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Sea-level rise and local government: Policy gaps and opportunities

Research Report for the
Deep South National Science Challenge

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Executive summary

This paper identifies some barriers, gaps and opportunities in the legal and policy options available to local government when managing the effects of sea-level rise due to climate change, and outlines the challenges facing local government in adapting to sea-level rise and climate change.

Work undertaken to inform the paper includes research, engagement, and policy analysis undertaken over a two-year period, with findings tested in a survey of local authorities with coastal interface (territorial authorities) or whose authority included coastal marine area (regional and unitary councils). The range of opinions expressed through the survey process demonstrate that every region and district has its own unique characteristics and priorities.

The most prominent message from our work is the desire for more commitment and involvement from central government. While local authorities are very well engaged and generally have a clear idea of issues arising from sea-level rise and climate change, 73 percent of participants said their organisations do not receive enough direction from central government on how to respond to the effects of climate change. It is acknowledged that useful guidance has been provided, such as the Ministry for the Environment's *Guidance for local government on preparing for climate change*. However, territorial authorities in particular are seeking a stronger lead, such as legislative reform, clearer and more directive policy, clarification of responsibilities, guidance on the use of particular adaptation tools that currently exist, and a national environmental standard on coastal hazard management. Such direction is seen as critical not only to achieve a nationally consistent approach but also simply to achieve adoption of appropriate climate adaptation measures.

Other key findings are:

- Sea-level rise and its impacts have the potential to create a significant additional engagement burden for councils. Territorial authorities in particular are not currently resourced or equipped to undertake this engagement.
- As all survey participants had coastal land within their boundaries, it is anticipated that all will face increased infrastructure costs due to sea-level rise. Many considered that funding should be provided at a national level, such as through a national climate change adaptation fund, to meet these costs.

- Territorial authorities are not all readily able to access the level of specialist resourcing (eg scientific knowledge and expertise) required to manage the effects of sea-level rise.
- There are significant differences in approach to climate adaptation decision-making for Māori land.
- There are significant differences between local authorities as to the most effective and equitable way of allocating costs relating to the effects of sea-level rise. Inconsistency in these areas could lead to lack of clarity for communities, and restrict councils' ability to plan effectively. Clearer direction on appropriate cost apportionment would help to resolve this issue.
- The option of managed retreat requires a more coordinated approach, ideally supported by legislation, to enable this to be utilised by local authorities where appropriate.
- While local government responsiveness to the effects of sea-level rise is improving, there is still considerable variability between organisations, particularly in assessment of risk exposure, level of expertise and maturity of thinking within organisations, and practical responses.
- Fear of legal challenges of appropriate adaptation measures has prevented some councils from acting.
- Some amendments to the RMA are suggested, both via the council survey and from the Iorns and Watts report on local government liability.
- If the key issues of community engagement, funding, specialist resourcing, climate adaptation decision-making for Māori land, cost apportionment and managed retreat are addressed at a national level, local authorities would be much better placed to manage the effects of sea-level rise at a local level.
- We have noted in another report on New Zealand's Earthquake Commission insurance scheme that reconsideration of EQC policies on relocation, replacement, and reinstatement, in particular, could support longer-term planning by other agencies including local government.

For further discussion and background work on these issues, see the other project reports by the authors (identified in the Bibliography).

Introduction

This paper identifies some barriers, gaps and opportunities in the legal and policy options available to local government when managing the effects of sea-level rise due to climate change, and outlines the challenges facing local government in adapting to sea-level rise and climate change.

The paper is part of a project examining where sea-level rise risks currently fall across different parties (private property owners, government and private insurers), commissioned by the Deep South National Science Challenge Impacts and Implications research programme. The project focuses on residential coastal housing and aims to examine the current legal and policy framework and identify liability in respect to sea-level rise impacts, and any gaps in the framework.

Work undertaken to inform the paper includes research, engagement, and policy analysis undertaken over a two-year period, with findings tested in a survey of local authorities with coastal interface (territorial authorities) or whose authority included coastal marine area (regional and unitary councils).

