national direction is being developed, it does not refer to existing national direction, such as the NZCPS. A companion publication – "Understanding and implementing intensification provisions for the National Policy Statement on Urban Development" provides advice on qualifying matters and places emphasis on the "only if necessary" requirement where density is to be reduced below the national direction.

[20]Further details of each of the referenced cases can be found in a report linked directly from https://niwa.co.nz/natural-hazards/hazards/planning-for-coastal-adaptation

endorsed by the Environment Court (relating to significant risk of a debris flow, rather than sea-level rise), and a case relating to hard protection has emphasised the need for effective planning across the mean high water springs boundary. This case law is set out in Table 3.

Table 3: Case Law Updates

Case	Outcome
King Salmon Supreme Court - Environmental Defence Society Inc v New Zealand King Salmon Company Ltd [2014] NZSC 38	Although this decision was released in 2014, its implications have taken some time to be applied, particularly into new policy. Three key aspects of the decision are: • Highlighting the importance of the policy flow from RMA Part 2, through national policy into regional policy statements and regional and district plans on the basis of the "giving effect" requirement. This means that, when plan preparation or variations or reviews are involved, and there is a relevant national policy statement, recourse to Part 2 should not be necessary except where plan provisions do not "cover the field", where the provisions are uncertain, or there is a claim of invalidity. The outcome has been a new emphasis on seeking to ensure that the NZCPS is adequately reflected in plans. • Emphasis on the importance of the language used in documents. The directive tone of words like "avoid" must be respected and carried through into lower-order documents. The more specific and directive the words, the clearer the obligation to implement the provisions. • Clarification that the methodological requirements of the NZCPS (in that case Policies 13 and 15) must be followed – i.e. the relevant environmental qualities must be assessed (at regional level), areas relevant to the policy must be identified, and regional policy statements and plans must include objectives, policies and rules which achieve the policies.
Sustain our Sounds Inc v NZ King Salmon Company Ltd [2014] NZSC 40	Although this decision is of the same vintage as the above, it has been of lesser practical impact. However it made important findings on the availability of an adaptive management approach in terms of NZCPS Policy 3 (the precautionary approach). The decision addressed what is necessary for an adaptive management regime to be an acceptable tool, including the ability to suspend, mitigate and remedy non-compliant circumstances. It also discussed the applicability of review of consent conditions under RMA section 128 and 132, and the ability to cancel consents. While the issues raised related to water quality, the legal implications extend to e.g. regional and district land use consents, although the tests were acknowledged to be high.
RJ Davidson Family Trust vs Marlborough District Council CA 97/2017[2018] NZCA 316	This case considered the need for decisions on resource consent applications to refer to RMA Part 2 and determined that they do. This decision does not signal that Part 2 matters can apply in a resource consent setting to render regional policy statements and plans ineffective [21] and both the High Court and Court of Appeal were definite about that. Rather, the Courts expect these lower order instruments to reflect the higher order (Part 2 and NZCPS) requirements effectively.
Transpower NZ Ltd vs Auckland Council [2017] NZHC 281 (Interim) and 1585 (final)	This case looked at the relationship between two NPSs under the RMA in terms of the Auckland Unitary Plan: the NZCPS and National Policy Statement for Electricity Transmission. Noting that there are slightly different wordings in the RMA between those for the NZCPS (s56) and those for other NPSs (s45), the Court determined that the statutory purpose of the RMA, other Part 2 matters, as well as NPSs are all relevant when exercising RMA powers and functions, and any NPS (this includes the NZCPS), however narrow its scope, cannot be ignored.
Tauranga Environmental	The logic of the above decision was confirmed in this case, although dealing with a

[21] It drew attention to and endorsed the High Court decision's concern about this potential outcome.

Protection Society vs Tauranga City Council and Bay of Plenty Regional Council [2020] NZEnvC 043	resource consent application. The Court confirmed that there is no basis to give one NPS priority over another when having regard to them under RMA s104. If they seem to "pull in different directions", and are not resolved in the relevant plans, then a detailed analysis must be undertaken in each case (this includes the NZCPS).
Auckland Council vs Auckland Council and Others [2020] NZEnvC 070 (interim decision)	This complex case involved the Community Facilities Department of Auckland City Council applying for consent to erect a walkway/cycleway and protective sea wall straddling the line of (MHWS)along the eroding esplanade reserve at Orewa. The Council, as RMA decision-maker, declined consent. The area is a dynamic and complex coastal environment, subject to past human change, and a present council programme of beach sand replenishment. By the time the application was heard by the Court, the proposal had been modified substantially so that the sea wall was on the landward side of MHWS(although it was still within the scope of the original application) and a number of rules (and associated policy) no longer applied, including policy that hard protection structures should be avoided. There was no dispute that the Auckland Unitary Plan gave effect to the NZCPS, so reference back to that document was not necessary. The decision found that the amended proposal was consistent with the objective and four policies relating to natural hazards in the AUP. The decision eventually turned upon two competing matters of national importance – the maintenance of public access to and along the Coastal Marine Area, and the preservation of the natural character of the coastal environment. While noting that the amended proposal was a compromise, the Court granted consent. Amongst a large number of contextual comments in the decision, the Court observed: • that the implications of the MHWS boundary, which limited the application of some coastal policy in this case, was "an inherent difficulty" and one which should be considered by any territorial authority when preparing district plan provisions for any parts of the district adjacent to the sea. • there should be comprehensive coastal management planning at Ōrewa, as there should be at many places around the New Zealand coastline. The Court recognised that simply seeking to maintain the status quo in a dynamic coastal environment is unlikely to be sustainable in the longer term and therefore would be unlikely to give effect to or have adequate regard for Objective 5 and Policies 24 and 25 of the NZCPS relating to dealing with coastal hazards. • there was expert agreement as to the extent of coastal retreat related to each metre of sea-level rise. While building walls or an option of raising the dune may delay erosion it would not prevent inundation, as the beach has waterways at both ends and stormwater outfalls along its length. • a long-term strategy, which may take 5 to 10 years to implement, would be needed. • the option of managed retreat in this case, widening the esplanade reserve landward, by acquiring private land along the beachfront (described in the decision as a difficult subject which may involve compulsory acquisition of land under the PWA 1981), had not been considered to any extent. The Court was only able to deal with the proposal before it. The decision does not mean that the longer-term issues will go away or even that they may be pushed back. The Court endorsed advice and warnings from the expert witnesses that the Council, both as Applicant and as Respondent, must face and plan for the longer-term issues now.
Awatarariki Residents Incorporated vs Bay of Plenty Regional Council and Whakatane District Council [2020] NZEnvC 215	This appeal related to a single house and the time by which it must be vacated as part of "managed retreat" provisions in the Whakatane District Plan and the BoP Natural Resources Plan. The circumstances were so unusual that, although the appeal was settled by consent, the decision set out more detail than would be normal for a decision by consent. The change to the regional plan was confirmed, subject to a modified date on one

	property, and the district plan change was also confirmed. The following findings were made. • The area is at high risk of a significant natural hazard (a debris flow) and MBI had determined under the BA that houses should not be built there, and therefore any form of permanent accommodation should be precluded. • Changes to the regional and district plan applied to an identified area in which both existing and future residential activities were prohibited. The status under the regional plan overrides and has the effect of terminating existing use rights under the district plan. • The RPS contained relevant provisions, which could only be given effect to in the circumstances by the two plan changes. • The programme for voluntary managed retreat was commensurate with the risk exposure. • The risk exposure by the extension sought for the single property of one year would not generally give effect to the RPS but was a shorter period than had full litigation of the appeal been carried out. The owners/occupiers of the property had agreed to indemnify both councils against any claim. • RMA section 85 was briefly discussed, but as determined in the original council decision, the plan changes were found not to deprive the landowners of the reasonable use of their land (referring to Hastings vs ACC, 2001). • The plan changes were appropriate in the circumstances and were confirmed.

4.4 The 'Climate Emergency' and Shared Responsibility across Portfolios and Levels of Government

The New Zealand Government on 2 December 2020 declared a Climate Emergency to signal the urgency for addressing climate change. This followed 17 councils across 75% of the population of New Zealand also declaring climate emergencies. Prior to this in 2017 a group of 66 out of 78 local government Mayors and Council Chairs signed a declaration calling for an urgent response and leadership on climate change in partnership with the Government.

The Climate Change (Zero Carbon) Response Amendment Act 2019 set out the framework for action on mitigation and adaptation and in particular, a National Risk Assessment, National Adaptation Plan (NAP) and for monitoring the progress and effectiveness of the implementation of the NAP. The Infrastructure Commission Act includes climate change as a matter to be considered in the Infrastructure Strategy Reports. At the same time the Government has set up Taumata Arowai, the regulator of the three waters - drinking water, wastewater, and stormwater - to uphold standards.

The practical effect of these new initiatives has not yet been demonstrated and will require high levels of coordination across central and local government and close integration with ongoing and future policy and planning work under existing and new legislation. However, in broad climate change response terms, they provide an opportunity for improved policy alignment of local, regional, and central government, and set a framework for pre-emptive adaptive planning that can reduce risk exposure and vulnerability.

4.5 Issues and Opportunities in Recent Changes to the existing Operating Environment for Coastal Planning

The various changes to the operating circumstances of local authorities signalled by the items set out in Tables 1 to 3, along with the urgency imparted by the climate emergency, embody both problems and opportunities in planning ahead for climate change in the coastal environment.

Integrating the planning already being, or yet to be, undertaken at national level by a range of new and existing agencies is likely to be challenging. This includes the necessary integration with existing operational government agencies responsible for transport, public and social housing. Further complexity is likely to arise from the need to address funding sources for a range of initiatives, involving programming and central government budgets.

While local government correctly identifies these changes as opportunities[22], they also see the potential for duplication of effort and insufficient opportunity for local government inputs into the various nationally based strategies.

The recent changes to the RMA relating to hazard risk (still the dominant law governing local government coastal planning activity) has focused on the management of "significant risk"[23]. This may reduce the ability to prevent subdivision where the effects of climate change are not immediate depending on how "significant" is interpreted by planners e.g. scale and/or proximity of risk in time. High levels of risk were demonstrably present in the Matata debris flow situation leading to the first "coastal retreat" plan change decision through the Environment Court as reported in Table 3. However, climate change processes remain unresolved as to the significance of the rising risk over time due to lack of recent case law and definition of "significant risk".

As explained in section 3.3 climate change is both an exacerbator of existing natural hazards like coastal erosion and cliff collapse and the source of new hazards from storm surge and inundation in low-lying coastal areas from ongoing sea-level rise which becomes the dominant hazard at the coast over time. The risks associated with sea-level rise are significant, whatever their timing, because of their pervasive and ongoing nature, long duration and impacts on coastal space. However, at a local level they may not be seen as significant in the short- or medium-term planning context.

Some areas of active coastal erosion, including cliff collapse, and areas of inundation, are exposed to immediate and significant risk which meet the type of significance analysis undertaken in relation to the Matata debris flow for example. However, a debris flow is quite unlike the risks from sea-level rise. It is not clear whether the new RMA section 6 matter was intended to capture and provide support for the growing risk over the "at least 100-year" framework of NZCPS policy, or whether it was intended that such risks remain at least partly a RMA section 7 "other matter" i.e. "the effects of climate change". It has not yet been legally tested whether all areas within the "at least 100-year" coastal hazard risk framework (NZCPS as assessed under the current Guidance) are subject to "significant risk". The concept theoretically allows for risk reduction through a range of practical on-site mitigation responses, but this cuts directly across the broader intentions of NZCPS Policy 25 (a) and (b) to avoid changes in land use or redevelopment that would increase risk[24] of adverse effects

[22] See https://www.lgnz.co.nz/our-work/our-policy-priorities/the-six-big-issues/, andhttps://www.lgnz.co.nz/our-work/our-policy-priorities/climate-change/

[23] E.g. evidence at Marlborough District Council hearings relating to coastal hazard provisions in the proposed Marlborough Environment Plan.

[24] As defined in the NZCPS.

from coastal hazards. Suffice to say the changes have created some uncertainty when addressing "significant risks" and "climate change effects" in sections 6 and 7 of the RMA as recently amended.

With the growing number of national policy instruments formulated under the RMA, and the relevant lines of case law, emphasis is being placed on their comparative directiveness expressed through their language, rather than a broader planning perspective. In this respect, the more recently developed NPSs have benefitted from the King Salmon decision and have adopted more directive language to set out and achieve national policy intentions. Particularly relevant in this case is the NPS-UD, where we have seen that the implications of sea-level rise require potentially tortuous justification if the urban density/intensity intentions of that particular NPS are to be modified in some areas to account for them. A question arises as to who is to monitor the workings of the NPS-UD in relation to the NZCPS to avoid intensification which may be contrary to NZCPS[25] Policy 25.

While many councils are still at the stage of responding to NZCPS Policy 24 (identification of coastal hazards), case law has not helped to clarify other aspects, such as adequacy of information and methods for risk screening(to determine areas "potentially affected"), on which to base coastal planning for the future.

On balance, while local government can see future opportunities from the changes set out in Tables 1 to 3, there are also significant areas of uncertainty (including planning timeframes and issues of significance of risk), which have emerged from these recent changes.

In the meantime, the responsibilities for local authorities to give effect to the NZCPS continue to apply, and its key requirements relating to coastal hazard and risk set out in Objective 5 and Policies 24, 25, 26 and 27 are as relevant today as when they were promulgated in 2010. The additional detail provided in the Guidance and in DoC, 2017 has assisted councils, but progress has been slow due to a perception of inadequate mandate, funding constraints for investigations, resourcing and level of engagement(LGNZ, 2020), hazard analysis and the complex and lengthy processes of implementing changes to planning documents (including policy and rules), difficulties in embedding the outcomes of DAPP within the essentially static statutory planning instruments, and other competing pressures which local authorities are having to address.

[25]The responsibility for the NZCPS lies with the Department of Conservation, including monitoring its effectiveness. Case law on NPSs to date has pitted DoC against Transpower – another national agency. DoC may not have the resources to pursue issues around the planning that will arise from the NPS-UD across the numerous local authorities involved.

5 BUILDING UP THE KNOWLEDGE BASE

5.1 Identification of Coastal Hazards

Over the past decade national research programmes and local authorities have made significant progress in mapping Aotearoa New Zealand's hazard and risk scape for the coastal environment. Reporting and mapping has evolved to include coastal inundation from sea-level rise when mapping hazards and considering risks(exposure and vulnerability) to the built and natural environment alongside the potential implications of necessary behaviour change and adaptive practices on society and culture. These hazard and risk assessments have been done at the national scale, mostly limited to risk exposure (e.g., Simonson & Grace, 2019; Paulik et al., 2020), and at the regional/district scale in more detail (e.g., Stephens et al., 2021 for Tauranga City and examples below).

The requirement for identification of hazards for areas "potentially affected" is clearly included in the NZCPS [NZCPS Policy 24] and has often been a driver to enable prioritisation of these activities, especially in relation to existing development and areas "most likely to be affected" [NZCPS Policy 27]. In this section we identify the value that identification of coastal hazards including climate change driven hazards has when progressing planning outcomes. This increasing understanding of the coastal risk scape will assist in the identification of areas where the NZCPS requires that future development must be avoided and those areas of existing development needing an adaptation strategy [NZCPS Policy 27].

Improvements in regional hazard assessments and mapping have enabled regionally consistent identification of coastal hazard areas, identified the need for site specific risk and social vulnerability assessments and catalysed the development of tools and strategies for managing coastal risk, such as DAPP, Real Options Analysis (ROA) that can identify adaptive actions and pathways supported by signals and triggers of changing conditions as sea levels rise.

Examples include:

- Auckland Council developed a Natural Hazards Risk Management Action Plan that complied and analysed all available regional hazard information. Having a regional (mapped) platform including multiple hazards (including climate change effects) was used as a tool in addressing future growth through the Auckland Unitary Plan and prioritising adaptive processes and adaptation investment. Auckland Council's mapping of coastal inundation areas (in 2016) for the Auckland Unitary Plan included both one and two metres of sea-level rise, followed by more detailed hydrodynamic mapping for priority catchments, providing a regional picture of exposure to coastal inundation and the impact of sea-level rise. More recently (2021) the Council has developed and published maps of a first-pass assessment of coastal instability and erosion under and range of sea-level rise scenarios and timeframes (2050, 2080, and 2130) based on sea-level rise projections recommended in the Guidance[26]. This information will contribute to decisions on resource consent applications and infrastructure decisions. It is now forming the basis for a change and update to the Auckland Unitary Plan.
- Northland's mapping (originally taking a risk-based approach to priority catchments) of coastal hazards was further updated to provide regional coverage. This mapping utilises both

[26]https://aucklandcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=3ded5342789f4af48deb906a3c05cabe

'bathtub' and hydrodynamic modelling to respond to the different coastal typologies around the regional coastline. The mapping at regional level has formed the basis for current regional rules and is now forming a basis for community engagement at local level and will eventually contribute to changes to district plans within the region.

- Waikato Regional Council's inundation 'slider' enables users to investigate land areas potentially impacted by different increments of sea-level rise and storm inundation events. The slider is separate and complementary to coastal hazard mapping available for other parts of the region, where mapping of both inundation and erosion has been undertaken on a regional priority catchment basis. This information is being used to inform second generation district plans within the region and is providing an information base for discussion about exposure, risk, and adaptation in parts of the region. An example of these further discussions is the "Wharekawa Coast - Looking Ahead - 2120" engagement and (non-statutory) planning activities.
- In the Hawke's Bay region, coastal hazard mapping has been undertaken by both regional and district councils. This includes both inundation and erosion mapping for different areas of the coast. The information has formed the basis of hazard and risk assessments[27] that have been used in the development of the Clifton to Tangoio Coastal Hazards Strategy 2120 developed by the Joint Councils Committee and community panels using a hybrid Multi-criteria Decision Analysis and DAPP process (Lawrence et al, 2019).
- The Bay of Plenty regional coastal hazards viewer combines various regional and district data sets for coastal hazards into one platform giving a regional view. The RPS requires a risk-based approach (using semi-quantitative assessment tools across a range of value domains) for natural hazards management. Areas with increasing development pressures (such as Tauranga City and surrounds) have undertaken more detailed coastal hazards (flooding and erosion)mapping and risk assessment (Stephens et al., 2021) to support decision making for future growth including areas potentially for managed retreat (Jones & Raynor, 2020).
- Greater Wellington Regional Council's coastal hazards reporting and mapping, includes both storm surge (inundation) and sea-level rise. This regional mapping has enabled the development of coastal vulnerability assessments, which are intended to guide decision-making and the development of community-led coastal adaptation strategies across the region. A regional sea-level rise slider provides a similar approach to the Waikato region and uses a detailed digital elevation model (DEM) alongside regional sea-level rise projections. A 3D prototype is also being developed which includes building footprints and adds to the visual impact of the tool.
- Nelson City is mapping and engaging with its communities on coastal inundation and erosion (see Section 6.2) and the development of coastal (and other) hazards mapping has been ongoing for several years. This mapping has been developed alongside a draft of the second-generation Nelson Resource Management Plan. Coastal inundation layers[28] are available through the website and show sea-level rise increments up to 2m.
- The Tasman District has undertaken coastal hazards (coastal inundation and erosion) and sea-level rise mapping (at 0.5m increments up to 2m and 1% AEP storm tide levels) for Tasman Bay/Te Tai o Aorere and Golden Bay/Mohua. This mapping has also included the identification of hard/coastal protection structures based on the council's database[29]. This

[27]Accessible at https://www.hbcoast.co.nz/resources/
[28]Accessible at https://shape.nelson.govt.nz/coastal-hazards/about-coastal-inundation-online-maps
[29]https://www.tasman.govt.nz/assets/Temporary-Documents/Coastal-Management-Project-Coastal-Risk-Assessment-Final-December-2020.pdf]

information was released in 2019 as a coastal hazards map viewer on the Council's website and launched the start of the Council's 'Coastal Management Project – Responding to Climate Change' which is following Guidance and will be used to inform a number of council work programmes including asset management and engaging on adaptation options using DAPP[30].