The range of opinions expressed through the survey process demonstrates that every region and district has its own unique characteristics and priorities. Further, regional and unitary councils have different responsibilities and levels of preparedness than territorial authorities, with regional and unitary councils having a primarily regional planning and environmental role and territorial authorities owning most of the affected assets, managing building and development and being more closely connected to their communities of interest. Because of their differing roles, regional and unitary councils generally have more targeted resourcing and specific expertise available than territorial authorities. We have provided further comment where survey responses differed between regional and unitary councils and territorial authorities.

Barriers, gaps and opportunities

More direction from central government

A clear theme in all our work, and confirmed by the survey results, was the desire by local government for more direction and leadership from central government to support local government to respond to the effects of climate change and sea-level rise, and in particular:

- clear directives from central government to improve national consistency and legal certainty
- regularly updated and authoritative scientific information to inform development of appropriate coastal zoning policies and plans.

Guidance provided by the Ministry for the Environment and Department of Conservation is utilised and valued by local government; the perceived gap is in relation to clearer and more directive policy to improve national consistency and clarify responsibilities, potentially through legislative reform, a national environmental standard on coastal hazard management, and/or other policy levers.

Responding to climate change is a new and evolving area for local government. Our work demonstrated that managing the broad range of complex issues required to respond to the effects of sea-level rise can be incredibly challenging, and high-level direction on key issues would support local authorities to make the significant decisions they face.

While rights of appeal are a fundamental check and balance on local authorities in the exercise of decision-making powers, in Australia it has been found that fear of liability is a principal reason for local authorities avoiding action on climate change.¹ The various rights of appeal provided for in the Resource Management Act 1991 (RMA) leave decisions by local authorities open to judicial challenge, adding to the expense, time and uncertainty of an already arduous decision-making process. Some councils have said that fear of legal challenge has limited their adoption of appropriate adaptation measures. National direction in key areas would address this, if only by clarifying best practice and thus the standards that councils should be upholding, thereby leaving less room for uncertainty and challenge.

¹ See, eg, Australian Government Productivity Commission, *Barriers to Effective Climate Change Adaptation* (No. 59, 19 September 2012). This is summarised in CJ Iorns & J Watts, *Local Government Liability in relation to Sea Level Rise Adaptation* (2019) at notes 87-105 and accompanying text.

Better community engagement

Sea-level rise and its impacts have the potential to create a significant additional engagement burden for local authorities. Determining how to respond to sea-level rise and working alongside communities that are directly affected requires more and different engagement than local authorities may be used to undertaking; this is resource-intensive and requires a different skill set from a local authority's business-as-usual consultation and information dissemination. Territorial authorities are not currently resourced or equipped to undertake this engagement.

More funding for increased costs

As all survey participants had coastal land within their boundaries, it was anticipated that all would face increased infrastructure costs due to sea-level rise. However, only three-quarters (73 percent) said their organisations were facing increased costs. Some participants considered they could meet these costs through general and/or targeted rates, and others had disaster relief funds or had already budgeted for increased infrastructure costs. However, many participants were unsure of what the costs would be and how they would be met, and a large proportion of participants called for a national climate change adaptation fund that they could draw on.

Clearer cost apportionment

The issue of who should pay has been a prominent feature throughout this project. There is a lack of consensus within local government as to the most effective and equitable way of allocating costs relating to the effects of sea-level rise. While it is understandable that many organisations consider this should be dependent on the specific circumstances of each situation, this approach may lead to inconsistencies between districts, lack of clarity for communities, and an inability to plan ahead effectively due to the need to assess each situation as it arises.

National inconsistency and lack of clarity can lead to increased risk of opposition and legal pressure. National direction on the options and responses available in different situations, and preferably on the most suitable for particular situations, would assist local government adaptation by decreasing challenges that are due to uncertainty.

Better, more consistent processes for climate adaptation decision-making for Māori land

Our work indicated that there is a significant gap in terms of specific procedures for climate adaptation decision-making for Māori land. While fifty-five percent of participants in our survey were aware of specific loss or damage to Māori coastal land occurring in their district, the survey did not identify any targeted guidelines, processes or policies for climate adaptation measures appropriate for that land either in place or under development.