- Following a critical review of earlier work (Kenderdine et al, 2016) Christchurch City Council is currently consulting on an updated coastal hazards assessment[31].This includes extensive interactive mapping of a range of sea levels, erosion, and changes in groundwater levels. The information is to be included on LIMs following public input and is the basis for work the council is undertaking on its adaptation planning programme.

- Many other regions and districts have undertaken coastal hazard mapping alongside and ahead of second-generation planning processes under the RMA. Development of information portals such as the Otago Regional Council's Hazards portal[32] are examples of regional innovations which can accommodate new information and multiple hazards including climate-related hazards such as flooding, heat, drought, and sea-level rise.

Challenges remain where studies apply differing methodologies (e.g. see Stephens et al. 2021 comparing risk between "bath-tub" and hydrodynamic modelling); select different subsets of climate-change and sea-level rise scenarios (or the improved approach of using sea-level rise increments (MfE, 2017), or are underpinned by different data sets (including accuracy and resolution of land topography LiDAR) either across regions or within a region. While some councils have advanced provision of coastal hazard information, including some having undertaken risk assessments in a changing risk context, there remain issues of adequate resourcing, staff capacity and the need for early community engagement in assessing risk and vulnerability in many parts of the country.

Building knowledge at a regional level has been supported at national level. This has included information from and investigations by both central government agencies and Local Government NZ, as well as outcomes of research programmes and the development of tools supported by wider government and private sector agencies, for example:

- The Parliamentary Commissioner for the Environment's investigation and reporting on New Zealand's rising seas, which included two NIWA assessments of sea-level rise hazards and risks and the effect of changing risk as sea-levels rise[33].
- Local Government NZ (Simonson & Grace, 2019) examined exposure to sea-level rise in *"Vulnerable: the quantum of local government infrastructure exposed to sea-level rise"* quantifying risk and identifying the most vulnerable regions at risk[34].
- RiskScape is an open-source modelling platform, developed through a collaboration between GNS Science, NIWA and now the Earthquake Commission to better understand exposure and potential losses associated with climate change and natural hazard risk. RiskScape has been used in coastal flood risk assessments, with varying increments of sea-level rise, "nuisance" and extreme coastal flooding at a national scale (Paulik et al.,

[30] https://www.tasman.govt.nz/my-council/projects/coastal-management-responding-to-climate-change/
[31] https://www.ccc.govt.nz/environment/coast/coastalhazards/how-we-assess-coastal-hazards/
[32] https://maps.orc.govt.nz/portal/apps/MapSeries/index.html?appid=b24672e379394bb79a32c9977460d4c2
[33] https://www.pce.parliament.nz/publications/preparing-new-zealand-for-rising-seas-certainty-and-uncertainty
[34] https://www.lgnz.co.nz/assets/Uploads/d566cc5291/47716-LGNZ-Sea-Level-Rise-Report-3-Proof-FINAL-compressed.pdf

2020; Paulik et al., 2021) and to support risk assessments by local and regional councils and iwi authorities[35].

- The MBIE-funded 5-yearNZ SeaRise Programme coordinated by Victoria University of Wellington will provide in March 2022 relative sea-level rise projections at approximately 20-km spacing along Aotearoa New Zealand's coastlines which includes new science on vertical land movement trends (subsidence and uplift) that can support tailored regional and local planning for coastal change[36].
- The Deep South National Science Challenge research by NIWA identified national exposure to coastal flooding from sea-level rise using RiskScape and coastal modelling (Paulik et al., 2020)
- The Resilience National Science Challenge *Adapting to New Zealand's Dynamic Coastal Hazards* programme is currently exploring the drivers of coastal change, coastal flooding predicters in estuaries and of compound risks, and coastal adaptation drivers and enablers such as vulnerability, planning and economic evaluation, monitoring, governance for managed retreat, and adaptation of coastal infrastructure. Guidance and decision tools will be delivered as part of the research.
- The Deep South National Science Challenge project on *Adaptive Tools for decisions on compound climate change impacts on water infrastructure* will produce a modelling tool accessible for councils for applying dynamic adaptive pathways planning for decision making and deliver workshops on how to use them.
- A 5-year MBIE Endeavour project *Transforming coastal lowland systems threatened by sea-level-rise into prosperous communities* coordinated by NIWA with GNS Science, universities, and consultants will investigate how relative sea-level rise affects lowland freshwater systems, wetlands, coastal marshes, and estuaries; the social, cultural, and economic systems that depend on them, and support evaluation and serious games for adaptive planning and design. The program will identify sea-level rise thresholds at which different land-uses are no longer viable, what adaptive actions are necessary, and when and where those thresholds may be reached.

Commentary:

The use of hazards and risk mapping in a static planning context has been shown to be insufficient for addressing risks from sea-level rise (MfE, 2017). The assessment of risk has traditionally relied upon the ability to put probabilities (likelihoods) on the impacts. However, there are deep uncertainties for sea-level rise beyond mid-century when trajectories widen across the different scenarios. Each scenario is based on how quickly greenhouse gas emissions are reduced and how further ice-sheet melting evolves, particularly if a tipping point is reached for runaway instabilities once global temperatures reach 2°C and beyond (IPCC 2021)[37].

The Guidance sets out new assessment frameworks and tools for tailoring risk assessments that allow for changing risk from several different coastal futures (scenarios) over long timeframes and build alternative pathways to the future with the flexibility to change options and pathways in response to signals and triggers activated before local adaptation thresholds (negative or intolerable consequences) are reached. These have been applied to river and coastal flooding (Lawrence et al

[35]https://niwa.co.nz/natural-hazards/research-projects/riskscape-software
[36]https://www.searise.nz/
[37]See Chapter 9

2019a; Lawrence et al 2019b) and to a range of infrastructure projects (Allis &Bell, 2019; Kool et al., 2020; Bell, 2020).

The ability to access information on sea-level rise hazards so that the consequences can be tested against different sea-level rise scenarios, is fundamental to progressing conversations about risks and vulnerabilities associated with sea-level rise. This can then lead on to exploration of how risks can be managed and what communities consider to be acceptable risk now and into the future.

Many of the strategies and plans being developed in response to updated hazard information indicate the need to consider longer term adaptive responses to coastal hazards and sea-level rise. The ability to consider hazards over longer temporal scales (given the decades to centuries persistence of rising seas) and to approach risk assessment in a more dynamic way relative to local adaptation thresholds, needs to be understood and then practiced in a spatial planning settings. Only then can the hazards and associated risks be effectively reflected in statutory documents (planning and other statutory processes including infrastructure planning and financing).

5.2 Sharing Knowledge and Building Capability

Continued national focus on some of the shared challenges and support for building capability and capacity within the research, private sector, and local government sectors, and within iwi/Māori organisations and communities, will continue to support the collective knowledge needed to both lead and participate in conversations about risk and adaptation. The increased visibility of coastal hazards through accessible maps and interactive tools alongside the use of the 2017 Guidance has led to more national conversations around adaptive processes and many districts and regions taking a keen interest in each other's approaches. There is more focus on adaptive approaches to address the uncertainty of when and how fast to respond to change, which is moderating the current focus on a "predict-then-act" approach which selects one scenario and chooses either a 'protection', 'avoidance' or 'accommodation' option to manage coastal hazards. This is timely and important given the current growth pressures and the need to focus more on regional spatial planning for urban intensification (see Box 1on the NPS-UD) and the location of strategic infrastructure.

Local Government:

Regional direction and information sharing platforms, such as Regional Council Special Interest Groups (SIGs), have long provided a channel for discussion, capability building and knowledge sharing. Inter-district and inter-and intra-regional for a have been developing over the years but are generally dependent on political support, funding, and resourcing. The emergence of regional champions (e.g. dedicated climate change staff and coordination groups) appears to be making a difference to the advancement of regional collaboration and the collection of coastal risk information and potentially as a catalyst that can help prioritise adaptation using DAPP planning. Recent good-practice examples follow.

- The 'CATT' group (Climate Adaptation Te Taitokerau) was established as a joint staff working group across the four Northland councils in 2018[38]. The purpose of this collaborative group is to work on a regionally consistent and coordinated approach to climate change adaptation. In 2021, a Joint Climate Change Adaptation Committee was also established as a formal committee under the Local Government Act. The joint committee has one councillor from each of Northland's four councils (regional and districts) and one iwi/hapū

[38] https://www.google.com/url?q=https://www.nrc.govt.nz/news/2021/april/joint-climate-change-adaptation-committee-meets/

representative from each of the councils' jurisdictions. The CATT group reports to the joint committee with recommendations and research to develop and deliver an aligned approach to supporting Northland communities to adapt to climate change. A key objective of the group is to develop an adaptation strategy to set direction and identify actions enabling the councils to plan and implement adaptation actions. The draft strategy was presented at the August 2021 joint committee meeting for sign-off by individual councils. A list of 46 recommended priority actions is included, relating to governance and management, improving information and knowledge, reducing climate risks, and building capacity. Projects underway by CATT include: a spatial climate risk assessment with specific focus on risks to coastal communities and Māori; detailed community adaptation profiles for 70 locations; an adaptation engagement framework detailing governance and project requirements for community adaptation planning for different communities; a review of statutory and non-statutory tools for local government; and a coastal adaptation programme outlining locations, proposed methods, and timeframes. Funding has been allocated by each council in the recent LTPs to finance many of the actions and projects in the adaptation strategy, including the delivery of several community adaptation planning projects across the region[39].

- The Waikato regional council has historically identified and provided hazard information including coastal hazard sat a regional scale, including tools to navigate and understand the interaction of the various legislative processes and tools[40]. An example is the coastal inundation slider (see section 5.1). This is augmented by more specific district and local assessments and the development of a Climate Change Action Roadmap including a commitment to defining clear and agreed trigger points using the DAPP approach to local coastal risk. The roadmap includes *"Coastal resilience - He takutaimārohirohi"* as one of the pathways to address the exposure of people, buildings, and arable land to coastal inundation. Development and resourcing of regional strategies across different environments includes support from the council of coastal panels, citizen science and coastal strategies within the districts in the region. Issues arising are often shared and discussed through regional for a such as the Waikato Resilience Forum which includes emergency managers, regional and district councils, researchers at CRIs and universities, neighbouring councils, iwi/hapū and other stakeholders.
- Greater Wellington Regional Council supports regional scale development of capability and capacity through collaboration with district councils and emergency managers. The council supports several opportunities to build knowledge and capability in hazard management[41] resilience studies[42] and climate change. In 2019, under the leadership of a specially constituted Wellington Region Climate Change Working Group, a vulnerability assessment, based on an analysis of coastal units was carried out on a regional basis[43], which has assisted the contributing councils to identify and focus on priority areas[44] based on improved understanding of both the coastal hazards and the vulnerability of the units.
- The Clifton to Tangoio Coastal Hazard Strategy 2120, was developed in the Hawke's Bay and governed by a joint council committee comprising (Hawke's Bay Regional Council (HBRC)

[39] http://northland.infocouncil.biz/Open/2020/11/CCWPC_20201125_AGN_2904_at Web.htm
[40] See Diagram at pages 10/11... https://www.waikatoregion.govt.nz/assets/WRC/WRC-2019/Climate-Roadmap.pdf
[41] https://www.google.com/url?q=https://www.gw.govt.nz/natural-hazards-management-strategy/&sa=D&source=editors&ust=1631746950348000&usg=AOvVaw3-U9AZy5QalzVfl9CWHTjE
[42] https://www.google.com/url?q=https://www.wremo.nz/assets/Uploads/191111-Wellington-Lifelines-PBC-MAIN-20191009.pdf&sa=D&source=editors&ust=1631746950349000&usg=AOvVaw1xjeaDeuKnkdXbhMw37f4G
[43] http://www.gw.govt.nz/assets/Uploads/Wellington-Regional-Coastal-Vulnerability-AssessmentJune-2019Final.pdf
[44] This study excluded Wellington City, which had already undertaken its own investigations.

Hastings District Council (HCC), Napier City Council (NCC)), iwi/hapū (He Toa Takatini, Mana Ahuriri Incorporated and Maungaharuru-Tangitū Trust Incorporated) and supported by the Resilience Science Challenge 'Living at the Edge' research programme and developed by a Technical Advisory Group with community panels empowered to work collaboratively with the councils. The strategy was underpinned by an agreed decision framework which included the use of DAPP alongside Multi Criteria Decision Analysis to draw up options and pathways and supported by Real Options Analysis (Lawrence et al., 2018). All councils agreed to proceed to implementation planning and assessment of detailed design of the resulting options and pathways and their feasibility and consent ability. The knowledge and lessons learned from Hawke's Bay have been applied at regional and local scales across several domains (see section 7). This has prompted discussions about how the RMA reforms could provide the framework for advancing the use of pre-emptive adaptive planning practice with DAPP to support it, and responsibilities for the implementation of adaptive strategies[45]. Implementing the DAPP strategies for each of the Hawke's Bay coastal cells has raised three key hurdles under the present RMA statutory framework (MfE and HBRC, 2020):

- core responsibilities in statutory framework for adaptation are ambiguous
- current tools and mechanisms to manage current and future hazards are limited or inefficient: needs to embrace DAPP and be agile, and
- a lack of agreed approach and principles for sharing costs of adaptation actions.

Local government networks, which provide for information sharing and for support and ideas (both regional and district) are supported by Local Government NZ, which is contributing to an increasing suite of resources and investigations relevant to changing climate risk (e.g. community engagement challenges, legal issues on withdrawing council infrastructure services, risk exposure of local government assets). As regions declare climate emergencies (see section 4.4) and move to address both climate change mitigation and adaptation, against a background of reform (Essential freshwater, Three Waters, RMA, and a review of local government itself) the need to build capability and capacity increases and these support platforms become increasingly important. Collaborations such as those described above are providing platforms for the undertaking of DAPP planning processes.

Māori/Iwi-led:

We acknowledge that there are a range of iwi/Māori and community led initiatives across New Zealand, both in research and applied settings. While a stocktake and analysis of such initiatives has not been possible for this research, an increased understanding of the actions being undertaken by iwi, hapū, iwi Trusts and organisations and through citizen science and community led initiatives, requires further exploration.

Many iwi, hapū, iwi Trusts and organisations are developing integrated strategies based on mātauranga Māori to address the current and future climate change challenges. Iwi and hapū representation in regional local government led for a provide opportunities for knowledge sharing, resourcing, inclusion, and knowledge equality that acknowledges the body of research by iwi and hapū. Such collaboration and recognition at a regional and national scale are essential for successful local government led initiatives that can reduce climate change impacts across all communities.

[45]https://www.hbcoast.co.nz/resources/

A current example of an adaptive and collaborative approach to cultural health monitoring and environmental restoration is emerging in Napier, following close liaison between Napier Port and local hapū of Ngāti Kahungunu during resource consent processes for dredging, deposition of dredge material and development of a large new wharf near to Pania Reef. The five applicable consent conditions set out a framework for surveying and monitoring of effects on the reef and required good faith relationships, information sharing, and administrative and financial support from the consent holder. In the three years since the consents were granted, a preliminary detailed cultural health monitoring report has been developed (Napier Port, 2021). Eleven entities, including 7 Marae, the iwi, and two mandated hapū organisations along with the consent-holder, have worked collaboratively through a Steering Komiti to develop a monitoring framework, specific indicators (based on a 3-level family tree of effects), and a scoring system for cultural health effects taking into account physical, social, and cultural indicators. The annual reporting is linked to an assessment methodology which involves demonstration of continuous improvement or correction of adverse trends.

Community-led:

Community led initiatives are also growing especially through social media and other information sharing platform. Examples follow.

- The Nelson Tasman Climate Forum is a community-led forum launched in 2020. The Forum's goals include reducing greenhouse gas emissions, adapting to adverse effects, and responding in a manner that recognises all living organisms and provides for a just, equitable and resilient society. The Forum has prepared a 'Climate Action Plan for Nelson Tasman (2021)' that sets out a range of actions to enable the community to progress towards a resilient, climate-responsible future. Some of these actions can be delivered through the council's resource management plans (such as urban intensification, climate, and hazard resilient communities) and other council work programmes (such as waste minimisation).

- King Tides initiative in Auckland is a citizen science initiative where members of the public photograph king tides across the region and upload them to social media and thus build a record of the effects of rising seas[46].

Researcher-led

Research programmes are increasingly delivering climate services that are building capability to address changing risk and uncertainties arising from sea-level rise. Examples follow.

- The "red-alert" tide calendar has been developed by NIWA to communicate to coastal managers, dates of higher-than-normal high tides that indicate when low-lying land is particularly vulnerable to coastal flooding (Lawrence et al 2021).

- Sea-level exceedance nomographs have been developed for assessing the increase in frequency of high waters exceeding present-day thresholds for different rises in sea-level. This is a readily usable warning device of early changes in sea level and is used widely by councils (Bell, 2010).

- A number of serious games are used for raising awareness of sea-level rise or flooding and for priming decision makers where changing risk and uncertainties exist. These can be for

[46]https://auckland.kingtides.org.nz/

individuals, councils, and communities, and range from board games, online games or computer simulated games of varying complexity and specificity. They can be used alongside DAPP to shift focus from short-term to long-term planning objectives (Lawrence et al 2021).

Commentary:

These examples illustrate how knowledge is being improved, refined, and shared, and has reached a stage where it can support adaptive planning in coastal settings. The use of different planning and assessment approaches, engagement processes and governance arrangements have local and national relevance for informing adaptive planning and for using DAPP in planning processes. Leadership and capability are being built locally and nationally, strengthening the national knowledge base, and encouraging multidisciplinary practice within and between agencies. In turn, this is increasing the overall capability and capacity to undertake DAPP processes and find effective planning outcomes.

Continuing to support regional ambition and leadership, while ensuring diversity and equality of participation, will be an important component of the transition from a static "predict-then-act" approach to dynamic assessment of risks and the adaptive decision processes and governance that support the reduction of exposure and vulnerability to the ongoing climate risks. The ability for central, regional, and subregional agencies, with the research community, to continue to share information and learn from each other's experiences enables the widespread adoption of DAPP planning approaches. Through such sharing of information and testing of tools and approaches, standards and practices can be developed and applied in a consistent manner within local contexts. This is an essential prerequisite to formalised planning processes and helps communities to become more familiar with the need to engage in the processes, and for policy makers, legislators, and practitioners to identify and resolve barriers to effective adaptation.

6 EMBEDDING REGIONAL POLICIES

6.1 The Need to Reflect the NZCPS Context for Managing Coastal Hazards in Regional Policy Statements

The NZCPS provides national direction, objectives, and policies to achieve the purpose of the RMA in the coastal environment[47]. Given the scale, complexity, and diversity of New Zealand's coastal environments, the NZCPS requires translation into more detailed policy at regional, district and local level[48]. In terms of coastal hazards including sea-level rise, this is explicitly embedded in the NZCPS through Policy 24 where risks are to be assessed taking into account national guidance and "the best available information on the likely effects of climate change on the region and district". Once risks have been assessed, NZCPS Policies 25 and 27 provide clear advice as to how planning policy should be designed and decisions made in a range of circumstances, keeping in mind overarching policies such as Policy 3 (precautionary approach) and Policy 7 (strategic planning).