More specialist resourcing

Resourcing emerged as a significant issue from several different perspectives: staffing structures in smaller local authorities do not support specialised resourcing. While access to scientific knowledge and expertise can be addressed through partnerships between territorial authorities and regional councils (as the latter often provide specialised support and advice to the former), the expertise required to appropriately manage the effects of sea-level rise in territorial authorities with significant coastline warrants more targeted resourcing.

Preventing new development

Councils have available a range of tools to prevent and control new development in coastal hazard zones. These exist under both the Resource Management Act (in relation to planning and to subdivision and resource consents) and the Building Act (in relation to the issuance of building consents).²

There is still the need for better guidance for councils to enable them to justify such restrictions being adopted in their areas, if only so as to signal it clearly enough to better ward off legal challenges to restrictions and consent denials. Such guidance could be by way of National Environmental Standards and/or the type of non-binding guidance currently provided by Ministry for the Environment and Department of Conservation.

Some law reform could also help, such as by making it easier to adopt prohibited activity status for certain developments on the coast (e.g., section 32 RMA). A National Policy Statement on hazards and risk could help by providing higher-level rules and standards for decision-making. There should also be law reform work done on compensation provisions, including section 85 RMA. This is so as to avoid local authorities being subject to compensation litigation, which only

² These are discussed in detail in another report produced for this Deep South National Science Challenge work: CJ Iorns & J Watts, *Local Government Liability in relation to Sea Level Rise Adaptation* (2019).

determines the parameters of compensation very slowly, one example at a time, and often very expensively.

There is room for nation-wide guidance on specific topics, such as on how local authorities should best identify relevant risks to be placed on LIMs and/or PIMs, and on how to better utilise particular tools such as consent conditions and liability covenants. At the moment local authorities are being left to each figure it out on their own, which is a more expensive and time-consuming process than if they were provided with more comprehensive decision-making guidance. Mandatory spatial planning for the future has been suggested but this would also be unfair to impose without more guidance on how to implement it (i.e. more than the MfE DAPP guidance that already exists).

Managing retreat and existing use rights

There is currently no legal mechanism specifically designed to allow managed retreat from coastal hazards. A more coordinated approach is required to enable local authorities to enable managed retreat from the coast where appropriate.

The lack of ability for local authorities to effectively extinguish existing use rights is a principal barrier to implementing managed retreat. At a territorial level, the general rule is that lawfully established land uses continue to be lawful, even if the activities contravene subsequently modified plan rules. This rule also allows the land users to re-establish activities that have been discontinued for 12 months or less if they do not increase the degree to which they offend the plan rules (consistent with the classic conception of real property rights). The starting point, therefore, is that a high threshold is required to justify an infringement of landowner rights.

In the context of proactive adaptation to sea-level rise, 'perpetual' land use rights are problematic. Sea-level rise is an inherently dynamic phenomenon. Retreating shorelines and associated coastal hazard risks are forcing local authorities to reconsider the appropriateness of in situ development.

Although territorial authorities cannot extinguish existing use rights, section 10(4)(a) of the RMA appears to allow a regional council to do so through changing regional plan rules. This may be a possible mechanism to facilitate managed retreat (see Matatā- BoP RC Plan Change 17). However, it is noted that this may not be a valid interpretation of the law on this point. Legal clarity on how councils may better undertake this is essential.

We considered whether section 128 of the RMA could be used to support managed retreat. This section allows a consent authority to review conditions of an existing consent in a variety of circumstances. However, this is another tool that may be possible in theory but is unlikely to be available in practice.

We therefore suggest that legal methods to achieve managed retreat need to be given more attention by central government. Our other reports provide more information on the existing legal methods, gaps and barriers in relation to adaptation, and possible law reform needed.³

³ See CJ Iorns & J Watts, above n 2, CJ Iorns *Case Studies on Compensation after Natural Disasters* (2018), CJ Iorns *Treaty of Waitangi duties relating to adaptation to coastal hazards from sea-level rise* (2019), C Iorns, V James & J Watts *The Extent of EQC's liability for damage associated with sea-level rise* (2019).

Survey on barriers to climate adaptation: observations and analysis

Purposes of the survey

The purposes of the survey were to:

- (a) test information and understanding developed through the engagement and research already undertaken in this project; and
- (b) identify any further key areas of difficulty for local government when managing the effects of sea-level rise.

The survey questions and results are summarised below. Observations and comments about the survey process that may impact on the validity of the findings are at Appendix 1.

Where territorial authorities differed in their responses to those of regional and unitary councils, we have provided further comment on regional and unitary council responses.

Survey questions

Our draft survey questions were finalised through consultation with other Deep South project leads, and tested with a regional council climate change group. The final survey comprised 27 questions split into five sections, covering a range of topics relating to sea-level rise adaptation and response. The survey asked a mix of yes/no, multi-choice and open-ended questions. The survey questions and responses fall into the following seven themes:

General background	The driving forces and rationale for organisations to respond to climate change and sea-level rise, consensus within organisations, and levels of preparedness.
Community considerations	How local authorities engage with communities, including procedures and guidelines for decision-making in relation to Māori land.
Planning and resources	The importance and efficacy of various planning instruments available to local authorities, the usefulness of guidance documents, and resources and

	expertise available for assisting with planning responses to sea-level rise and climate change.
Community demands and responses	Community demands in relation to climate change and sea-level rise and how local authorities have responded and considered responding to those demands, including evaluation of the success of various adaptive mechanisms currently available to local authorities.
Costs and responsibility	Whether local authorities are facing increasing costs due to sea-level rise, and how these costs should be met, participants' views on how costs should be allocated for more contentious aspects such as managed retreat, private property issues, and the potential burden facing smaller coastal communities.
Central government	Whether local authorities are receiving enough direction from central government, whether central government should get involved at a local level (and if so, when), and options to improve local authorities' ability to respond to the effects of sea level rise and climate change.
Adaptation barriers	Identification of legal and policy barriers to climate adaptation and how these might be resolved.

We had originally envisaged that the survey would be followed up with further consultation, targeting specific issues and developing the survey data. The survey process, however, was more complicated than anticipated; when it became clear that any opportunity for secondary consultation would be minimal, the survey was instead expanded to cover as much as possible.

Survey process

Sixty-three regional and unitary councils and territorial authorities from around New Zealand with authority adjoining or including the New Zealand coastal marine area were identified as being relevant to the survey. Of the 63 organisations contacted, eleven opted out or did not respond. The survey was sent to the remaining 52 organisations. Thirty-three responses were received: from seven regional and three unitary councils and from 23 territorial authorities around the country. This was a 63 percent return rate.

Survey results and analysis

General background

Response rationale

Participants were asked their organisation's main reasons for responding to the effects of sea-level rise and climate change. The overwhelming theme from the responses was a responsibility to protect communities and infrastructure. Some participants stated that their responsibility came from statutory directives/requirements (including the RMA, Local Government Act 2002 (LGA), and the Civil Defence and Emergency Act 2002, the New Zealand Coastal Policy Statement (NZCPS) and other regulatory instruments). Another common reason was community expectations. A number of participants indicated that they wanted to protect the natural environment from the effects of sea-level rise. One participant listed "murmurings" from the insurance sector as part of their response rationale. One participant said that having the ability to pay was part of their rationale for responding.

Responses to this question included:

- Protecting people and private property
- Community wellbeing
- Protecting natural environment
- Protecting council-owned infrastructure
- Potential to mitigate the effects (and costs) associated with sea-level rise
- Political responsibility/accountability, as well as legal responsibility (Local Government Act, Resource Management Act, Building Act 2004 and the Civil Defence Emergency Management Act)
- Community concerns
- Reputational risk of doing nothing
- Avoiding risky new development
- Councils have the ability to respond
- Increasing public awareness and preparedness
- Central government pressure and legislative programme
- Increasing frequency of severe climatic events, and improving resilience to them
- Susceptibility to climate hazards (e.g. low-lying floodplains).

Organisational consensus

Our preliminary research indicated that a lack of consensus on how to respond to sea-level rise is a significant issue for territorial authorities. In particular, it was suggested that the three-yearly political cycle meant it could be difficult to achieve consensus between staff and elected officials. The survey asked participants if there was a consensus in their organisation in responding to sea-level rise. Twenty-four (73 percent) selected 'yes', seven (21 percent) selected 'no', and two did not answer. About half of the participants who selected 'yes' qualified their answer by saying it was a general, relatively good, or broad consensus, or there was a consensus on the need to respond but not on how to respond.