Hazard and risk assessment of "areas … potentially affected" (NZCPS Policy 24-25) and prioritisation of "areas … likely to be affected" (NZCPS Policy 27), are best undertaken at regional level. Regional councils (or unitary authorities where they exist) provide the basis for consistent information collection and evaluation across a wider, usually multi-catchment-based, area than do territorial authorities. They also tend to have access to longer-term and more consistent records over time, and greater in-house expertise to support such studies[49].

To provide the basis for the next steps in managing coastal hazard risk consistent with the NZCPS, it is fundamentally important that the hierarchy of planning documents – the Regional Policy Statement, regional plans (to the extent they are relevant) and district plans contain a developed policy framework. This should show a clear policy flow from the RPS to the plans which must give effect to the RPS and be relevant to the regional and district circumstances and the management of coastal hazard risks.

Since the 2017 coastal guidance was issued, it could be expected that RPSs as a minimum reflect:

- NZCPS Objective 5, along with processes and approaches which reflect guidance methodologies and NZCPS requirements, including undertakings for coastal hazard assessments
- policy which reflects NZCPS Policy 25 (subdivision, use and development in areas of coastal hazard risk)
- a holding position (on a precautionary basis) which limits new and redevelopment in risk areas; and
- policy to apply DAPP or similar planning processes as a method (which is well aligned with NZCPS Policy 27 in identifying and planning for transition mechanisms, and with further guidance provided in DoC guidance (DoC, 2017)).

[47] RMA s 56.

[48] This was implicitly recognised in EDS Inc vs New Zealand King Salmon (see Table 3).

[49] This was found by Wellington Regional Council when undertaking a gap analysis and stocktake of natural hazard information across the region and the various territorial authority areas within it prior to developing an integrated Natural Hazards Management Strategy - See Stocktake and Issues Report, MWH, 2016.

Where a council has more detailed management provisions (either through a DAPP process or another method such as spatial planning), policy needs to be put in place at the same time[50]. If adaptive planning is involved, this should also be specified in policy, including preconditions and triggers that would lead to a change in actions.

Given that the current NZCPS dates back to 2010 and given the RMA requirement (section 62 (3)) that RPSs must give effect to national policy statements including the NZCPS, we have looked at how regional councils have reflected the requirements through their RPSs. Without these requirements in RPSs, integrated regional and/or district planning faces barriers due to lack of a coherent and regionally tailored policy framework.

6.2 Regional Policy Enhancements Post 2017

We have reviewed several RPSs which were already in train, or which have been reviewed or changed since the 2017 Guidance was issued, to see whether policy has been modified in the light of that guidance about the use of DAPP and, if so, how.

The most comprehensive policy framework developed since the Guidance has been that of **Marlborough District Council**, which notified its proposed unitary plan[51], including the proposed Regional Policy Statement, in 2016. Because of the range and nature of submissions on the notified plan, the hearing and decision processes facilitated good alignment of the policy provisions in the plan with the Guidance. These provide a framework for systematic progress on dynamic adaptive planning processes for the district's numerous coastal settlements. The details of this set of provisions are included in Box 2below.

However, other Councils have also been making progress. Amongst those including new policy approaches in their RPSs relating to sea-level rise and coastal hazards are:

6.2.1 Southland Regional Council

> New RPS policy (operative 2017) that *ensures adequate measures or methods are utilised within the coastal environment when making provision for subdivision, use and development to:* (inter alia) *avoid or mitigate the impacts of natural hazards, including predicted sea-level rise and climate change.*
>
> As a Method: *require natural hazard assessments to be included as part of resource consent applications for activities that would potentially be affected by coastal hazards, sea-level rise, and climate change.* As a further method, Territorial Authorities will, through their district plans, ensure *that the effects of climate change and, in particular, sea-level rise are taken into account when determining the appropriateness or otherwise of subdivision, use and development within the coastal environment*.

[50]Tasman District's Mapua planning provisions rely on an effective pre-existing regional objective (RPS level) and several specific policies in the natural hazards chapter of the Tasman Resource Management Plan.

[51]As a unitary authority, the council was able to integrate its planning and develop the Proposed Marlborough Environment Plan. This is currently partly operative. In terms of the coastal hazard provisions in the climate change section of the plan, only the single coastal setback rule is subject to an appeal.

6.2.2 West Coast Regional Council

New RPS objectives (operative 2020) in the Coastal section are to:

> *"… ensure that any new subdivision, use or development in the coastal environment has appropriate regard to the level of coastal hazard risks: and to ensure that coastal hazard risks potentially affecting existing development are managed so as to enable the safety, and social and economic wellbeing of people and communities: and policy requiring that where new subdivision, use or development in the coastal environment may be adversely affected by coastal hazards, adopt a risk management approach taking into account, where applicable:*
>
> > *a) Official, nationally recognised guidelines for sea-level rise.*
> >
> > *b) The type and life cycle of the proposed development, including whether it is short-term, long term, or permanent.*
> >
> > *c) Whether the predicted impacts are likely to have material or significant consequences.*
> >
> > *d) The acceptability of those potential consequences, given their likelihood; and,*
> >
> > *e) Whether there are suitable options to avoid increasing the risk of harm from coastal hazards, and whether future adaptation options are feasible.*

- A separate policy imports the at least 100-year timeframe for consideration of risk.
- Associated Methods are: *Continue to review and include the Coastal Hazard Areas in the Regional Coastal Plan and in district plans and identify whether these Areas have a low, medium, or high risk of being affected by a coastal hazard.*
- In the Natural Hazards section of the RPS is found this policy:

  Avoid or mitigate adverse effects on the environment arising from climate change by recognising and providing for the development and protection of the built environment and infrastructure in a manner that takes into account the potential effects of rising sea levels and the potential for more variable and extreme weather patterns in coming decades.

6.2.3 Otago Regional Council

New RPS objective(partially operative as at early 2021) under the heading Communities in Otago are resilient, safe, and healthy is the following objective: *Otago's communities are prepared for and able to adapt to the effects of climate change.*

Under the policy heading of Sea-level rise, the policy states:

> *Ensure Otago's people and communities are able to adapt to, or mitigate the effects of sea-level rise, over no less than 100 years, by using:*
>
> > *a) A sea-level rise of at least 1 metre by 2115, relative to 1990 mean sea level (Otago Metric Datum); and*

b) Adding an additional 10mm per year beyond 2115, or the most up-to-date national or regional guidance on likely sea-level rise.

Under the policy heading of Climate Change, the policy states:

Ensure Otago's people and communities are able to mitigate and adapt to, the effects of climate change, over no less than 100 years, by all of the following:

a) Taking into account the effects of climate change, including by using the best relevant climate change data.

b) Applying a precautionary approach when assessing and managing the effects of climate change where there is scientific uncertainty and potentially significant or irreversible effects.

c) Encouraging activities that assist to reduce or mitigate the effects of climate change.

d) Encouraging system resilience.

Northland Regional Council

This council undertook a complete review of its stand-alone RPS[52]. It includes extensive explanation, helpful for interpreting policy. The RPS was developed alongside coastal hazard mapping for the region which included sea-level rise and climate scenarios. Climate change is identified as a regionally significant issue, and one of great concern to Tangata whenua: "*For Tangata whenua the effects of climate change have serious implications, and a lack of information or planning is a major issue*".

The issue is addressed comprehensively through an objective and a complex set of policies and methods, providing clear direction for decision-makers.

- The objective seeks better understanding of coastal hazards, including climate change; better preparedness for the consequences of natural hazards; avoiding "inappropriate" development in coastal hazard areas; promoting long-term strategies that reduce the risk of natural hazards; not compromising the effectiveness of existing defences (natural and man-made); and enabling appropriate hazard mitigation measures to protect existing vulnerable development.

- Policies include a general risk management approach (including relying on best available information including risk assessments, minimising any increase in vulnerability from residual risk, ensuring the access and building platforms are assessed when considering subdivision, and applying a cautious approach); specific provisions for new subdivision, use and development in areas potentially affected by coastal hazards (reducing risk overall, ensuring that building platforms and accesses are outside 1/100 year inundation areas, there is no increase in social, environmental or economic harm); specific provisions for existing development in known hazard-prone areas (design for relocatable or recoverable structures when changing existing

[52] This gave effect to the 2010 NZCPS but predated the 2017 guidance. The RPS became operative in 2016, apart from a small number of provisions.

buildings, setbacks, managed retreat by relocation, removal or abandonment of structures, protecting and restoring natural defences); requiring that climate change is embedded in all natural hazard risk assessments; and the future application of a dynamic adaptive pathways approach in areas potentially at risk from coastal hazards.

- Methods to help achieve the policies are set out in detail. These involve requirements that district councils include new coastal hazard mapping (to be done by the regional council) and related policy and rules in district plans as soon as practicable to give effect to RPS policies (including the use of prohibited or non-complying activities, requiring engineering assessments and minimum specified floor levels). Where a destructive event has occurred, repair or reconstruction is to be covered by a regional rule. Monitoring, advocacy, and education are also stated methods.

- A specific set of policies and methods relates to hard coastal protection. These promote non-structural and natural methods over hard protection and set out the specific circumstances in which hard protection may be appropriate. The methods require that both regional and district plans must include provisions that promote protection and restoration of natural protective features (including vegetation, wetlands, and ponding) and provisions relating to hard protection structures.

The extensive explanatory material assists in interpretation. Overall, the provisions for coastal hazards in this RPS are comprehensive and (as with Marlborough's) set out long-term strategic direction to be achieved through further coastal planning in the future. Northland Regional Council has commenced working with Tangata whenua and district councils in accordance with the 2017 guidance to implement its stated policy framework.

Tasman District Council

Tasman District Council has recently undertaken a RMA section 35 efficiency and effectiveness review of the Natural Hazards policy provisions in the Tasman Resource Management Plan[53]. This is a key step in that council's wider unitary plan review. The review takes each of the objectives and policies within the Natural Hazards chapter, analyses their application, effectiveness (rating of achievement) and continuing relevance. It also looks at their contributions to other plan objectives and policies. Finally, it makes a recommendation as to whether to retain, remove or review each of the provisions. The review also identifies new legislation and central government direction that the new plan will need to give effect to.

This is an effective first step for councils to take in updating their policy and plans.

Nelson City Council

While still collecting coastal hazard and risk information for its comprehensive unitary plan review, Nelson has released a series of Draft Nelson Plan Documents with preliminary policy approaches (Shape Nelson). These integrate RPS, RCP, RP, and DP provisions and include:

- identification of areas subject to a 1%AEP event, over at least 100 years.
- an interim requirement that subdivision, use and development within 4m of MHWS must be considered in terms of its vulnerability to hazard, the likely frequency and consequences of an event, the ground or floor levels that will protect the proposal, proposed mitigation,

[53]https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.memtas-haveyoursay.files/3716/0195/3195/TRMP_Chapter_13_Evaluation_-_Natural_Hazards.pdf

including hard protection, site layout, including access and escape routes or refuges and effects beyond the site.

- adoption of the DAPP approach for planning in areas potentially at risk as both regional and district provisions, including education, funding, and partnership with the Nelson-Tasman Climate Forum in developing strategies. Adaptive pathway approaches are signalled in policy for coastal hazards as regional and district policies. Methods identified in the Draft RPS include education, funding and partnerships with the Nelson Tasman Climate Forum, and support for the Forum's work and development of strategy. This further highlights the suite of tools necessary to support adaptive planning processes.
- limiting the use of, and the potential effects of, hard protection structures (with a preference that, if justified, such structures are placed as far landward as possible); and
- ensuring that infrastructure avoids areas at risk except where there are no reasonable alternatives and structures are resilient and do not add risk to people, property, infrastructure, or the natural environment
- Policy NH-P4 (a regional, coastal and district policy) which refers specifically to the accommodation practice of elevating habitable areas of a building in a flood hazard area. This policy includes specific preference for elevated floor levels rather than alteration of the ground level[54].

These provisions are at an early stage, have been subject to public consultation, and are likely to undergo considerable transformation in the process of developing the proposed plan.

6.3 Opportunities for Policy Improvements

Other regional councils, including the **Bay of Plenty Regional Council** in its RPS (most recently changed in 2016), have remained grounded in the past, with as yet no recognition of the 2017 Guidance. As an example, the BoP RPS includes only a cross reference to the Natural Hazards section within the Coastal Environment Section. This makes natural hazards easy to overlook when considering coastal policies (compared with other aspects of coastal management which appear to have a strong emphasis on development) and does not readily align with the NZCPS's requirement for integrated management. The section on Integrated Management (section 2.5) does not mention hazards and mentions coastal issues only in passing, although it does state:

The division of resource management functions between regional and city and district councils requires close coordination to ensure an efficient allocation of resource management functions and duties. Duplication and omissions are inefficient and could also result in adverse effects on the environment.

Within the Natural Hazards section the following Objective is found:

Objective 31 *Avoidance or mitigation of natural hazards by managing risk for people's safety and the protection of property and lifeline utilities.*

[54]Accommodation practices such as increasing floor levels and land levels have long been applied in Nelson (and in many other areas) to address flood risk. This has led to unfavourable outcomes both in terms of cumulative effects on flood storage and amenity issues for adjacent properties and street interfaces. The specific policy is unusual and in contrast to other plans which seek only that finished floor levels are achieved.

Along with:

***Policy NH 11B**: Providing for climate change.*

This style of RPS, where very high-level objectives are set out, and an intervening general policy connects to a number of methods (in this case allocating development control to either regional, district or city plans, or decisions to be made at the time of resource consent applications) do not align well with NZCPS requirements. Wellington's RPS is similar, although it also allocates management responsibilities, which require more detailed policy development through district and regional plans.

The Natural Hazards section of the BoP Regional Natural Resources Plan deals only with flood hazards and the debris flow hazard at the Awatarariki fan head (this latter as a result of a change undertaken by the Whakatane District Council[55]). There are no regional provisions relating to coastal inundation or erosion (subject to a rolling review of regional planning instruments which has not yet programmed further natural hazard policy improvements). The Proposed Wellington Natural Resources Plan (notified in 2015 and now partly operative) includes enhanced policy and additional definitions, but no specific rules[56].

The contents of these examples of RPSs and plans fall short of the response to the 2010 NZCPS (hazards policies) that could be expected. In terms of the King Salmon decision, planners, and the Courts in dealing with resource consent applications or private plan changes, would thus need to refer back to RMA Part 2 and the NZCPS, instead of being able to rely on regional policy or plans. The policy vacuum at this level also creates difficulties for territorial authorities in preparing plans, as there is no "giving effect" requirement for them in terms of an RPS that is tailored to the circumstances of the district within the region.

Regions in this position should be aligning their RPSs, and if applicable, their regional plans, with the NZCPS and the 2017 guidance.

Box 2: Marlborough Natural Resource Management Plan Provisions

This plan includes the RPS, as well as regional and district plan provisions. It is not fully operative and is subject to a number of outstanding appeals[57]. The plan is unusual in that it has a separate chapter on climate change. The hearing commissioners determined that the climate change chapter should have more prominence by being moved forward in the plan (at present it is shown as Chapter 19, the last section of Volume 1, Policy). A note indicates that this will be done when the plan becomes operative.

As there have been no appeals on Issue 19B relating to the influence of climate change on natural hazards, this part of the plan can be considered to be fully operative. As there are a small number of outstanding appeals relating to Issue 19A which relates more generally to the effects of climate change, including on the region's productive activities of farming, forestry and aquaculture, water supply, and communities, this policy has status but is recognised as being potentially subject to minor changes through the appeals process.

The operative part of Chapter 19 is headed "Climate Change could affect natural hazards and create a coastal inundation hazard associated with sea-level rise". Under this heading, , the plan contains the following:

[55]Using the RMA provisions for private plan changes.

[56]The Coastal Marine Area and beds of lakes and rivers are defined as high hazard areas, meaning that policy applies to applications in such areas as well as to other applications for regional consents, but there are no specific land use rules which would trigger application of the policy.

[57]The two appeals lodged on climate change matters are from aquaculture industry participants, who seek enhanced recognition of ocean acidification as a climate change issue – covered under Issue 19A - and support that climate change issues be given greater recognition in the plan.

Issue statement – this acknowledges the range of sea-level rises within the 2017 guidance. It also acknowledges some of the localised influences on sea-level rise in Marlborough, including natural coastal protection and land subsidence. It notes the potential for increased frequency of extreme weather events and the effects this would have on areas of settlement and regionally important infrastructure.

Objective – the single objective is: *Avoid and mitigate the adverse effects of natural hazards influenced by climate change.*

This is an RPS, regional, coastal and district objective.

Policies – there are two policies (regional, coastal and district) relating to coastal inundation. The first sets out interim sea-level rise allowances to be used (until the second policy has been applied in any area) for different planning situations, as follows:

(a) Coastal subdivision, greenfield developments, and major new infrastructure – use a minimum 1.52 m sea-level rise: and

(b) Changes in land use and redevelopment (involving intensification or use of land beyond the existing footprint of built development or structures) – use a minimum 1.52 m sea-level rise; and (c)Existing coastal development and assets within their existing footprint – use a minimum 1.0m sea-level rise; and

(d) Non-habitable short-lived assets with a functional need to be at the coast, and which either have low consequences or are readily adaptable (including services) - use a minimum 0.65m sea-level rise.

The explanation for the policy explains that a single figure is used to give certainty for resource users, rather than the range enabled in the 2017 guidance. It refers to the need to take a precautionary approach for long-term changes. In particular, the explanation notes that the plan has a life of only 10 years but subdivisions and new property titles which may be approved within the plan's lifetime have an indefinite life, and buildings and infrastructure have a minimum design life of 50 years. The policy is to be applied to resource consent applications, plan changes and designations. There are no specific rules associated with this policy. However, the explanation notes that there is a setback rule in the plan, and that any applications within this setback area will also trigger this policy.

The second policy adopts a process for future more detailed planning in specific circumstances, which is fully aligned with the 2017 guidance, as follows:

Using a collaborative community engagement model, identify and prioritise areas, assets, and infrastructure (e.g. roads) where the coastal environment is under threat of inundation from rising sea levels and associated storm surges. Using that process develop an implementation plan to avoid or mitigate the adverse effects of such outcomes on the community.

The explanation for the policy states that the council will be undertaking a DAPP process with the communities potentially affected by sea-level rise in accordance with the MfE 2017 guidance, as part of the recommended approach for long-term strategic planning and decision-making in adapting to the effects of climate change in vulnerable areas.

Methods – the methods set out under these two policies involve Council-led research, planning processes involving an action plan to be developed with affected communities using the 10-step decision cycle to determine long-term strategic plans and decision-making for coastal areas. District rules which apply a horizontal setback are to be used to reduce the potential for structures and infrastructure to be inundated until research and community engagement is completed. It is anticipated that these steps may prompt the need for additional rules to ensure that the objective and first policy above continue to be met.

Anticipated Environmental Result – the AER applicable to the above policy framework is that: *Buildings and infrastructure established after the notification of the MEP are not inundated by the sea.* Monitoring of effectiveness is to be based on reports of inundation and/or damage to buildings and infrastructure.