Despite the majority having consensus on the need to respond, most said they were still in discussion and development stages for substantive responses.

Of the participants who indicated that their organisation did not have a consensus, one said they still needed to decide how to respond and how much money to spend. Another said they struggled with coordination between departments, but there was no obvious governance/operational divide. One participant said that the upcoming elections gave uncertainty as to whether there would be a consensus. The political nature of responding to sea-level rise was also raised as an issue. One participant stated that recently elected members had jeopardised funding for a coastal hazards strategy.

A unitary council participant stated there was consensus for specific areas and in regard to short-term management, but long-term consensus was lacking.

Organisational preparedness

Participants were asked whether they considered their organisation was under-prepared, moderately prepared or well-prepared to respond to the effects of sea-level rise and climate change over the next 10, 50, and 100 years. The following table shows the response rates:

	10 years	50 years	100 years
Under-prepared	33%	49%	55%
Moderately prepared	40%	36%	24%
Well prepared	18%	6%	12%
No response	9%	9%	9%

Participants indicated difficulty with gauging level of preparedness over long timeframes due to uncertainties, such as the outcomes of planning strategies and the actual rate of sea-level rise. Some answers were contingent on the success of consultation and planning measures. Several participants stated that a perceived lack of central government coordination and legislative response meant that local authorities were less capable of forward planning. One participant commented that there was “no viable short-term route to reaching a ‘well-prepared’ state”.

When the draft results from the survey were provided to participants for feedback, one person commented on the surprising (and perhaps optimistic) levels of preparation. The survey did not define what each option meant, or set criteria for different levels of preparation. The question was therefore open to subjective interpretation.

Community considerations

General consultation and engagement

Sea-level rise and its impacts have the potential to create a significant additional engagement burden for local authorities. Determining how to respond to sea-level rise and working alongside communities that are directly affected requires more, and different, engagement than local authorities may be used to undertaking. We wanted to understand how local authorities are managing and resourcing this additional work.

Participants were asked how their organisation engages with ratepayers and communities who are or will become vulnerable to the effects of sea-level rise and climate change. While the responses to this question demonstrated that a broad range of methods are being used to engage with communities, they also showed that most local authorities have not yet been able to resource additional engagement. Active consultation (rather than engagement) through public meetings, submissions, and education were most commonly mentioned, along with passive consultation (social media, newspapers, mail drops, online databases, mapping and public reports). Methods for targeted engagement with vulnerable communities were not common, except in areas where strategic adaptation plans were being developed.

Most local authorities have held public meetings. Some are working on a case-by-case basis and consulting communities as the need arose. A handful are in the process of designing and

implementing strategic community adaptation/management plans, which will involve targeted consultation with stakeholders. Other methods identified included:

- Identifying hazards and providing this information to landowners and public through LIMs, PIMs or hazard mapping
- Using social media, newspapers and mail drops for general awareness and updates
- Online feedback opportunities
- Advisory groups
- Developing an engagement plan specific to the issue of climate change/sea-level rise
- Regional councils supporting territorial authorities in engaging communities
- Engaging with school communities
- Providing a natural hazards database online (publicly accessible)
- Formal consultation requirements under the LGA and RMA
- Environmental education through dune restoration activities
- Global Covenant of Mayors community engagement
- Establishing regional climate change adaptation groups (part of community-led adaptation strategies)
- Initiating a programme of integrated planning processes for local geographic areas
- Regional councils providing property specific reports including effects of climate change and sea-level rise where applicable
- Attending hui on marae with local tangata whenua to discuss sea-level rise
- Structure plans, which include iterative public consultation.

Only one participant indicated that they had not undertaken any consultation with ratepayers on this issue.

Tangata whenua and Māori land

Participants were asked whether they were aware of tangata whenua in their region or district suffering loss or damage to their land due to sea-level rise and climate change. Fifty five percent of participants were aware of tangata whenua in their regions or districts suffering damage or loss to their land due to sea-level rise and climate change. Two participants indicated that they were aware of erosion issues but were unsure if this was caused by climate change. Another participant said that coastal erosion was an issue, but it had been known to occur in that area for hundreds of years.