Commentary and relation to rules -The objectives and policies relating to coastal risk in the Marlborough RPS set the scene for future detailed planning in line with the Guidance. The provisions foreshadow the further work and indicate that further plan changes to incorporate new provisions will be needed. No timetable for this work has been provided yet. In the meantime, the plan relies on a relatively standardised set of rules across the four zones that abut the coastal marine area within the complex coastline of the Marlborough district. The main settlement areas are within the Coastal Settlement zone, and here buildings are not permitted within 28m of MHWS. In the other zones, there is limited opportunity for subdivision and new development (much of the coastline is edged with legal road or open space), but a coastal setback of only 8m is typically required. As this is a permitted activity rule, it would be difficult to require more even with appropriate policy (due to the "permitted baseline" concept when assessing adverse effects). Filling of land is not permitted within 20m of the coast in any of the zones,

ensuring that new buildings closer to the coast are likely to be built on piles or poles and potentially relocatable.

All land use rules are district rules, whereas rules on filling are district and regional (the regional rules mean that any consent granted has a limited life, with a maximum of 35 years). The default status for all activities that do not meet permitted standards is discretionary, enabling relevant policy considerations to be brought into play.

These provisions can be criticised in that they do not take into account topographic variability, or exposure of parts of the coast to adverse sea conditions. The RPS provisions at least set in place an undertaking to progress the detailed DAPP planning that is needed to adequately address risk.

6.4 Discussion

This review of progress by regional councils in reflecting the 2010 NZCPS policy for managing coastal hazard risk, the 2017 MfE guidance and the companion 2017 DoC guidance, indicates that, while some councils have made considerable progress, others have not seen this as a priority. It is not unexpected that, overall, regional responses appear very uneven. There is in part the inevitable problem of the "snapshot in time" resulting from the long and complex processes of RPS development or change and the slowness of the parallel or subsequent plan preparation across the country's 16 regions to an operative state. However, it is also a reflection of regional priorities, and in some situations, an apparent reluctance of regional councils to become involved in matters of land use and subdivision planning or development control, which have traditionally been seen as the responsibility of district and city councils (territorial authorities).

At present, only one RPS, prepared by the unitary authority of Marlborough District Council, contains direct reference to DAPP processes and the 10-step decision cycle which the MfE guidance recommends. That council has not yet commenced the detailed work which DAPP involves across its coastal communities, but the overarching policy is now in place to enable it. In the meantime, risk is managed by an interim set of rules in the plan which can be criticised, as they may actually allow for inappropriate development. Northland Regional Council provides another example where RPS provisions assist current decision-making and set up future investigations and policy undertakings, for the region and the districts within the region. This should lead to more specific management and control of coastal hazards, including through district and regional plans.

The interim approach, where RPS policy sets out requirements to be met prior to updated provisions in plans or interim district rules are put in place (for example, Marlborough, Northland, Nelson), can only ever be partly effective. This is because it can only apply in relation to subdivision, land uses and developments which are not enabled by plans (i.e. activities which need to be assessed as discretionary or non-complying activities, where policy is an active consideration). Activities which are permitted, controlled, or restricted discretionary will generally not be touched by such policy concerns[58].

Where there is an inadequate policy framework in the RPS, this creates difficulties for district councils dealing with land use and subdivision applications and also creates a contextual vacuum for district and regional plan changes and reviews. While the King Salmon decision mentioned earlier (see Table 3) provides for reference back to the NZCPS if an RPS has not provided adequate devolved policy (i.e. does not "cover the field"), decision-makers are left second-guessing the appropriate approach for the region and any particular part of the region. Unfortunately, much of the country, including some of the most vulnerable coastal settlements, remain in that position.

[58]Unless specific reference to specific policy is included as a matter of control or discretion, which is not usual and can add interpretive complications particularly if policy is relatively high-level.

A clear issue arising from this brief review is that, however well-intentioned a local authority, the processes involved in planning for coastal hazard are lengthy, costly, and cumbersome. Even at the level of general policy a single appeal can hold up the full implementation of provisions. Councils are also juggling a range of planning imperatives, including those required by direction from central government. The inclusion of new provisions is a resource intensive process requiring leadership (both executive and political), collaboration, innovation, and vision in terms of process and outcomes.

However, this analysis has shown that councils, under regional leadership, can make progress towards improved management of coastal risk by policy development and implementation. The detailed forward planning involving DAPP planning is best undertaken within an effective regional policy framework, based on an appropriate understanding of risk. There are now examples in place of such policy frameworks.

7 PROGRESS IN PRACTICE

7.1 Using Available Tools

Our research has identified that councils have been making progress in planning for sea-level rise through data collection to ensure they have as robust and comprehensive understanding (as possible given resourcing) of existing and anticipated risks (in line with the 2017 Guidance) and in some cases regional councils have been revamping RPS policy to better reflect the 2010 NZCPS and the 2017 Guidance for their region. There is also evidence of collaborative policy development and planning, including between councils and with communities.

Against that background, the pressure for coastal development has continued. District councils have inevitably been involved in planning-related coastal development issues and the direct application of consent processes for specific development proposals. Where comprehensive policy that aligns with the 2010 NZCPS has not been added to the relevant RPS, NZCPS policy must be applied directly[59] to consent processes. In some circumstances, district councils have proceeded with their own coastal hazards land use planning, despite a policy vacuum in the RPS. In a few cases, regional councils have introduced specific land use and other provisions in regional plans. In one circumstance, a district council (Whakatane District) undertook a private plan change to regional planning documents so that both regional and district land use rules could apply to the identified hazard areas (Bay of Plenty RPS and Regional Natural Resources Plan)[60].

The 2017 Guidance includes tables that set out a comprehensive range or menu of types of plan or planning processes and specific planning methods and techniques which can be used by local government in managing coastal hazard risks (see Tables 25 and 26 of that document). These tables give wide scope for how councils might use existing planning instruments to reduce coastal hazard risks and integrate the DAPP process into them. No one instrument included in the tables is mutually exclusive and many can be used in parallel in a self-reinforcing manner as part of planning practice.

Using these tables as a basis, we have looked at practice since the 2017 Guidance was issued to demonstrate how coastal planning is evolving, including those in train in 2017. Findings are set out in Tables 4 and 5 below.

[59] In accordance with the King Salmon decision (see Table 2) – where policy is absent or no longer fully aligned with National Policy such as the NZCPS.

[60] This unusual situation involved an Environment Court Appeal decision – See Table 3 in this report - Awatarariki Residents Incorporated vs Bay of Plenty Regional Council and Whakatane District Council [2020] NZEnvC 215.

Table 4: Uses of Types of Plan and Planning Processes to help Manage Coastal Hazard Risks

Types of Plan/Planning Process	Commentary	Examples of Use
Spatial planning, growth planning	In 2017, the NPS-UDC 2016 had just been introduced. While it did not promote any particular techniques. Spatial planning and growth planning were clearly required activities under the NPS-UDC. The 2020 NPS-UD which has replaced the earlier 2016 NPS-UDC now specifically mentions spatial plans as a suitable vehicle for the required Future Development Strategy. Constraints on development require identification, evaluation, and justification as a "qualifying matter". The implications of sea-level rise may be such a matter in specific areas. Commentary on the implications and concerns about the directive nature of the NPS-UD in relation to coastal planning is provided in Box 1 of this report. Identification and mapping of coastal hazard areas in the spatial planning context does not guarantee any specific management approach but does indicate areas where growth needs to be constrained and/or specifically managed through more specific instruments such as district and regional plans.	A number of territorial and unitary, and in some cases, regional councils had been attempting spatial planning processes for various purposes prior to 2017, and many more have joined them in undertaking spatial planning for growth as a result of the successive NPSs. Auckland's spatial plan (Auckland Plan) was completed prior to its unitary plan process but was at a level of generalisation which did not specifically identify constraints or limitations in particular coastal areas. At this stage regional coastal hazard mapping had not been undertaken and the combination of regionally coherent data sets was in its infancy. The proposed unitary plan which followed did include limitations on coastal development and underlying zoning principles associated with flood hazards, where data informed this approach. As spatial information improves (across a suite of hazards and other values) Auckland continues to improve its approaches The Draft Wellington Regional Growth Framework (currently at Phase 3 of 4 phases towards approval) has been developed by the local authorities in the wider region as a "blueprint" to accommodate an additional 200,000 people over 30+ years. Although it is a high-level planning document, it identifies and maps constraints including coastal areas at risk from coastal processes and sea-level rise. These are expressed as Wāhi Toiora constraints, where "potential urban development must be carefully managed with appropriate consideration and a mitigation of risks". For most of the region, such constraints have been based on a 1% AEP storm surge with 1.2m sea-level rise hazard, applying NIWA models (2020). One council (Horowhenua District, of which a small part is within

Types of Plan/Planning Process	Commentary	Examples of Use
	Considering growth is the first step. Subsequent spatial planning, particularly in rural areas will need to consider rural uses, infrastructure, cultural heritage and ecosystem responses to coastal hazards and sea-level rise.	Wellington Region) within the region has done its own separate coastal risk mapping which was used. Tauranga's Urban Form and Transport Initiative (UFTI) was released in July 2021, including a high-level optimal growth plan for the Tauranga-Western Bay of Plenty area, and the Smart Growth Spatial Plan is being consulted on in August 2021. Constraints have been identified and mapped under the headings of wāhitoitū (no-go layer constraints) and wāhitoiora (go-carefully constraints). These include flooding and erosion hazards. Given the scale of the area under investigation, the coastal constraints occupy very small areas, often affecting areas already urbanised. Within the preferred "Connected Centres" growth option, the report concludes that "use of the wāhitoitū and wāhitoiora approach to constraints mapping helps ensure that areas of high sensitivity are avoided in future growth plans" - see https://ufti.org.nz/wp-content/uploads/2020/02/ufti-report-spacial.pdf.
Regional strategies, such as natural hazards strategies	The development of such strategies is mandated through LGA, RMA, BA and CDEM provisions. Such single-purpose strategies which are integrated across a number of functions of a single local authority unit (or which if developed by a number of units together) can encourage co-operation and co-ordination and underpin development of more detailed plans. It appears that few councils have used this type of plan for coastal or integrated natural hazards planning.	This type of strategy has been applied by regional councils and unitary authorities, seeking to achieve overall consistency across regions. An example is Greater Wellington, where a Natural Hazards Management Strategy was developed, led by GW but involving territorial authorities. It commenced with a stocktake of current information and practice, followed by a gap analysis and issues report. The actual natural hazards plan is a living document which set broad objectives, allocated tasks, and ways of working together across agencies. It is subject to ongoing review (most recently in 2019). It has underpinned work on the more recent Draft Wellington Regional Growth Framework. Hawke's Bay Regional Council, Napier City and Hastings District have together progressed the "Clifton to Tangoio Coastal Hazards Strategy

Types of Plan/Planning Process	Commentary	Examples of Use
		2120". This has been pioneering work, involving the councils, other agencies, iwi, and the affected public, and seeking to apply the 2017 guidance in identifying and planning for coastal risks. The national processes in the Coastal Hazards and Climate Change Guidance for local government were broadly followed including a hybrid use of DAPP alongside MCA. The strategy has reached the stage of looking at more detailed options and monitoring system design before implementation through funding of the council's LTPs. Development of the strategy resulted in identification of a number of the practical difficulties also covered in the present study[61] – see https://environment.govt.nz/publications/challenges-with-implementing-the-clifton-to-tangoio-coastal-hazards-strategy-2120-case-study/
Regional Policy Statements – coastal or natural hazards policy	This is a statutory requirement under the RMA, and a regional-level responsibility. It must set out objectives, policies and other methods which must be given effect to in regional and district plans. Objectives and policies can be directive and can vary in their application across the region. The RPS must determine which level of local authority is responsible for the avoidance or mitigation of natural hazards or any group of hazards in the region. If not specified, the regional council retains the	Progress in RPS contents is addressed in Section 7 of this report. Key features to note include: • the indication of risk assessment approaches, including processes for addressing risk tolerance thresholds or metrics (BoP RPS and proposed Otago RPS) • inclusion of regional policy direction around management and response to coastal hazards including where no go zones may be established (West Coast). • the inclusion of specific responsibilities for hazards management, including the use of regional land use rules

[61]These include ambiguity as to which unit of local government is responsible for what across the RMA and other legislation, including funding responsibilities, and limitations in available tools, including their generally static nature which makes them difficult to apply in rapidly changing environmental circumstances.

Types of Plan/Planning Process	Commentary	Examples of Use
	responsibility. RPSs are also the only instrument able to achieve the RMA s 30(1)(gb) function of the strategic integration of infrastructure with land use, as many infrastructural elements are multi-district and the purpose of the RPS is to achieve integrated management of natural and physical resources in a region, so they are crucial in expressing the outcomes of regional spatial planning and other large-scale planning undertakings.	(Northland's RPS) • prescriptive directives around response to coastal hazards (Northland's RPS) • determination of the extent of the "coastal environment" to make it clear where the coastal development policies of the NZCPS apply (Waikato's RPS) • identification of shared forums such as the CATT group in Northland as a catalyst for progress and cross/inter regional integration. • acknowledgement of other regional initiatives, and the need for adaptive approaches, acknowledgement of emergency management responses and setting a mandate for further hazard information to be progressed. • setting of values to be protected or restored, reflective of local aspirations or national policy, particularly important in a coastal setting in relation to character, landscape and ecosystems and the management of structures (such as coastal protection) in these areas.
Regional plans – regional coastal environment plans or a coastal or natural hazards section of a regional plan	A regional coastal plan is a statutory requirement for regional councils, but since 2011 it can comprise part of another regional plan. In line with the NZCPS 2010, which relates to the coastal environment, such plans have become more integrated with other regional plans in recent years. Often regional plans and regional coastal	The Hawke's Bay Regional Coastal Environment Plan is an example of a stand-alone coastal environment plan which manages activities in an integrated way across the Coastal Marine Area and the landward 'coastal margin'. It contains objectives for the management of coastal hazards and policies which are expressed as environmental guidelines. The Plan maps hazard areas (across 3 different types of coastal hazard zones which are mapped in the plan) and includes some rules applying to development and activities on land. It adopts a detailed

Types of Plan/Planning Process	Commentary	Examples of Use
	plans include general policies relating to management of coastal hazards, and they may map coastal hazard areas. However, the opportunities to manage activities and uses in relation to coastal natural hazards through regional coastal plans (RMA section 12) or regional level control of land uses (RMA section 9(2)) have rarely been taken up through these plans. Unitary plans are generally better at integrating coastal management across the line of mean high- water springs than stand-alone coastal plans or "one-plan" style regional plans, as policies can be integrated, and regional and district rules can be combined. Even unitary plans do not always utilise regional land use rules to address the status of protective coastal structures which may be built inland of mean high-water springs and retain the use of only district-level rules for all structures on land – even those within areas of identified coastal hazard risk (see reference to the Orewa Case in Table 3).	precautionary approach to the assessment and management of coastal risks and provides a comprehensive set of management policies (including support for retreat in erosion areas and prevention of new subdivision and development in most at-risk areas). It contains rules relating to uses and development, including removal and extraction of material, existing and new structures, and infrastructure in identified coastal hazard zones). Where a territorial authority has rules that are considered to be more precautionary, the plan defers to those rules. The Tairāwhiti Resource Management Plan (Gisborne District) is an example where coastal hazard management is covered in the region-wide provisions and includes identification of Areas Sensitive to Coastal Hazards and Coastal Hazard Overlays (extreme risk, high risk, moderate risk, and safety buffer areas). Objectives and policies for these areas are expressed as being regional and district, and the rules are regional only and cover buildings, structures, subdivision[62] and earthworks. Northland's proposed Regional Plan is another example of the inclusion of regional land use rules alongside section 12 rules associated with protection structures. The proposed plan (largely resolved) also includes regional land use rules associated with the reconstruction of any building damaged by a coastal hazard. District Plan reviews across the associated districts is currently underway. The Auckland Unitary Plan (which incorporates the RPS and regional and district provisions) integrates climate change considerations across the plan (in contrast to Marlborough, which has a stand-alone policy chapter within the proposed Marlborough Environment Plan). A

[62] Subdivision can only be controlled through rules in a district plan, so the *vires* of the subdivision provisions is questionable.

Types of Plan/Planning Process	Commentary	Examples of Use
		combination of zoning and overlays have policy and rules which seek to address natural hazards in the coastal environment alongside the protection of ecological and other natural system values in the coastal environment. The plan also refers to the need for adaptive management when large infrastructure projects are being considered. Developing regional documents such as engineering standards will provide complementary techniques, standards, direction, and assistance in relation to such projects.
District plans	District plans are the responsibility of territorial authorities, including unitary authorities. Usually it is district plans that include land use, and also subdivision. The coastal hazard issues incorporated in district plans tend to reflect the RPS requirements (as they are required to give effect to the RPS), and the extent of their development is usually directly correlated. District plan provisions are also embedded in unitary plans and have the potential benefit of better integration with regional provisions and across mean high-water springs. A key responsibility for the RPS is to identify the relationship between DP and RP provisions for addressing natural hazards recognising the different provisions for DP consent becoming an existing use and RP consent requiring a resource consent for a maximum of 35 years.	There are numerous examples now of district plans which have identified hazard areas and provided for their management through policy, and specific zoning or overlays with rules managing activities, including subdivision, earthworks, buildings, and structures in accordance with the policy. Some examples of techniques included in district plans are set out below. Table 5 expands on and provides examples of many of these techniques. • **Overlays** based on hazard analyses, which form the basis for protective policies which are in addition to the underlying zone. • **Zoning,** intended to achieve objectives and policies for identified areas in the district plan. • **Prohibition of activities** in identified areas. • **Explicit consideration of sea-level rise:** including specific policies which require sea-level rise to be determined and considered in relation to coastal areas and natural hazards. Plans may include specific values or methods to determine an approach. Plans can also include specific management of activities and development in such areas through zoning or overlays and associated rules.