Participants were asked whether their organisations had particular procedures for climate adaptation decision-making in relation to tangata whenua and/or Māori land. Six had in place, or were in the process of implementing, particular guidelines for substantive decision-making in relation to tangata whenua or Māori land, but this was not specific to sea-level rise or climate change. From the responses, it appears that few of the surveyed local authorities have particular procedures for this purpose. However, participants did give detailed accounts of their general iwi consultation methods, which included:

- Māori Joint Committee
- Memorandum of understanding/memorandum of partnership
- Responsibilities under LGA (s 81)
- Private arrangements to consult
- Māori representative for input on council decision making
- Iwi policy working group/committee for Plan review process
- Joint Management/Co-Management Agreements
- Kaitiaki groups established allowing departments to engage with mana whenua
- Māori Advisory Party
- Iwi and Local Government Chief Executives Forum
- Cultural Accord between iwi and council
- Council-appointed principal advisor on Māori engagement
- Council/iwi steering group.

One participant reported that a local iwi has developed their own climate change strategy that they intend to share with the council and other stakeholders.

Participants were also asked whether their organisation had or used any particular guidelines for substantive decision-making in relation to tangata whenua and/or Māori land. More than one-third of participants indicated they did not have any particular guidelines for this purpose. Six participants gave examples of particular guidelines that they had in place, or were in the process of implementing, including:

- Significance and engagement policy (that lists thresholds, criteria and procedures council and community use in a decision assessment; this includes the need to take account of Māori culture and traditions)
- Iwi management plans consulted in decision-making process, along with a co-management agreement used by council to administer returned lands owned by iwi

- Iwi partnership agreement used to guide communication and agreement. Substantive decision-making occurs through an iwi governance group (and associated working groups)
- Reports to council committees and local boards required to include a Māori impact statement; there is a guidance document on what to consider in such a report
- Māori responsiveness framework: Departments develop their own Māori responsiveness plans that include general guidance relevant to the work of that department.

While both regional and unitary council participants engaged with tangata whenua, in some instances this was only in relation to specific projects. In one unitary council's case, the engagement structure was reflective and undertaken after decisions had been made. However, another unitary council participant had guidelines requiring that all reports contain a Māori impact statement, had established a Māori Responsiveness Framework and ongoing training/awareness programmes to build staff capability, and had created a plan outlining key issues to Māori.

Planning and resourcing

Planning Instruments

Our early research identified concerns that current planning instruments were unsuited to dealing with sea-level rise impacts, because of the long-term nature of the planning process and the need for sea-level rise to be addressed quickly in some cases.

To understand if current planning processes can adequately accommodate responses to sea-level rise, participants were asked which planning instruments were most important for managing the effects of sea-level rise and climate change. The question provided a list and asked participants to select any/all that applied. The list was:

- regional policy statement
- regional plan
- district or city plan
- combined regional-district plan
- long-term plan
- other.

Regional policy statements, district or city plans, and long-term plans were all important according to over 75 percent of participants. Under the 'other' option, the most commonly listed were asset or infrastructure strategies.

The majority of participants said that planning instruments are very important for managing the effects of sea-level rise, allowing authorities to prospectively control and direct future activities, subdivision and development. Some stated that plans are inadequate to deal with existing use rights, and a more coordinated approach would be required for managed retreat. Some expressed concern about the rigid nature of planning instruments, including the arduous process involved with making plan changes, and the inability to incorporate up-to-date science into planning instruments. Several stated that plans are only as good as the science they are based on, and they need to keep pace with changing circumstances.

A minority said that planning instruments are inadequate for dealing with sea-level rise, and one participant said that the planning process is too long and too vulnerable to short-term political interests or legal challenge.

One participant commented that the NZCPS was the most valuable document available to them, because it provides a mandatory hazard-planning horizon of at least 100 years and being "clear and certain" removed some of the debate around property rights.

Participants were also asked whether their organisations had any draft or proposed planning instruments which would change the way they managed climate change and sea-level rise in their region or district. Fourteen participants stated that they were in the process of reviewing plans or have draft or proposed plans available.

A regional council participant said that planning instruments were only part of the solution as a framework and minimum bottom line, and a unitary council suggested that they need to be accompanied by other tools and actions including accurate data (sea-level rise rates, inundation mapping) and effective asset management.

Guidance

Participants were asked if they were aware of, had read, or had used the Ministry for the Environment (MfE) Guidance,⁴ the Local Government NZ (LGNZ) Decision Making Toolkit,⁵ and the Insurance Council NZ (ICNZ) natural hazards Perspective.⁶ They were also asked if they had used other guidance documents, and to explain which was the most valuable and why.

The MfE Guidance was the most widely read and used, with participants stating that it was comprehensive, robust, and provided a nationally consistent approach. Some considered that it provided for a credible process that would help withstand challenge. A regional council participant commented that it was helpful because it was up-to-date, set out a community consultation process, and included dynamic adaptive policy pathways. Others, however, expressed their views that it is “a bit weak in areas”, “too uncertain for infrastructure and planning purposes” and “only guidance, not policy or regulation, so can be readily challenged.”

Most had also read or were aware of the LGNZ Toolkit and ICNZ Perspective. The latter had the least awareness. Participants also listed a wide range of other documents that they had used, including the Department of Conservation guidance on coastal hazards.⁷

Resourcing

Participants were asked what resourcing and expertise their organisations used to assist with planning responses to sea-level rise and climate change. Twelve participants indicated they have some in-house staff with roles relating to natural hazards, engineering, or coastal science. All others rely on consultants when necessary. One participant commented that it was more economic for a medium-sized local authority to engage specialist advice when required. Another said that their natural hazard staff were extremely valuable to their organisation. It was commonly reported that territorial authorities rely on expert advice from their regional council.

One regional council participant said they had the resources and expertise and were up-to-date with the science, but ultimately it “came down to political and managerial will”.

⁴ Ministry for the Environment, *Coastal hazards and climate change: Guidance for local government* (Ministry for the Environment, ME 1341, December 2017).

⁵ Local Government New Zealand, *Climate Change and Natural Hazards Decision Making Toolkit* (Local Government New Zealand, May 2018).

⁶ Insurance Council of New Zealand, *Protecting New Zealand from Natural Hazards: An Insurance Council of New Zealand Perspective on ensuring New Zealand is better protected from natural hazards* (Insurance Council of New Zealand, October 2014).

⁷ Department of Conservation, *NZCPS 2010 guidance note: Coastal Hazards* (December 2017).

A unitary council participant commented that Envirolink-funded work from Crown research institutes was critical for smaller councils.

Demands and responses

Community demands

Participants were asked whether they had been receiving adaptive response demands from their communities. Hard protection structures and provision of hazard information were the most commonly cited by participants. Other comments and demands were:

- Better stormwater management/flood protection measures
- Hazard mapping
- Frequent queries from prospective landowners on hazards
- Private construction of seawalls and levees (with and without consent)
- Vulnerable property owners expect to be able to get consents for hard protection structures; some individuals have requested an easier consenting process
- Calls for council to plan for renewable energy sources; to reduce reliance on fossil fuels
- Not many people ask for managed retreat and this option is not met with enthusiasm where suggested by councils, but some people do want to be bought out.

The expectation by communities for hard protection structures puts local authorities in a difficult position. On one hand, the NZCPS directs local authorities to avoid hard protection structures. On the other, public expectations are defensive of private property rights and uses. It is interesting that one participant considered the NZCPS to be “too idealistic” in its long-term approach, failing to reflect the cost-effective benefits of hard protection in the short-medium term.