Types of Plan/Planning Process	Commentary	Examples of Use
		• **Management of activities:** plans can classify activities which are more vulnerable or sensitive to hazards and those which may be more 'tolerant' or appropriately located in potentially hazardous areas. The Auckland Unitary Plan utilises definitions of "more vulnerable activities" and "less vulnerable activities". • **Subdivision limitations/intensification limitations:** E.g. Auckland Council's use of the Single House, Large Lot and Rural and Coastal settlement Zones in some coastal areas combined multiple policy drivers including coastal matters. This limits further intensification and sets larger minimum lot sizes than other residential zones in the region. • **Temporal considerations/removability of structures:** many second generation (and several first) generation plans include a requirement to consider removability of structures, although the conditioning and implementation of such measures is less well demonstrated. • **Inclusion of adaptive triggers:** Whakatane's district plan contains triggers for the consideration of the need to relocate consented buildings when the line of mean high-water springs is at 20m from the closest point of the building within identified hazard areas.
Precinct, area, or structure plans	Such plans are normally required for large new development areas as a prerequisite for inclusion in a district plan. They provide the basis for integrated environmental, infrastructure and development planning. Areas of	Te Tumu – one of a number of possible growth areas for Tauranga city, has been subject to a structure plan process. The 760 ha of land fronts the coast to the north and is bounded by a river and river mouth to the south and east. The structure plan process aims to cater for a new community of between 8,000 and 14,000 people over the next 15 to 20 years. Development of the structure plan has involved a collaborative

Types of Plan/Planning Process	Commentary	Examples of Use
	constraints such as coastal natural hazards should be excluded from development but can become part of open space and amenity systems. This type of plan is now regarded as an essential step for new development areas.	process (see item below in this table), and has systematically worked through information collection, constraints identification, layout, and development options. Coastal hazards have been identified as affecting parts of the area and are addressed by a combination of setbacks of development (providing for open space) and earthworks to raise ground levels. Approximately half of the area will remain undeveloped for open space and ecosystem services. Auckland Unitary Plan has used Precincts to provide additional controls to those applying through zoning and overlays for small spatially identified areas where specific policy outcomes are sought through detailed precinct plans and controls. In precincts such as the Wynyard, Westhaven, Central Wharves and Port Precincts, provisions integrate management across MHWS, with shared policy direction and rules tables. In the case of coastal hazards and sea-level rise these spatially specific provisions provide an opportunity for control of specific activities including bespoke provisions for hard protection structures.
Special purpose area plans	Such plans are non-statutory but have the benefit of integrating across local authority and agencies' responsibilities and integrating community involvement to address specific issues over small geographic areas. Because they are written down, and in a format aligned to their purpose, they are likely to provide long-term direction. They can also feed into the range of statutory plans which councils are required to have.	Gisborne/Tairāwhiti council prepared the Wainui Beach Erosion Management Strategy through a collaborative process with a key stakeholder working group. There are approximately 100 dwellings in the highest risk coastal hazard zone, and many more subject to a lower level of risk. The strategy aims to protect the numerous values of Wainui Beach recognised by the stakeholders, including its surf breaks, natural ecology, recreational values, and cultural values, and manage these in an integrated and holistic way. It looks at short, medium, and long-term requirements. Management is based on 8 areas which are experiencing different types and levels of threat. The plan includes a clearly stated, staged, implementation section of actions that the council and the community will undertake. It sets out principles for funding into the

Types of Plan/Planning Process	Commentary	Examples of Use
		future but does not resolve them. The plan has already contributed to the district's relatively new resource management plan and to some asset management plans.
Asset management planning	These plans are required for all local government assets and are developed through long-term plans and 30-year infrastructure strategies.	Tasman District's Coastal Activity Management Plan provides a comprehensive basis for management of its coastal assets, which include existing protection structures, coastal recreational facilities, and programmes such as beach sand replenishment (Torrent Bay). It interfaces with other AMPs which include infrastructure such as coastal roading and water services, as well as reserves within the community services AMP. Work recently undertaken has identified and mapped 83 registered coastal protection structures with conditions ranging from poor to good. A major risk identified is the impact of climate-change driven sea-level rise and storms. The AMP imports relevant targets and actions from the 2019 Tasman Climate Action Plan. It includes an interim position statement which provides for maintenance and repair of existing council-owned structures only; new investment in coastal protection only where substantial council-owned assets are at risk and it is impracticable to relocate them; no investment in or maintenance new structures, nor existing private protection works; and giving consideration to private protection structures only when they are compliant with NZCPS policy, policy and rules of the Tasman Resource Management Pan and the Council Reserves Policy Document. This AMP is a good example of integrated coastal management, based on a consistent policy approach across all of the council's responsibilities, and setting out its 30-year capital and operational budgets for all coastal assets. Auckland Council have progressed the development of a Coastal

Types of Plan/Planning Process	Commentary	Examples of Use
		Management Plan Framework[63] which frames the development of area engagement, specific plans and will form the basis of future investment and asset planning.
"Community futures" or "community vision" planning	This type of planning often forms the first stage of the development of other policies and plans, including many of the plans and processes set out above in this table.	While this type of planning is now most associated with the engagement undertaken by councils as part of long-term planning under the LGA, where it is an essential component, it can also be undertaken at a much smaller scale. A Petone visioning exercise was undertaken by the local community board for the built-up area of Petone/Moera which is vulnerable to both sea-level rise, heavy rainfall events and flooding from the Hutt River, as well as other natural hazards of earthquakes, liquefaction, and tsunami. An outcome was to develop a clear community understanding of the physical vulnerabilities across the area, highlighting the areas which are most suitable for more intensive development, and those which should remain at present levels of intensification.
Collaborative planning	Collaborative planning is undertaken when iwi and hapū, various agencies, landowners and community stakeholders are brought into a planning process. Collaborative planning has become an essential underpinning for most planning processes.	Because coastal change is taking place at the interface of land and sea – in areas with strong Tangata whenua, public, recreational, open space, and ecological values as well as private interests at stake, collaborative planning is a widely applied model. Many of the examples earlier in this column of the table have applied some form of collaborative planning. This approach is seen as fundamental to the DAPP planning process especially where outcomes affect existing uses at the coast. It is also good planning practice at a strategic level for building community trust

[63]https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/environmental-plans-strategies/Pages/coastal-management-plans.aspx

Types of Plan/Planning Process	Commentary	Examples of Use
	It can be particularly applicable for smaller-scale planning exercises included above.	in planning outcomes administered by public authorities. In Northland, the development of the CATT group (see section 5) and the subsequent collaboration, governance and funding is an example of what can be achieved through collaborative regional scale planning. With a focus on the development of district plans across the three districts of the region and commitment to coastal adaptation, Northland is rapidly advancing the use of multiple statutory tools to work towards an integrated DAPP outcome.
Reserves management planning	This is a statutory requirement, but few reserves management plans yet consider the implications of sea-level rise and other climate change effects. Such plans are often not a priority for councils and many coastal reserve plans (that are not local purpose reserves where a reserve management plan is not required) are out-of-date.	Although the Tahunanui Coastal Reserve in Nelson is held under a trust deed rather than as a reserve, because of its importance the council manages it under a management plan as if it was a special purpose reserve. The constant geomorphological change of the area is recognised in the plan, and forms one of the bases for management of its public use and development on it. In particular the plan clarifies areas where further hard protection may be considered in future (specifically to protect the existing campground), where existing hard protection should be removed, and areas where planting is the only accepted means of managing risk of loss of land. The plan contains detailed requirements for planting, limiting dune access, protection of existing saltmarsh and back-dune areas in the coastal management area. The other two management areas – the inland management area and the motor camp management area – have complementary policies.

Table 5: Planning Methods and Techniques Available to Local Government to help with Managing Coastal Hazard Risks

Technique	Commentary	Examples of Use
Zoning	A fundamental technique used in district plans to manage land use, subdivision, and development, and sometimes in regional plans. Zones have objectives, policies, rules and expected outcomes to indicate the type of future for the land in the zone. There is an increasing use of zoning based on exposure to natural hazards – for example a range of coastal hazard zones. Limitations on use and development become more restrictive, the greater and more immediate the risk. The National Planning Standard mandates special zones in certain circumstances, and coastal hazard management can be one of these.	Whakatane has a Coastal Protection Zone, identified on the basis of the highest risk of coastal erosion and inundation. This Zone is intended to provide a level of protection against coastal hazard events. It is predominantly an open space zone, not generally intended for development. There is also a Coastal Hazard Erosion Policy Area (CHEPA) based on the 2100 assessed erosion area (plus a buffer) comprising three zones – the Current Erosion Risk Zone (CERZ), the 2060 Erosion Risk Zone (2060 ERZ), and the 2100 Erosion Risk Zone (2100 ERZ). There is targeted policy and increased limitations on use and development across the three zones.
Identified hazard lines or overlay areas	Hazard lines shown on planning maps form the basis for overlay areas, which have management objectives, policies, methods, and rules applied. As with zones, once in a plan these are static and can only be modified or updated with improved information through a plan change process. Such overlay areas are mandated through the National Planning Standard, in preference to special zones. Overlays have increasingly become used in both district and regional plans for hazard management.	Napier City's district plan includes coastal hazard overlays, and limits or prohibits activities occurring within them. The hazard line lies over a number of zones, including residential, open space and recreation zones, and the overlay rules apply in addition to the zone rules, with the most restrictive rule having greatest effect. The Tasman Resource Management Plan identifies a 'coastal risk area' overlay in Mapua/Ruby Bay which restricts further intensification of the area in recognition of the coastal hazard risks; and at the time of the plan change new residential zoned land was provided to the north-west of the settlement on the hills to enable future expansion of the settlement away from low-lying land and the inundation and erosion prone coastline.

Technique	Commentary	Examples of Use
Designations	Designations provide for "public works" and an alternative consenting route for development or protection for local authorities and a limited range of other agencies. They can be used as the basis for compulsory acquisition of land and buildings, so could have application in areas of risk possibly following a DAPP process. Designations cannot be applied within the coastal marine area.	We have not found any examples of designations applied in coastal risk situations.
No subdivision areas	Subdivision consents generally precede development, and a subdivision approval conveys the expectation that a building will be able to be built on the new lot, or development will be able to be intensified. Limiting subdivision in identified hazard areas should be a fundamental control. Usually, subdivision is subject to the range of types of control described in the following item, along with other land use, development, and activity controls. However, the ability to intensify in coastal areas through successive subdivision applications yielding smaller and smaller lots, is an aspect of concern.	There appear to be few Councils which have prohibited subdivision even in identified hazard areas. The Tairāwhiti Resource Management Plan (Gisborne District) makes "subdivision to enable new development to occur, except for the provision of esplanade reserves", prohibited within the CHZ1 (Extreme risk) Overlay, and "subdivision for new commercial or residential development" prohibited within the CHZ2 (Moderate risk) Overlay. The Tasman Resource Management Plan prohibits subdivision in the 'coastal risk area' overlay at Mapua/Ruby Bay to ensure that development in the low-lying and coastal hazard prone area is not further intensified.

Excluding particular activities from identified areas	The RMA provides for a range of types of activity status, with increasing limitations and greater degree of consenting difficulty from permitted (with or without conditions), through discretionary, to non-complying and then prohibited activity status (where an application cannot be made for the activity). Most rules that apply to coastal hazard areas are district rules, meaning that once a consent is granted, unless it is bounded by particularly complex conditions, existing use rights will apply into the future – a problem when sea-level rise and/or coastal erosion make the development untenable. Regional rules do not convey permanent use or occupation rights and terminate existing use rights[64], but there are very few examples of their use. Prohibited status is also rarely used, but where it is used it is very effective in preventing further development. Restricted discretionary status is a "soft" control which generally means an activity will be able to be consented subject to conditions, but full discretionary and non-complying status brings policy considerations into play (including regional, district and national) and enables decline of consent.	Napier City is an example of a plan that strictly limits activities within the plan's coastal hazards overlay. New or relocated buildings and structures (other network utility operations, fences and coastal protection works) are prohibited. Existing buildings may be maintained and repaired, but not extended (horizontally or vertically) as a permitted activity but subject to a notation on the title at the time of the works. Subdivision is fully discretionary and would be subject to a requirement that any future building or development only takes place on part of a title outside the hazard overlay, and the title is notated as to its risk. Beach renourishment and planting is a permitted activity. In Whakatane within the Coastal Hazard Erosion Policy Area, existing buildings can be maintained, but new buildings and other structures face increasing consent difficulty, depending on the zone. Easier consenting paths are provided for new dwellings if an alternative building site for future relocation is provided. Such sites must be held available (within the same legal ownership title) for eventual building relocation. Relocation is triggered when the line of mean high-water springs is at 20m from the closest point of the building. Draft conditions in the plan indicate what the council will require owners to do (including notations on the land title) if consent is granted. Otherwise, rules and policy make it very difficult to obtain consent for new buildings. Similarly, there are strong consenting barriers which mean that any form of coastal protection, other than methods such as dune planting, is unlikely to get consent. Northland's proposed Regional Plan includes rules that require regional consents for rebuilding of habitable buildings that have been materially damaged by natural hazards. This is a restricted discretionary activity if accompanied by a hazard assessment by an appropriately qualified person, or non-complying if not. Several matters of discretion relating to

[64] See para 10, Awatarariki Residents Incorporated vs Bay of Plenty Regional Council and Whakatane District Council [2020] NZEnvC 215

	We have found a wide range of different types of activity status, matters of discretion and policy "messages" across plans which have included zoning or overlays for areas at risk from coastal hazards.	the specific circumstances of the damage, and adjacent land, apply. Although Marlborough District has been progressive in its policy towards addressing the effects of climate in the new Regional Natural Resource Management Plan, management of coastal development in the plan is more rudimentary. This is explained in Box 2. This plan provides a low level of coastal risk protection, with the regional rules limiting filling (for building platforms or other purposes) within 20 m of the coast likely to be more effective than the land use rules in controlling such development, due to their limited life and the lack of associated existing use rights).
Specifying minimum floor levels	This can be done through rules in plans, or as a condition of any building consent that is granted. It is more commonly applied in flood hazard areas than coastal hazard areas and is a relatively common condition of consent. However, concern is expressed about the long-term effectiveness of such controls if access is also not protected.	The Tairāwhiti Resource Management Plan (Gisborne District) specifies minimum floor levels in relation to design flood levels, for broadly defined areas, and in some cases, this will pick up coastal flood-prone areas. The Nelson Tasman Inundation Practice Note (2019) sets out non-statutory guidance to determine minimum ground and/or floor levels at the time of subdivision, new buildings, and major extensions. This guidance is used to inform resource and building consent processes and enables landowners and developers to determine what Council's expectations are regarding ground and floor levels in low-lying areas that are prone to seawater and/or freshwater inundation. (see 'related guidance' on https://www.tasman.govt.nz/my-council/key-documents/more/growth/land-development-manual/) In other areas, where buildings are subject to consent processes, conditions such as this are normally able to be applied where they can be shown to "avoid, remedy or mitigate" coastal hazard risk.

Specifying types of construction and building design and use	This approach to risk mitigation is most likely to be used through consent processes, or directly through the building consent process (if a resource consent is not required).	Resource consents may specify building on piles, excluding structures that may become de facto protection structures, etc.
Specifying relocatable buildings	This is a practical means of conveying that land and development may in future be subject to the need to retreat. It has been used by a number of councils.	This technique has most notably been applied in the Whakatane district plan, in association with proof of ownership of a site suitable to relocate the building. It is also a common condition of consent if a consent has a limited term applied.
Temporary development or land use consents	Some councils have provided for temporary consents (with or without relocation conditions) for recreational buildings such as surf or rowing clubs, where close access to the sea is necessary. Other consents have been granted subject to "trigger" conditions, which will require relocation (or review/reconsideration of risk) when a pre-determined set of circumstances is reached.	Whakatane's district plan's coastal hazard provisions include a strong emphasis on demonstration of a relocatable site for any new building, indicating that use and development in the zoned areas will only be temporary**.**
Prohibited activities	Prohibited activities specified in a plan zone or overlay cannot be applied for – their establishment is banned. There are a small number of prohibited activities in coastal hazard zones in plans – see item on "excluding specific activities" above in this table.	Amongst prohibited activities are landfills in the CH3 Zone in the Hawkes Bay Regional Coastal Plan; subdivisions for some purposes in some coastal hazard areas in the Tairawhiti Resource Management Plan (Gisborne District); all subdivision in Residential Closed Zones in Mapua, Ruby Bay and Anchorage in the Tasman Resource Management Plan; new dwellings and other structures in a number of coastal hazard zones in Whakatane District Plan.

Land information memoranda (LIM); project information memoranda (PIM)	A council is required to disclose information known to it about natural hazards for any site or buildings, at the request of any person under the Local Government Official Information and Meetings Act 1987, unless that information is available in a district plan. A recent Local Government NZ review[65] has found that there are many inadequacies in this means of conveying information about natural hazard risks and have proposed changes to address the problems. At present, information in a district plan, where limitations on use and development can be reviewed in parallel, is more useful to potential purchasers of land.	Information is generally provided in the form of a link to a report, on request for a LIM or PIM. Councils are not consistent in their disclosure, and much coastal land changes hands without a LIM or PIM at the time of transaction. We have not found particular examples of these being used as effective techniques within planning processes as part of this study. Christchurch City Council is currently consulting on an updated coastal hazards assessment and mapping prior to including details on LIMs from the end of 2021.
Covenants, easements, and consent notices	Where consents are granted, a wide range of conditions are usually attached to mitigate future potential effects, including specific covenants, easements, or consent notices (the latter only applicable upon subdivision), including requirements that there is no future building (including no coastal protection structures) on parts or all of a lot and that existing vegetation is protected.	Examples reviewed have included wide-ranging and creative means of protecting most vulnerable parts of land. As provisions are tailored to specific consents, no examples are provided.

[65] See https://www.lgnz.co.nz/assets/Uploads/LGNZ-Review-of-Land-Information-Memorandums.pdf

Bonds	Where consents are granted, future performance is sometimes secured by a bond. Bonds are most likely to be applied if, for example, a building or structure is subject to a relocation or removal requirement. The purpose is to ensure that the community is not required to pay for future remediation. The option has not been widely used but may become so in the future.	As provisions are tailored to specific consents, no examples are provided. However, in the case of Mahanga E Tu Inc v Hawke's Bay Regional Council and Wairoa District Council W083/2014, the Court imposed a bond of $35,000 and a 5% per year compounding annual increase if the Council had to remove the consented structure.
Land purchase	Where subdivision is involved, esplanade reserves or esplanade strips may be taken. Esplanade strips move with the line of MHWS, so are more appropriate in coastal areas affected by sea-level rise. Land can be compulsorily acquired in relation to a designation, but otherwise land purchase by local authorities can only be achieved by agreement (potentially including through a resource consent condition).	We have not found any examples of local authorities acquiring land specifically for coastal hazards management purposes to date.
Targeted rate areas	Targeted rating areas enable a council to charge additional rates to cover the costs of works undertaken that result in particular benefits relating to specific identified areas. This approach appears to be increasingly used where communities are seeking coastal protection works, sometimes on a cost-sharing basis with the wider community.	An example is found in Waihi, where approximately 85 residential properties pay additional rates which covers part of the overall cost of improved coastal protection structures. Targeted rates are being considered in Hawkes Bay and Gisborne for the same purpose.

Grants and information support	Councils can support community groups undertaking coast care on the basis of the Civil Defence Emergency Management Act or the Local Government Act. The progress that can be achieved is cost-effective and contributes to local resilience.	Such activity is widely supported by councils around the country. Numerous voluntary coast care groups have become a major force in local coastal restoration and managing the effects of climate change.

7.2 Discussion

The analyses in Tables 4 and 5 show that the techniques available to councils are being taken up and applied. However, councils across the country have prioritised natural hazards as an issue differently and progress has been uneven. The development and application of the techniques has been to some extent experimental, to fit with the specific circumstances of each local authority and the natural hazards they face.

Where councils have undertaken planning and applied the techniques above, there is a lack of consistency, for example in how hazard lines have been established, how they are described, and the approaches to managing land use, development, and subdivision (activity status, matters of control, stated policy for decision-making). In addition, there is very little use of prohibited activity status[66]. Many plans provide for land use and development in hazard areas as restricted discretionary activities, meaning that proposals are considered only in terms of a narrow range of stated effects considerations usually excluding policy but allowing for mitigation. Few regional councils have developed regional rules to limit coastal development, meaning that district councils are left with the decision-making role, but this is often compromised by inadequate regional policy and legislative existing use rights which are extremely difficult to override, even through complex conditions of consent.

The uptake of the available techniques reflects the wider policy context, the preferences and resources of the individual local authorities, and the nature and existing content of the plans they have[67]. A number of consistent threads have emerged when trying to identify best practice or explain the basis for specific provisions when any particular techniques are being applied which are likely to come more to the fore when DAPP planning is being implemented at the local level. We outline these, and their implications below.

7.2.1 Patchy uptake of clear direction in NZCPS

The patchy nature of the policy contents of RPSs relating to coastal natural hazard risk has been identified and commented on in section 6 of this report. The implications are that all the districts within some regions have the benefit of a clear and consistent policy framework at regional level to work with (devolved and clarified from the NZCPS in a way that is appropriate and relevant to the needs of the region[68]) when reviewing district plan contents and processing consent applications and private plan changes, while others do not and must rely directly on the NZCPS or the rather weak old-style guidance in some RPSs.

Furthermore, where districts are left to develop their own policy and provisions in a RPS policy vacuum, there is likely to be inconsistency amongst the different districts in the region, including in terms of the planning tools and methods they choose to use. This puts considerable pressure on the

[66]Councils are known to be reluctant to expose themselves to RMA s85 (reasonable use) challenges. S 85 provides that planning provisions are neither an interest in land or an injurious effect unless the land is rendered incapable of reasonable use because of the provision.

[67]The RMA included no standardised way, other than through plans, of achieving its purposes. As a result, there has been huge diversity in the form, nature, and contents of plans over the past 3 decades. The 2019 National Planning Standards are intended to result in more consistency in plans, but none has yet emerged.

[68] Northland is an example of clear direction at RPS level, which districts can rely on in developing their plans. However, progress has been made with all councils and Tangata whenua now working together to develop more detailed plan approaches and provisions for their areas and communities.

first district to develop policy[69], and there may be little incentive or encouragement for others to progress.

These inconsistencies do not arise in unitary authorities, as the policy hierarchy is seamless from regional level to district level. Unitary councils are generally more advanced in terms of natural hazards policy and better able to ensure consistent administration of policy across regional and district responsibilities.

7.2.2 The Regional/District responsibility conundrum

The RMA, s 62(1)(i) requires, *inter alia*, that a RPS must state:

> *"the local authority responsible in the whole or any part of the region for specifying the objectives, policies, and methods for the control of the use of land—*
> *(i) to avoid or mitigate natural hazards or any group of hazards"*

S 62(2) provides that:

> *"If no responsibilities are specified in the regional policy statement for functions described in subsection (1)(i)(i)..., the regional council retains primary responsibility for the function in subsection (1)(i)(i)".*

Note that methods include as wide a range of techniques as a council might determine, encompassing zoning, overlays, precincts and structure plans, and rules.

The respective requirements are normally negotiated and agreed between the councils, or through the formal procedures of preparation of an RPS (except in the case of unitary authorities where a single council has all functions).

In reality, because the functions of district councils include the integrated management of the effects of the use, development, and protection of land, including controls for the avoidance and mitigation of natural hazards (RMA s 31), and the control of subdivision (RMA s 11 and Part 10) is entirely the responsibility of district councils, the primary responsibility for actually implementing regional policy usually lies primarily or solely with district councils.

Only rarely are regional councils prepared to pick up a level of responsibility through a regional plan, although RMA s 30(1)(c) provides that they have the function of the "control of use of land" for, inter alia, "the purpose of avoidance or mitigation of natural hazards".

There is a long tradition of regional councils stopping short of developing regional rules for the management of regional coastal hazards, despite the benefits of regional rules, which include the cancellation of existing use rights[70]. For sea-level rise, there is even more benefit, as regional councils (together with the Department of Conservation) are responsible for all RMA planning seaward of MHWS. Planning across the shifting line of MHWS as sea-level rises is the only way of ensuring integrated and sustainable management of resources within vulnerable areas, and the involvement of regional councils is necessary to ensure this[71].

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[69]Kapiti Coast within Wellington Region is an example. There was (and continues to be) little policy on managing coastal natural hazards in the Wellington RPS when this council developed its approach to policy, hazard lines and restrictive rules in its proposed district plan, although the Greater Wellington Regional Council is now taking an active role and working closely with district councils within the region on coastal hazards.

[70]These benefits of regional rules are now widely accepted, have been extensively canvassed in publications and commentaries such as the Review and Recommendations for the Clifton to Tangoio Coastal Hazards Strategy Joint Committee, R Asher, 2021, and also confirmed by the Environment Court in Awatarariki Residents Incorporated vs Bay of Plenty Regional Council and Whakatane District Council [2020] NZEnvC 215.

[71]Although primarily looking at funding, the report on the relative responsibilities of the regional and district councils in Hawke's Bay found: "*geographic logic supports a single agency implementing measures to respond to coastal hazards along this coast, and the reality of the boundaries of the territories of the councils supports that council being the HBRC*"

Subdivision remains outside this framework, meaning that district councils are inevitably drawn into the decision process where there is pressure for the development that is invariably a consequence of subdivision. We have found a small number of examples where district councils have applied prohibited activity status for subdivision in the most vulnerable localities, and non-complying or full discretionary status in other compromised localities. Both of these statuses require consideration of policy in reaching decisions, and benefit from strong policy and regional and district councils that work together.

RMA s 106 provides a back-stop evaluation which must be applied in all situations where there are potential natural hazard risks associated with a subdivision, regardless of the provisions of a plan and what the zoning provides for in terms of subdivision. As noted in Table 1, the provision has not been legally tested and pre-existing case law is no longer relevant since this section was effectively rewritten in late 2017. It is likely that the statutory tests set a higher barrier to the decline of consent than under previous wording and councils will be less confident in applying the provision.

The current shared responsibility for management of natural hazards, along with other provisions, complicates management on the coastal edge when land use change, subdivision or development is proposed. This is further confounded by the issue discussed in section 7.2.3.

7.2.3 The RMA problem of "mitigate" being preferred over "avoid"

The RMA operates on the basis of managing the use, development, and protection of natural and physical resources, through a mantra of "avoid, remedy or mitigate"[72] actual and potential adverse effects. Despite the NZCPS clearly directing that in circumstances of increasing risk, a change in land use (e.g. by rezoning or new development), and redevelopment, should be avoided, and that managed retreat or abandonment should be encouraged to reduce risk, councils primarily strive to manage resource consent applications in areas exposed to sea-level rise, primarily on the basis of mitigation of immediate and clearly foreseeable adverse effects.

This can be seen in the very rare use of the prohibited activity category in identified hazard-prone areas in plans, and the relatively frequent use of restricted discretionary activity and even controlled activity status in such areas. Controlled and restricted discretionary status are subject to limited assessment criteria which are set out in the plan and the focus of decision-making is whether adequate and appropriate conditions can be applied to a consent to allow the activity to be established (for example, minimum floor levels may be set). Controlled activities cannot be declined consent and consents cannot be subject to conditions which make the activity impracticable to establish[73]. Only rarely is a restricted discretionary activity declined consent. The two intermediate categories of discretionary activity and non-complying activity send slightly stronger signals against development, but consents are granted where a developer offers or agrees to conditions designed to mitigate immediate risk sometimes with a potential second stage of relocation or removal once trigger conditions (such as the MHWS having come within x metres of the closest wall of a dwelling) are reached. Sometimes the trigger simply results in a further expert report which may recommend further measures as mitigation.

While arguably plans that enable temporary forms of development within the at least 100-year hazard areas that the NZCPS requires to be considered are providing for efficient use of land in the

(i.e. the regional council) - Review and Recommendations for the Clifton to Tangoio Coastal Hazards Strategy Joint Committee, R Asher, May 2021.

[72] RMA s 5.

[73] The exception is subdivision applications which can be refused consent directly under RMA s 106 in particular circumstances – see also RMA s 87A(2).

interim, there are a range of problems in such "solutions" based on complex conditions. These include locking in developments (and infrastructure) that may provide sub-standard and/or risky living conditions; eventual abandonment of structures leaving the clean-up to be arranged and paid for by the community; and most commonly, the installation of informal or illegal protection structures and/or pressure on local authorities to allow for protection structures.

Where control over land use and development is exercised through district planning documents, the RMA effectively provides that such activities, once established, become permanent through mechanisms in s 10 - certain existing uses in relation to land protected - and a similar provision in s 10B relating to buildings. These provide that, even if an activity or building is temporarily interrupted or destroyed, it can be re-established as it was within a year (or a longer period if the council is advised of the intention to re-establish it). Regional rules effectively over-ride these provisions but are rarely in place to avoid lock-in of developments exposed to sea-level rise. RMA s 85 - which provides that plan provisions must not render land "incapable of reasonable use" - also makes councils reluctant to apply limitations on use and development, even in hazard-prone areas. This is particularly the case where land parcels (single lots) are entirely within hazard areas and owners are unable to develop them with buildings or infrastructure[74].

These two statutory provisions compound the reluctance of councils, when making decisions, to go beyond mitigation, if mitigation seems possible in any given circumstance. They reinforce the rights of landowners and developers and run counter to sound planning in situations of natural hazard risk, especially in coastal areas where risks are increasing due to sea-level rise. There are real issues with the widespread application of the mitigation concept. The two statutory alternatives of "avoid" or "remedy" are scarcely applied in relation to coastal hazards, despite the NZCPS's policy emphasis on these mechanisms in certain specified situations.

7.2.4 Static Nature of RMA Planning

In the 30 years since the RMA was promulgated, processes for developing, reviewing, and changing plan provisions have become much slower and more exacting. Successive changes have been made to the statute and its schedules (which cover plan-making and the processes of making plans operative). The work involved in developing and documenting a change in the planning framework prior to notification may span several years. Periods of 2 to 5 years between notification of a new plan or plan change and its becoming operative, are not unusual. The more controversial a plan change is, the more submissions and risk of lengthy appeal processes following council hearings and decisions there are likely to be.

While RMA s 86B provides that certain types of rules in proposed plans have immediate effect[75], this does not include rules or other provisions designed to protect land, people, or buildings from risk of natural hazards. It is possible for a council to request the Environment Court to order that any rule has immediate effect under RMA s 86D, but this provision is rarely used. An example of its use was as part of a plan change undertaken by Tasman District Council relating to "closed zones", where further subdivision and development was effectively prohibited from the date of notification of the proposed plan change by order of the Court[76]. Where councils do not use this provision, landowners

[74]There is a long recognition in NZ planning law that, if land has been subdivided, it should be possible to put a house on each separate allotment. This goes back to earlier local government law, where subdivision was controlled directly under the Local Government Act and 10-acre subdivisions were allowed throughout the nation's privately-owned rural areas.
[75]Such types of rules include rules that protect historic heritage, water, air, or soil (for soil conservation), and significant indigenous vegetation or habits.
[76]See Environment Court Decision on Application by Tasman District Council – W047/2011.

can, and often do, obtain approvals under existing rules for developments which would not be possible under changed rules in a proposed plan or plan change[77].

The slow nature of changes to plans or plan reviews, and the lack of effectiveness of new provisions while statutory processes are taking place, poses particular difficulties when the environment is changing, and coastal hazards are shifting inland. It is relatively easy for landowners or others to make successful applications for uses or developments or to establish permitted activities in hazard-prone locations, regardless of adverse information, policy direction, and new rules which are signalled in a proposed but not-yet-operative plan.

As sea-level rise affects more existing developed areas, the inability for planning to move fast enough and prevent greater community exposure to growing risks, will have foreseeable physical, social, and economic consequences. One of the benefits of DAPP planning is that it identifies signals and triggers which foreshadow changes to a different situation which may involve relocation of services (transport and piped services) or coastal retreat. The present statutory planning framework is too cumbersome to facilitate these processes in the short term, and also has limited means of sending long-term signals of the need for changes in the future[78].

7.3 Adaptive Management Examples

Adaptive management is widely used as a natural resource management tool internationally. However, adaptive management is seldom reflected formally in legislative provisions with only a limited number of examples including in UK, EU, Australia, New Zealand, Malta, Trinidad and Tobago some of which apply in coastal areas and implement AM as responsive to new information and change to allow for adjustments (McDonald & Styles 2014). The application of adaptive management principles in New Zealand case law focuses primarily on development of flexible conditions on project approvals, including the following examples:

- aquaculture and water resource management (e.g. for enabling intensification of use of allocated coastal space, limiting water 'takes' where availability diminishes across seasons, and for modelling geothermal reservoirs for consents under conditions of uncertainty).
- consents managing effects on water quality (e.g. managing suspended-sediment levels from dredging activities).
- consents under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act)for activities in marine areas
- managing current hazards by providing for roads to be raised, or for roads and rail bridge upgrades as conditions change as part of project approvals (e.g. Waterview Causeway SH16 NW Motorway, Auckland; Ngauranga to Petone shared walking/cycling pathway).

NZCPS Policy 3 directs that a precautionary approach be adopted for activities with effects that are uncertain, unknown, or little understood, but potentially significantly adverse. The NZCPS guidance

[77] Where subdivision is involved, RMA s 106 may be applied, but there is no such provision for use or development applications.

[78]The life of any plan under the RMA is only 10 years, after which it must be reviewed. While the planning behind some provisions, including zoning for residential and business development, must now be based on a 30-year horizon, this does not mean that a plan will provide for the full 30 years. There are much greater difficulties in using a present day to 10 years ahead plan to signal prudent planning for the next 100 years.

note[79] identifies AM as one approach for implementing Policy 3 and sets out that it involves "clearly specified staging of development, monitoring of staged development, and review", and provides clear expectations around its use and where it is likely to be inappropriate for use.

Examples of the use of adaptive management through statutory RMA plans in New Zealand are limited. Most of the practical examples, are found in subsidiary provisions such as through management plans developed as conditions of resource consent.

- A legislated and defined term within the EEZ Act and was a feature of the resource management approach of two applicants, Trans-Tasman Resources Limited and Chatham Rock Phosphate Ltd.

- *Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020,* proposes the adoption of an AM approach that enables ecological and other relevant information to be incorporated into decision-making, acknowledging some AM initiatives are already in place.

- In the case of Sustain our Sounds v King Salmon [NZSC 40], the New Zealand Supreme Court drew on the International Union for Conservation of Nature (IUCN) guideline on the application of a precautionary principle, which included a guideline on adaptive management (Guideline 12)[80]. This case is outlined in Table 3.

- The Tasman Resource Management Plan includes an adaptive management approach for the development of its aquaculture management areas. This was subject to a long series of court cases before being incorporated in the plan - the first to test the concept of adaptive management in NZ's RMA[81]. The policy provisions are found in Chapter 22 of the plan and enable the staged development of aquaculture in "zoned" areas, while prohibiting the activity elsewhere in Tasman and Golden Bays. The rule provisions, including the details which implement the adaptive management policies are found in Chapter 25 and its schedules. Key elements in the provisions are a requirement for monitoring after the initial consent is granted, the review of monitoring information before intensification of development is considered through a request by the operator for a change of conditions, and a protocol for the establishment and operation of an Ecological Advisory Group to advise the decision-maker when a request is made for a change in conditions to intensify the use and development of a marine farming area.

- Adaptive management approaches are used in Environment Canterbury's Land and Water Regional Plan which implements *"adaptive management conditions"*[82] in the Selwyn Te Waihora sub-region due to the sub-region being over-allocated. The adaptive management

[79]https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/coastal-management/guidance/policy-3.pdf

[80]Under the Effective Implementation Guidelines, Guideline 12 states: "Unless strict prohibitions are required, use an adaptive management approach, including the following core elements:
• monitoring of impacts of management or decisions based on agreed indicators.
• promoting research, to reduce key uncertainties.
• ensuring periodic evaluation of the outcomes of implementation, drawing on lessons and review and adjustment, as necessary, of the measures or decisions adopted; and
• establishing an efficient and effective compliance system."

[81]Golden Bay Marine Farmers v Tasman District Council EnvC Wellington W19/2003, 27 March 2003; Minister of Conservation v Tasman District Council HC Nelson CIV-2003-485-1072, 9 December 2003; Golden Bay Marine Farmers v Tasman District Council EnvC Wellington W89/2004, 3 December 2004.

[82]Meaning a condition or conditions on a resource consent to take groundwater that includes an annually variable volume dependent on the annually assessed state of the groundwater resource in a zone.

conditions are to be implemented until the allocation limits are no longer exceeded (Policy 11.4.29). This exists in both the policy context and the ability for the principle to be implemented through Resource Consent/Permit Conditions for "top-up" consents.

- The proposed Marlborough Environment Plan includes a specific policy regime implementing an AM approach for aquaculture. Introduced by variation in 2020[83], the operative and proposed policies include reference to trigger levels, inclusion of conditions of consent which directly link to monitored effects on the receiving environment. The application of an adaptive approach is directly linked to those indicators or triggers which may be monitored and where the regulator (the Unitary Authority) can implement measures (through consent conditions) to address actual and potential effects.

- The Whakatane District Plan has adopted a more dynamic adaptive approach in a coastal context by applying triggers to require action. The district plan (operative since 2017) identifies existing erosion hazard areas, and 2060 and 2100 hazard lines on the planning maps and has strong policy and rules to manage development within hazard areas. Inland to the 2100 hazard line, existing buildings can be maintained, but new buildings and other structures face increasing consenting difficulty the closer to the coast that they are. Further details on the provisions are provided in Table 5, under excluding activities from particular areas. The processes which have led to these plan provisions are in line with DAPP, and the approach is consistent with the NZCPS.

- Geothermal management provides an example in the Waikato Region where consents for access to geothermal fluid in the development of geothermal systems require a system management plan (the effects from perturbing a systems are uncertain). Decisions are made on the basis of reservoir model outputs which are monitored, and the information reviewed by independent peer review panels, which forward recommendations for changes in conditions to the regulatory authority (the Waikato Regional Council)[84]. This approach provides for adaptive management and flexibility over time, regional plans that are not inconsistent with any approved system management plan and monitoring and reporting processes that include trigger points for initiation of actions to avoid, remedy or mitigate adverse effects. This is the closest example to implementing a DAPP type process into a regulatory process that this review found.

A further strand of adaptive management under the RMA is provided for by review conditions attached to consents. These are hedged with requirements[85] which must be set in place at the time that the consent is initially granted and are in practice rarely used by local authorities because of the many legal limitations in their application. They can, however, if appropriately worded, be used to address effects which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage[86].

[83] https://www.marlborough.govt.nz/repository/libraries/id:1w1mps0ir17q9sgxanf9/hierarchy/Documents/Your%20Council/Environmental%20Policy%20and%20Plans/MEP%20Variations/Variation_Provisions_List/V1_Schedule_Changes.pdf

[84] Waikato Regional Policy Statement - Geothermal chapter 9 (pages 9-7 to 9-10) Table of Contents (waikatoregion.govt.nz). https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/Rules-and-regulation/WRP/Chapter-7-Geothermal-Module-Operative-Waikato-Regional-Plan-to-include-NESPF-amendments-as-at-9th-August-2019.pdf.

[85] RMA ss 128 to 132. Such conditions must specify the reasons for and circumstances in which a review of conditions may be initiated, and the timing for initiation of the processes.

[86] The issue when dealing with effects associated with natural hazards is demonstrating that they arise from the exercise of the consent, not from other factors such as sea-level rise.

AM approaches have been implemented for management of over-allocation of groundwater and freshwater. Here AM is reliant on the lapsing of existing consents in order to replace them with more flexible and shorter-term consents, through inclusion of additional monitoring of these 'new' consents, to either enable or preclude water take, subject to a trigger being exceeded. In developing and implementing these measures, through a plan change or regulatory consenting, a robust section 32 analysis or assessment of effects would be required. The focus is generally narrow (a catchment or specific aquifer of interest), the science (or at least triggers or indicators) generally resolved and the options or actions clear and generally limited (i.e., enable water take or preclude water take).

7.4 Examples of DAPP Application

To date the application of DAPP in New Zealand has been primarily in non-regulatory settings in a number of decision domains where environmental conditions are changing the risk (see section 7.4). For example:

- managing flood risk decisions as flood frequency changes with climate change (Hutt River Flood Risk Management Plan(Lawrence et al 2019a).
- developing coastal hazard strategies where coastal flooding is being exacerbated by sea-level rise and more frequent coastal flooding is occurring, to make decisions on short-term actions (Hawkes Bay Clifton to Tangoio Coastal Hazards Strategy 2120, Lawrence, Bell, Stroombergen, 2019).
- decisions on roading to make short-term decisions and chart long-term options that give flexibility to change options and pathways based on signals (warning) and triggers (decisions) of change, ahead of reaching thresholds (Allis & Bell 2021).

Several councils are currently part-way through a DAPP process following the steps set out in the Guidance. For example, the Thames Coromandel District Council Shoreline Management Plan process is at steps 5 and 6 of the 10-step decision cycle (Figure 4) and will produce a DAPP Strategy with triggers at step 7.

Several government agencies have used DAPP processes to inform future decisions in a changing climate, principally in an operational setting. For example, the Department of Conservation has used DAPP to identify and describe adaptation options to ensure the resilience of the visitor infrastructure and experience on the upper Tasman Glacier to future climate change (DOC 2021)[87]; for identifying risks and timeframes for planning roading assets and (Waka Kotahi NZ Transport Agency); for planning wastewater asset thresholds under changing flood frequency and sea-level rise (Watercare Services); for planning water demand and supply (Wellington Water).

There are no known examples in New Zealand yet where the outcomes of a DAPP process have been implemented in a statutory planning setting. There are several examples where councils have progressed along the steps toward adaptive strategies and are almost implementation ready for example the Clifton to Tangoio Strategy 2120 in Hawke's Bay. The one example where DAPP is mentioned in a statutory document is in the Marlborough Regional Environment Plan (see Box 2).

The adaptive framework provided by the NZCPS, section 6 (h) and the ability for plans to provide for a DAPP process for intensification and new developments, as set out in the Guidance could enable councils to start along the adaptive management of changing risks. However, pre-emptive adaptive

[87] https://www.doc.govt.nz/globalassets/documents/our-work/climate-change/climate-change-risk-assessment-and-adaption-plan-for-tasman-glacier-huts.pdf

planning has met too many barriers (MfE & Hawkes Bay Regional Council 2020) that need systematic attention, before DAPP processes can be integrated effectively into the current RMA regulatory context.

Applying adaptive management techniques in the sea-level rise context create challenges arising from their ongoing and changing spatial and temporal implications for developing appropriate and reasonably consistent policy and plan provisions (Somerville, 2013). In order to accommodate a dynamic adaptive planning pathways approach, where uncertainty of effects remains and potentially a broad and dynamic range of response options are to be considered, a regulatory regime is required that can maintain and update the changing evidence base, include monitoring of changing risk and provide for dynamic options and evaluation tools appropriate for changing risk contexts, such as where sea level will continue to rise and surprises affecting the pace and magnitude of the change cannot be ruled out. The *Enabling Coastal Adaptation* research programme is developing further guidance on such tools as part of the wider programme[88].

7.5 The Problem of Hard Protection

The NZCPS includes in Objective 5, the management of coastal hazards by protecting or restoring natural defences. Policies 25, 26 and 27 discourage hard protection structures[89] and promote the use of alternatives to them, including natural defences where areas are potentially affected by coastal hazards over at least the next 100 years, and encourage the protection and restoration of natural defences, including beaches, estuaries, dunes, intertidal areas, wetlands, coastal vegetation, and barrier islands. The Department of Conservation's implementation guide for NZCPS Objective 5 and policies 24 to 27[90], issued at the same time as the MfE Guidance, sets out in some detail the issues likely to be experienced in the long term with hard protection structures, which include initial cost, increasing costs of maintenance over time, potential failure, alongshore effects which extend well beyond the "protected" frontage, the "coastal squeeze" concept, and loss of habitat, amenity and useable public open space.

Hard protection creates further problems for planning for rising sea levels. Perceived higher levels of protection results in increasing land values and further pressure to invest in the protected area through intensification or reinvestment in existing dwellings and infrastructure. The resulting lock-in of development and communities works against the "relocation and removal of existing development" option and the "planning for transition mechanism and timeframes for moving to more sustainable approaches" option, both of which the NZCPS requires to be assessed against hard protection options.

The NZCPS in Policy 27 does provide that in some cases hard protection may be necessary, specifically to protect existing infrastructure of national or regional importance and to sustain the potential of built physical resources to meet the reasonably foreseeable needs of future generations. Policy 27 also requires that options for hard protection for existing settlements must be carefully and comprehensively considered, taking into account all coastal values and with a focus on risk management approaches that reduce the need for such structures and similar engineering interventions.

[88] https://resiliencechallenge.nz/scienceprogrammes/coastal-theme/

[89] Hard protection structures are specifically and comprehensively defined in the NZCPS to include a seawall, rock revetment, groyne, breakwater, stop bank, retaining wall or comparable structure or modification to the seabed, foreshore or coastal land that has the primary purpose or effect of protecting an activity from a coastal hazard, including erosion.

[90] Including an Appendix entitled Natural vs Armoured Shorelines.

Nevertheless, hard protection still appears to be a preferred solution whenever coastal communities are faced with coastal hazard risk. Box 3 provides some recent examples where consents have been granted and funding provided. Each of these examples has been considered through comprehensive consent processes, including an evaluation in terms of the NZCPS and any relevant RPS and plan policies. Box 4 gives details of one example, Pakawau's proposed sea wall, where consents were declined. This decision has not been appealed, but the community is now working with the Council on further options.

Box 3: Use of Hard Protection Structures Consented and Funded

There are many examples of councils and/or communities obtaining resource consents and funding hard protection proposals to protect even quite small communities - e.g., Haumoana in Hawkes Bay with a population of 1150 where the council funded $600,000 for rock revetment protection. At nearby Clifton, population 770, the same council, and two local landowners are investing $2.8M over 35 years to protect a road, a camping ground, and a small settlement. At Waihi Beach in the eastern Bay of Plenty, population 3000, the council evaluated options and obtained consent to build a replacement sea wall and undertake dune enhancement to protect existing properties. Funding is through a targeted rating area, where capital and maintenance is largely covered by those who benefit and 25% of the costs are funded via a related council programme (the wall has been extended, recently on the same basis to address "end effects" of the structure).

Box 4: Pakawau's Sea Wall Proposal and Decision to Decline (2019)

Part of the small Golden Bay community of Pakawau, which is strung out along a narrow strip of land between the coast and the sea, sought to construct a 345m long rock revetment to halt erosion along the sandy beach, which was encroaching on 16 residential properties, including their septic tank systems, and affecting 2 public access strips to the beach. The residents considered that council's current approach, involving sand "push-ups" and planting, to be inadequate. The proposed revetment would meld into an existing structure which currently protects the camping ground to the east (established in 1979) and a protective structure on private land further to the east. The group of residents which would benefit proposed to fund the capital cost of the new structure and sought consents from Tasman District Council. As the structure would cross the line of MHWS, both coastal and land use consents were needed. The activity was a discretionary activity, meaning that both policy and effects on the environment had to be taken into account.

The decision took into account the NZCPS, the provisions of the Tasman Regional Policy Statement and Tasman Resource Management Plan, and the council reserves management policy and coastal asset policy. It also considered the submissions both in support and against, the expert evidence for applicant, submitters and the council, and the applicant's legal submissions.

Influential in the decision to decline consent were considerations of natural coastal character and natural coastal processes, and evidence that there would be significant adverse effects on natural character and processes from the proposed revetment. The decision found that the proposal was against the clear guidance in the NZCPS relating to hard protection, and contrary to plan policy (when read as a whole or as individual policy items). The decision also dealt with precedent and that some submitters felt that they had been unfairly treated. Significant in the decision's findings were the implication of the council's policy on new coastal protection through its asset management planning (see item in Table 5) and on the use and development on reserves, neither of which provided any support for the proposal, and which would leave the structure without future funding for maintenance of repair.

See full decision, item 11 in the following link:

https://www.tasman.govt.nz/my-property/resource-consents-and-subdivision/current-publicly-notified-resource-consent-applications/application-decisions/pakawau-community-residents-association/

There are several issues behind the circumstances under which hard protection structures are able to gain resource consents to proceed.

1. The NZCPS, while strongly discouraging hard protection structures in general terms, does provide for circumstances in which such structures may be necessary. This comes under the heading of "strategies for protecting significant existing development from coastal hazard risk" and is carefully hedged by requirements for thorough assessment and evaluation of a wide range of options, including coastal retreat through transition mechanisms. A strengthening of language to make the national policy more directive, or a clear statement on what can be considered as significant existing development, may be desirable.
2. RPS policy, giving effect to the NZCPS, often provides a means for councils and communities to make decisions that hard protection would be necessary, and that consents can be granted. For example, Northland's RPS provides a potential consenting pathway through a policy that states that "*new hard protection structures may be considered appropriate when the level of hazard protection that the proposed structural asset is seeking to achieve is appropriate and cannot reasonably be achieved through non-structural options*" or other tests which involve considering the vulnerability of existing development and the proposed works' contribution to a long-term hazard management strategy; the best practicable option for the future; whether the financial costs of non-structural methods are "*too high for the community*"; whether the benefits outweigh the adverse effects, and whether the structure minimises adverse effects on the environment. The loose policy wording provides opportunities for legal arguments which may successfully result in consented protection structures.
3. Rules which may provide significant barriers to structures in the Coastal Marine Area including the foreshore (under the regional coastal plan) result in applicants turning to protection on-land at the time of construction. An example of this was the case of Auckland Council vs Auckland Council and Others [2020] NZEnvC 070, see Table 3, where a proposed sea wall along the foreshore, originally declined resource consents, was modified so that it was located above MHWS. This removed it from the policy considerations which were relevant to structures below MHWS, and so consent was granted on appeal.
4. A number of RPSs and district plans encourage any coastal protection which is proposed, to be established as far inland as possible. This is intended to prolong its effectiveness and to avoid issues associated with the use of public land (including esplanade reserves or strips). However, protection which is established on private property inland of MHWS will inevitably become subject to sea-level rise, over time will contribute to coastal squeeze, and may be abandoned by owners and eventually become subject to community clean-up.
5. District plans often provide for fence-like structures (up to 2m in height including within yards which otherwise must remain free of structures) as permitted activities (or exclude them from the definition of structure) which can then be constructed as protection devices, including retaining walls, on or near to eroding coasts as of right. A number of more recent district plans have specific rules which define coastal protection widely and require consents for them, however that is not the norm.

6. Emergency powers under the RMA have been used to formalise consents for hard coastal protection - particularly the dumping of rubble or riprap. These powers (RMA s330) primarily apply to local authorities and network utilities, but other powers (RMA s341) provide a defence for otherwise illegal works or dumping if the action was in response to a natural disaster or necessary to protect property. In some cases coastal protection remains informal and unconsented, contributing to a legacy of such structures in many districts.

The apparent preference for hard protection for even the smallest coastal communities is a matter which is yet to be fully addressed through DAPP planning processes. To date, the few communities which have undertaken such processes have all identified preferred pathways which have included hard protection as the first options. The legacy of existing formal and informal protection structures, erected primarily for erosion control and ineffective as sea-level rise dominates, will place increasing financial burdens on communities as they become subject to sea-level rise and require removal. Any new structures will add to that burden as well as locking in new development which will become unsustainable over time.

At present there appear to be no mechanisms which effectively deal with funding for alternatives such as planned and staged retreat. Without this, it is likely that coastal communities will continue to see ongoing hard protection as the preferable future option, however ineffectual over time it becomes.

7.6 The Role of Public Parks and Reserves in Adaptive Coastal Planning

Public ownership of land at the coast provides an opportunity for managing the effects of sea-level rise. There are, however, limited opportunities for local authorities to acquire new reserve land adjacent to the coast where land has already been subdivided for development. Any future acquisition of such land for reserves or other form of open space must be undertaken through normal acquisition processes.

For new subdivisions (parcels of less than 4 hectares) in areas adjacent to the coast or a river, the RMA provides a framework for esplanade reserves or esplanade strips up to 20m wide, to be transferred to the local authority as public reserve. Amongst the reasons for these types of reserves is the mitigation of natural hazards (RMA s 229(a)), public access and recreation use with a primary purpose of conservation. The inland boundary of an esplanade strip moves with any change in the position of the MHWS (in contrast to an esplanade reserve, which has a fixed inland boundary),giving it salience for responding to sea-level rise. Wider esplanade/riparian reserves, open space areas, sport fields or similar facilities are often proposed where an area may be subject to hazards. Such land uses are regarded as 'less vulnerable' with lower levels of investment (for example a picnic table or an open grassed area) which can be more easily abandoned, relocated, or managed.

Several recent examples challenge the notion that public open space is a good/ best option for coastal land use. Over the past decade a preference is apparent to protect 'dry' public coastal space even where this requires hard protection solutions. Boxes 4 and 5 provide examples of dynamic coastal environments where community values, perceptions of the value of investment and the importance of coastal space to the wider community have been part of decision making. Examples include the maintenance of legal roads and services access (in the case of Princes Road Seawall in

Ruakaka[91]) or the desire to provide for access along the coastal marine area for a variety of users, such as the Orewa Beach Esplanade walkway and seawall (see details in Table 3).

If open space is to be used as a land use option at the coast to advance adaptive outcomes, well planned and managed strategies with community engagement are essential components set out in the Guidance. In the case of Tahunanui near Nelson, an informal reserve management plan provided a useful step to clearly communicate the dynamic nature of the coastal environment and to develop and agree on intentions for the activities, development, and permanence of use of the coastal land. However, the ability to develop this level of policy at a regional scale (for parks, reserves and general esplanade reserves) that is equitable at a regional scale and meaningful at a local level requires substantive resourcing, funding, and community participation.

The Marine and Coastal Area (Takutai Moana) Act 2011 provides that existing roads that are (or become) in the Coastal Marine Area are not part of the common marine and coastal area. However, other than existing common law rights relating to accretion and erosion, other land which subsequently becomes below MHWS automatically is made part of the common marine and coastal area and loses its title. This is consistent with the RMA in that the boundary of a district (and district plan provisions) move when the MHWS line moves, whether due to rising sea level, coastal erosion or reclamation or declamation. Where a local authority loses land which it has formerly purchased to the common marine and coastal area, including reserve land, it can seek redress from the Minister of Conservation. The implications of this legislation remain largely untested. However, it appears to offer a route by which a local authority can gain some level of recompense from central government, if it has purchased land for any reason associated with coastal retreat, including for temporary reserve purposes.

[91] https://www.wdc.govt.nz/News-and-events/News-and-notices/New-Princes-Rd-Seawall

8 CURRENT PRACTICE RISKS, THE ADAPTIVE PLANNING HIATUS AND A REFORM AGENDA

There is currently a hiatus between the practice of the current regulatory settings that drive planning decisions and the development and implementation of reformed planning legislation. This poses two risks for those communities exposed to coastal hazards and sea-level rise. One from "business as usual" planning practice (particularly where regional policy has failed to keep up with the direction of the 2010 NZCPS and is not supporting appropriate responses to pressures on district councils for land use and subdivision consents - see section 7.2) and the other from legislative gaps and misalignment that has been made worse by recent legislative changes (sections 4.1 and 7.2). Here we first highlight the current practice risks that are transferring further legacy effects to future generations as the seas rise and more heavy rainfall and coastal storms occur as a result of climate change (section 8.1) .Second, we highlight where there are opportunities for greater use of existing legislation for adaptive planning (section 8.2). Third, we set out issues that must be addressed in the reforms to enable the risks of changing climate to be managed going forward(section 8.3). Finally, we suggest specific provisions for inclusion in the Strategic Planning Act and the Climate Change Adaptation Act to enable effective coastal adaptation(section 8.3).

8.1 The Current Practice Risks

Developments continue to be located in areas at-risk from coastal and other flooding over at least 100 years. This includes areas of new development and areas where existing development is being infilled and intensified. Furthermore, current planning and development practice is attempting to manage these risks for example by raising houses and filling land above sea levels at the land parcel level. These practices at and near the coast are virtually certain to have only temporary effect, resulting in maladaptation that will transfer large costs on to future generations.

Current council policies and plans and their implementation do not provide the means by which ongoing sea-level rise, rising water tables and increased coastal and pluvial flooding can be managed. Councils and infrastructure agencies are giving scant regard to how housing and infrastructure developments function within the wider regional context of access to functioning communities. This is partly due to legacy consents not yet implemented and the low level of attention being given by councils and infrastructure agencies to the impacts of climate change during the life of the decisions being taken. This is being compounded by a combination of increased pressures from developers, COVID-19 funding (stopbanks and seawalls for new urban developments) and in a context where the Government is trying to accelerate housing and its affordability. It is also supported by aspects of RMA legislation where "mitigation" is usually favoured over "avoid" or "remedy" in decision-making.

Common current responses are increasingly relying on practices to accommodate the risks, without consideration of cumulative risk, the wider flow-on effects, accessibility issues and the community expectations being set for defence and hard protection measures to protect the investment that are temporary at best. Furthermore, there is a lack of buyer awareness of the risks and the limitations of such practices. In many cases there is an automatic preference to utilise defences to enable existing development to remain—at both individual and community level. This raises expectations of further protection for further development in coastal areas—a recipe for ongoing exposure and legacy effects that entrench risk. Some of these protection measures are presented as temporary or may have been undertaken under emergency powers. The net effect of this practice is to delay the implementation of adaptive action, and is resulting in social, cultural, and economic challenges, in

the short-term as coastal flooding continues to be experienced at king tides, and in the mid-term as the seas continue to rise, flooding land and assets further inland.

8.2 Greater use of Existing Legislation for Adaptive Planning

While this report identifies examples of positive approaches that some councils are taking to stem the flow of risk exposure, more can be done in the interim to use the existing legislation to undertake the set-up phases of DAPP (Fig 4) which would help position local authorities for using DAPP in the reformed RMA. In summary these include:

- regional and district councils clarifying their respective responsibilities and embedding them clearly within the RPS, so that sea-level rise that will impact land use activities within their lifetime does not "fall between the cracks".

  regional and district councils developing consistent approaches to collecting and applying hazard information, and, where councils are currently not using best practice, finding means of accessing and updating such information.

- regional councils taking the responsibility for land use management and decision-making in hazard areas, including the application of regional rules to control land use change and development.

  regional councils undertaking vulnerability assessments using consistent methodologies (aligned with local context) to prioritise areas where DAPP planning should be undertaken, and the results embedded in strategic spatial plans with effect over district planning.

- strengthening policy that supports risk reduction from sea-level rise over the lifetime of affected land use activities in RPSs and, where relevant, in regional and district plans.

- reviewing the status of subdivision, land use, building and infrastructure rules so that decisions on new activities in hazard areas are subject to a relevant policy lens and removing any presumption that development is appropriate in such areas.

- greater use of section 86D RMA that enables application to the Environment Court to request that new rules which are intended to reduce exposure to coastal natural hazards have immediate effect (rather than being deferred until the plan or plan change becomes operative).

- effective use of section 106 RMA where best practice information indicates subdivision should not be consented [NZCPS Policy 24 (h) viz "taking into account national guidance and the best available information on the likely effects of climate change on the region and district"][92].

8.3 Issues for the RMA Reform to Address

We have concluded from this enquiry that the current planning system and associated statutes (LGA, Building Act) and current practice does not facilitate embedding adaptive (DAPP) planning into the regulatory processes to reduce the risks from ongoing and changing sea-level rise when making decisions today. Here we identify the issues that require addressing in the RMA reforms to facilitate the practice risks associated with coastal hazards as sea-level rise advances and becomes the dominant coastal hazard. We consider these issues require urgent attention and potentially national

[92] Issues with the rewording of RMA section 106 have been identified in Table 1 and the subsequent commentary. Until this section has been legally tested there remains some uncertainty as to its effectiveness.

direction, to ensure that current risks are identified, and future risks are managed and reduced to an acceptable level for the benefit of present and future generations.

8.3.1 Definition of Significant Risk lacking to Enable Adaptive Planning for Coastal Hazards

Issue of concern – changes to the RMA (s6(h), s106) since 2017have shifted the planning focus to management of significant risk (matter of national importance) which is undefined with no case law and being interpreted to mean at scale and imminent, rather than planning to address harm from risks that will manifest at scale over the longer term, despite the NZCPS precautionary policy.

- *Changing risk* – sea-level rise and associated impacts are predictable into the future, yet in the RMA are buried in s7(i) as just "another matter" to which regard must be had in the wider context of "the effects of climate change". Adaptive planning for this known increasing risk creates difficulties when "significant" has not been defined in the RMA. It is being interpreted to mean imminent threat since there has been a shift to a greater emphasis on demonstrating significant risk due to its elevation of to a RMA s 6 matter of national importance for natural hazards. This plays out particularly in relation to land use change and subdivision.
- *Time* – the NZCPS requirement to address risk over at least 100 years, which is necessary when planning for ongoing sea-level rise, is constrained by the RMA 10-year policy and planning, the 30-year framework for urban development capacity under the NPS-UD and infrastructure planning under the New Zealand Infrastructure Commission/Te Waihanga Act 2019, the 50-year design life for individual buildings under the Building Act, and 30-year time horizon for infrastructure under the RMA. Reconciling these time frames across the different statutes is currently very difficult for councils when planning and consenting land uses.
- *Lifetime of assets* – once in place the expectation is that assets are permanent (roads, seawalls, flood protection and housing and other development on subdivided land). This necessitates building in the ability to adapt as sea-levels rise, hence the need for at least a 100-year time horizon for decision making today.
- *Precaution as a principle (NZCPS Policy 3)* – precaution is an active, necessary, and well-recognised planning principle consistent with adaptive planning approaches for urban environments (which is best practice in such situations using DAPP). However, the current RMA and practice makes "down-zoning" difficult or impossible where existing uses are enshrined, and urban intensification is being strongly promoted, despite the NZCPS mandate. Planned retreat as a "remedy" for existing communities was not envisaged within the planning framework, other than in the NZCPS where it is foreshadowed as a necessary response to sea-level rise in some circumstances.
- *Policy alignment* Several reviews are underway and new statutory mandates give rise to alignment issues for planning to reduce risks from coastal hazards and sea-level rise, e.g., EQC reform, RMA reform (including the Strategic Planning Act and the Climate Change Adaptation Act), the three waters reform, the preparation of the National Adaptation Plan based on the National Risk Assessment and private sector decisions about insurance coverage and cost.

- *When rules have effect* - Changes to the RMA in 2009, and further amendments in 2011 and 2017, means that most rules in proposed plans do not have effect until the plan becomes operative. The lengthy notification and submission process, which is part of a new plan or plan change, provides prior warning of changes to come, and creates an opportunity for people to seek consents that may thwart the purpose of new policy and provisions relating to natural hazards such as sea-level rise. At the very least, rules to protect people and the environment from the effects of natural hazards should be amongst the group of rules that have immediate effect (alongside rules relating to soil conservation, protection of historic heritage, water quality and quantity, and air quality).

- *Transitional Provisions* - setting out principles that could apply in the interim, before the reforms are fully implemented in practice, and applied on a transitional basis would be prudent on condition of application of the NZCPS and interim no-go areas based on the risk exposures set out in the Paulik et al 2019 NIWA report, to address the moral hazard issues that surround the funding of hard protection(e.g. seawalls, stopbanks, rock revetment) which have created maladaptation in New Zealand and internationally.

8.3.2 NPS on Urban Development

Issue of concern – the strongly directional language of the NPS-UD, plus its processes, means that it is likely to trump the requirements of the NZCPS and further entrench exposure to coastal hazard risks.

- *Further entrenchment of coastal risk* – while an objective is that future urban environments are resilient to the current and future effects of climate change, and qualifying matters can modify the directional requirements of the NPS-UD when a Future Development Strategy is being developed, planning to address sea-level rise (over at least 100 years) is low in the hierarchy of matters (other matters) to take into account and will require "proof" under subpart 6, clause 3.3, even though different NPS objectives must be reconciled. The short timeframe for councils to act and the pressure for proof to justify an exception to density requirements, for example, means that NZCPS requirements are likely to take a back seat and be "softer", despite its requirement in law. This outcome is likely to be lock-in by increased development capacity in urban coastal areas within the preferential intensification areas, regardless of long-term risk, unless the Resource Management (Enabling Housing Supply and Other Matters) Amendment Bill[93] adequately addresses coastal hazards and sea-level rise specifically.

[93] https://www.legislation.govt.nz/bill/government/2021/0083/latest/LMS566131.html#LMS566115

8.3.3 Urban planning

Issue of concern - the increasing urgency placed on providing for urban growth and intensification to address current housing pressures are conflicting with due consideration of the hazard-scape; climate change effects and future risk (to all well-beings); and the future of urban form required for changing behaviour to achieve the national climate change emissions budgets[94].

- *Greenspace and reserves for mitigation v intensification* - the demand for intensification within existing urban areas places increased pressure on greenspace and provision for coastal reserve land (esplanade reserve/strip). Greenspace or undeveloped Crown or council-controlled land will be an essential component for enabling successful adaptation, accommodating sea-level rise impacts in the short to midterm, and avoiding path dependency that creates lock-in of developments in areas exposed to coastal hazards. New esplanade reserve or esplanade strip land is only considered and/or created when land adjacent to MHWS is being subdivided into lots smaller than 4 ha. Clear expectations around the acquisition, funding, purpose, and management of these areas are required.
- *Driving good urban form* - greater leadership, potentially through local government reform, is required to plan for the future of urban form, taking a dynamic adaptive and precautionary approach in coastal areas. Implementation of such an approach will require empowered leadership, and proactive and directed development of urban land and infrastructure to achieve comprehensive co-beneficial and multi-generational outcomes.
- *Links between climate change mitigation and adaptation* - to achieve the outcomes sought for emissions reduction, behaviour change across multiple sectors will be required. This will influence future urban form, infrastructure demands, and the rural urban interface. When considering policy changes across sectors, government departments/legislation, it will be essential to integrate actions for climate change mitigation alongside dynamic adaptive actions to achieve outcomes for managing risk and increasing resilience hand in hand with reducing emissions.

8.3.4 Legacy subdivisions and current practice

Issue of concern - Implementation of adaptive planning is exacerbated by legacy decisions, community expectations of further 'protection' and the use of poor accommodation practices such as land filling and raising floor levels, which give a false sense of security to property owners. The drive to provide for intensification and re-development in hazard prone areas is not being adequately addressed through planning documents.

- *Responsibility for subdivision* - subdivision is, by law, a district council (territorial authority) responsibility and precursor to development. Changes to the RMA in 2017 have increased the difficulty of declining subdivision applications in relation to natural hazards and has removed the value of previous case law. With coastal hazards having been raised to a matter of national importance, subdivision applications may more effectively be managed by regional councils, when in an identified hazard area. The implications of a change in

[94] https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-Aotearoa

decision-maker, and the limited lifetime of all regional consents would require careful evaluation prior to such a change.

- *Legacy subdivisions (how many are there/where are they?)* - land use change, subdivision and intensification of land exposed to current and future coastal hazards is not declining. Further with a legacy of (consented) coastal subdivision with a common law presumption of development 'rights', the extent of this increase of risk remains unquantified. Our observations indicate this may be significant and will grow. Greater support for councils retrospectively managing risk, through use of existing mechanisms under the RMA and Building Act, for example through regional rules for prohibiting further development in such areas, would reduce further legacy effects.
- *Accommodation practice (ground levels)* - it is common practice when redeveloping or enabling further development in flood hazard areas (both coastal and terrestrial) to elevate habitable areas (above flood levels) through filling/modification of ground levels (or floor levels). This practice, in addition to resulting in hydraulic modification of the surrounding land, does not address associated infrastructure, access, future emergency management response/planning, and complicates and limits future adaptive actions. District and regional plans, to date, are largely inadequate in managing this practice and are likely to lead to increases in risk as seas rise and heavy rainfall events become more frequent.
- *Mitigation as the "default' risk management tool using hard protection structures* - the reliance on the maintenance, replacement and upgrade of existing hard protection structures and continued use of new hard protection structures, even where they form a 'short term' option, transfer burdens onto future generations by creating expectations of permanence even when used as part of a DAPP process Maintaining and further strengthening existing policy direction (including a comprehensive approach across MHWS) around the use of such practices (including reclamation) will be required to ensure that such practices do not remain the 'default' risk management tool and create expectations of permanence, even where hard protection is used as a part of a DAPP process due to temporal and design limitations.

8.3.5 Planning hierarchy and tiered approach going forward

Issue of concern – land use/development planning responsibilities under the RMA primarily lie with territorial authorities and the opportunities for regional urban development strategies are not being taken up except where this is identified as a regional issue in an RPS. This tiered approach creates mixed and confused mandates and can result in decision inertia.

- *No go areas regionally* - This is the most appropriate level to identify risk/vulnerability as the first stage in the planning process based on the precautionary principle while detailed engagement using DAPP can take place at a community level.
- *Regional spatial planning* is the best level for hazard management through urban planning. At present there is a disconnect and regional councils are reluctant to pick up land use planning responsibilities.
- *Regional land use planning and subdivision responsibility (extinguishing existing uses)* – the opportunities available for regional councils to control development/extinguish existing uses in areas of risk are not being taken up, but regional councils have no role in subdivision and

RMA changes since 2017 have added to the degree of difficulty for territorial authorities in applying s106.

8.3.6 Missing enablers for adaptive planning

Issues of concern-there are several missing enablers for adaptive planning that could be filled through the planning reforms including better statutory alignment.

- *Implementation/funding* - One of the biggest barriers to implementing coastal adaptation in a robust manner is the availability of funding mechanisms that acknowledge the scale of the coastal risks and the need for community engagement. Concurrent risks nationally, their compounding nature and cascading impacts have been highlighted in the first national climate change risk assessment. Addressing these risks in an effective manner cannot be sustained using current rating mechanisms at the local level. Without some interim funding for adaptive pathways planning prior to the RMA reforms being in place, legacy decisions will continue making the application of new funding settings envisaged in the Climate Change Adaptation Act extremely difficult. Preparation for shifting from a largely reactive paradigm to a more planned anticipatory mode of operation is essential. There is an opportunity now for the options to be explored and mechanisms put in place so adaptation can be planned in an orderly and precautionary fashion consistent with the NZCPS mandate, and able to be implemented.

- *Infrastructure Planning* - the Infrastructure Commission Te Waihanga Act requires regard to mitigation of the effects of climate change and adaptation to climate change. However, there is little guidance in the Infrastructure Strategy as to how this is to be assessed and in particular taking account of timeframes and lifetime of the infrastructure. Infrastructure investments are effectively permanent investments that once in place, are locked in. In the current situation where increasing housing supply is urgent, it is inevitable that the implications of the location (in areas exposed to sea-level rise and coastal flooding) and design (zero carbon) of new infrastructure and renewal of old infrastructure, will along with the NZCPS directive be traded off in practice.

- *Building Act misalignment* - there has existed for some time a tension between how natural hazards and climate change are considered under the RMA and BA[95]. This has resulted in a disjunct in decision making and has a marked impact on the expectation of landowners. Issues arising include inconsistencies between the purposes of the two statutes, the variations in terms and their meanings, timeframes (specifically the 50-year implicit life of a building under the Building Act, and the mitigations required to avoid or satisfy processes under each act. These have worsened since the 2017 amendments to the RMA, as RMA section 106 has become more problematic in relation to a grant of subdivision and the consequent expectation of building on new lots. In particular, the Building Act makes it very difficult to refuse a building consent[96] even where the land is known to be subject to one or more natural hazards, unless it can be demonstrated that the building will worsen the hazard or affect other properties. Even in such circumstances, a council must grant consent if it is "reasonable" to provide a waiver of the Building Code. Similar problems arise in

[95]See "A Strategic Framework and Practical Options for Integrating Flood Risk Management - to reduce existing flood risk and the effects of Climate Change" - PS Consulting and MWH, 2009, report prepared for Ministry for the Environment.
[96]Under s 72 of the BA and despite the apparent direction of s 71.

relation to reinstatement of damaged buildings, and additions and alterations to existing buildings in hazard areas. Such provisions provide further hurdles to councils trying to restrict development in coastal hazard areas under the RMA contributing to the preference to mitigate predictable effects on existing and new buildings, rather than achieve long-term avoidance or remedy by preventing development in the first place. Amendments to Building Act s 3, purposes, s 4, principles, and/or s 72, consent must be granted in certain cases, would contribute to better alignment between the statutes and improve management of development in areas subject to hazards associated with sea-level rise. Clear identification of the misalignment between the RMA and BA and recommendations for resolution should be progressed to inform the reform of the RMA and necessary amendments made to the BA. (Note this has been recommended on many previous occasions, the most recent being the Climate Change Adaptation Technical Advisory Group Recommendations 2018; the BA was out of scope for the Randerson Review and the issue has not been adequately addressed).

- *Property constructs at the coast* – planning to relocate, develop adaptive actions and manage land uses, interact with, and rely on mechanisms under the Reserves Act, Lands Act(s) and the Marine and Coastal Areas Act (MACAA). In order to support a precautionary approach at the coast and proactively address issues of public access, biodiversity and the associated funding support, legislative mechanisms for management of this land must be available, coherent, and workable. Currently this is not the case.

8.4 Specific provisions for inclusion in the Strategic Planning Act and the Climate Change Adaptation Act to enable effective coastal adaptation

Our analysis points to a number of measures for enabling coastal adaptation that could be included in the RMA reforms (within or in schedules to the new Climate Change Adaptation Act and/or the Strategic Planning Act). These would accelerate the uptake of DAPP and other appropriate assessment tools and building on and complementary to approaches set out in the national *Coastal Hazards and Climate Change Guidance for Local Government.* These suggestions recognise the capacity constraints of councils and the urgent need for community involvement and institutional and behaviour changes to support effective adaptation.

- Put on hold changes in use and existing unimplemented consents (with the exception of infrastructure designations for managed retreat) within the "area of interest" (definition to be developed but defined as a set distance or modelled IPPC worst-case 100- or 150-year sea-level rise scenario or sea-level rise increments from present shoreline) until the DAPP process is undertaken with the potentially affected community in any area and the outcome is included in the plan.

- Unless resolved in the Strategic Planning Act, the provisions of the Climate Change Adaptation Act should over-ride all other statutes that provide for use and development in the "area of interest" (except for the Marine and Coastal Areas Act), including for existing use.

- If significant risk is to be retained in the reformed legislation, that it be defined to include risks that are known but not yet fully manifest and will impact decisions on activities taken today that have permanence e.g. building and infrastructure which will be affected by coastal flooding from sea-level rise within their lifetimes, with the objective of risk reduction.

- Each council to provide the central government or supervisory agency with a report identifying coastal communities, their priority vulnerability, and a programme to undertake DAPP within a binding timeframe aligned with the Climate Change Response Act timelines for the monitoring of the NAP and the next NCCRA.

- DAPP guidance within or outside statute (e.g. in a RMA Schedule with process or checklist of steps) that includes provisions for the integrated management of land use, subdivision and development, asset management and building.

- Each council to undertake a rolling programme of DAPP on a timetable agreed with central government or supervisory agency and implements DAPP by including the outcome in its statutory plan.

- The DAPP outcome with preferred pathways to be included in the statutory plan complete with agreed preferred pathway(s), signals, and triggers with limited opportunities to oppose due to the community engagement in their preparation.

- The plan must be able to move forward on the basis of the signals and new rules and actions implemented when the triggers are reached, based on the DAPP process previously undertaken with the affected community

- Mechanisms under the Strategic Planning Act to enable forward planning of infrastructure or utility services that may not be required for decades as part of a managed retreat option under an adaptive plan using DAPP.

- Mechanisms to address ongoing change in the Coastal Marine Area jurisdictional and cadastral boundary for forward planning that adaptively incorporates projected sea-level rise over at least 100 years.

- Rules to have immediate effect, and new/replacement rules developed when signals are reached (or earlier) and become effective when triggers are reached and the path changes, with limited opportunities for public input on new rules since they would have been socialised with the community previously based on the DAPP process.

- The regional council to establish a dedicated fund for land/property purchase/other works, and with a process and criteria agreed with central government for sourcing, securing, and using the funds on an equitable basis to avoid moral hazard.

9 CONCLUSION

Our research set out to answer how the current planning framework and measures can facilitate planned interventions where ongoing sea-level rise, is, and will continue to affect human activities. In particular, how current planning policies and measures can consider the timing, sequencing and potential lock-in of people and assets as the sea rises and the frequency of storm events exacerbate risk before new legislation is in place to address such risks. A clear way is required to enable decision makers to step from the current locked-in pathway to another in the DAPP process in a timely manner that accounts for lead-time for implementation based on signals and triggers.
While this report identifies examples of positive approaches that some councils are taking to stem the flow of coastal risk exposure, we conclude overall that the current planning system and its implementation does not facilitate the embedding of DAPP planning to reduce risk from ongoing and changing sea-level rise. Nevertheless, more can be done using the existing legislation to undertake the set-up phases of DAPP (Fig 4) that can help position local authorities for using DAPP in the reformed RMA and we set these out in section 8.2.

The review of current practice has enabled us to identify issues with the current statutory settings that are creating problems for adaptive planning in low-lying coastal areas, and which need to be addressed in the RMA reforms. These include a definition of 'significant risk' (if it is to be retained) that covers decisions taken today for buildings and infrastructure that will be affected by sea-level rise within their lifetimes. This would facilitate the use of dynamic adaptive planning for coastal hazard risk to be codified within regulatory decisions. In addition, greater attention to coastal hazard risks as part of decision making under the NPS on Urban Development is required. Opportunities for urban planning that facilitates adaptation and mitigation of carbon emissions, creating co-benefits. Maladaptive planning practices from temporary risk 'mitigation' practices(e.g., hard protection structures and land filling) are creating further legacy subdivisions and require transitional measures until the reforms are implemented. Retention of the planning hierarchy and tiered approach going forward to create more systematic risk reduction practice. There are several missing enablers for adaptive planning, including for its implementation and funding, transitional principles to guide decision making, misaligned statutes including the Building Act and inadequate property constructs at the coast to accommodate ongoing sea-level rise. We conclude with some specific provisions for inclusion in the Strategic Planning Act and the Climate Change Adaptation Act that would enable more effective coastal adaptation.

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