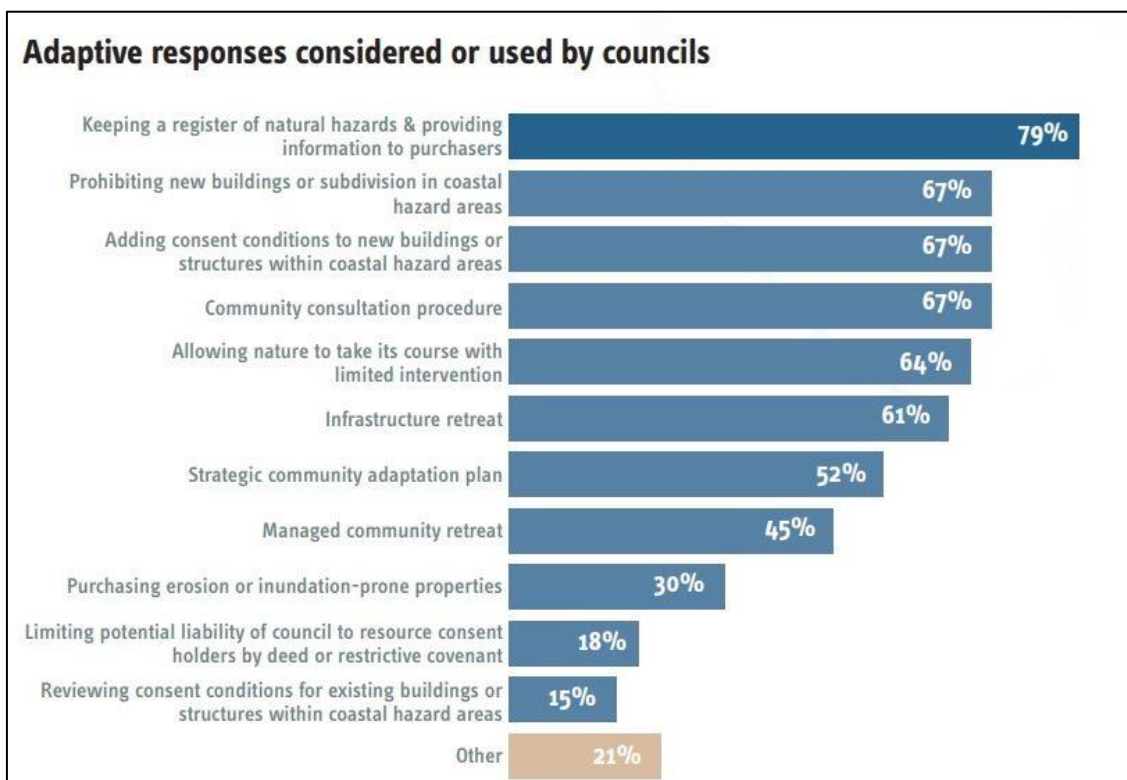
There is little evidence from the survey responses to suggest that vulnerable communities want or expect local authorities to coordinate managed retreat. One participant noted that their community had not been asking for it, and when raised by the local authority it was met with “fear and denial”. Another participant said that managed retreat of a flood-prone village had failed in the past, but some landowners still wanted to be bought out. The lack of community dialogue around managed retreat might suggest local authorities and/or central government

need to do more work in order to prepare vulnerable communities for these inevitable discussions.

Some regional and unitary councils commented on community demand for an increase in the level of service of flood schemes, requests for mapping, and robust discussion on who should pay for adaptation or retreat and better storm-water management. Other regional councils said that community demands were managed by territorial authorities.

Responses to community demands

Although some local authorities are operating on a reactive basis, others have strategies or plan provisions in place which assist with responding to demands. Some have policies to only protect public assets, not private land. The survey provided a list of possible response mechanisms, and participants were asked to select options their organisation had considered. Most options were popular choices, especially keeping a LIM/PIM register, prohibiting (or opposing) new buildings and subdivision in coastal hazard areas, and community consultation procedures. A summary of the responses is below:



Mechanisms that seek to avoid further development, thereby reducing future risk, had the highest uptake within local authorities. Mechanisms that seek to address existing risk were less

popular. The two lowest-ranking options were some of the more novel response options that surfaced during earlier research within this project. As these options were scarcely considered by local authorities it could be concluded that there is not much awareness around these options, and/or perhaps they are ineffective and impractical. Other responses were:

- Improving storm-water services
- Issuing consents for some private coastal protection works
- Refusing consent for subdivision in some coastal areas
- Long term planning for asset relocation, as well as directing growth away from coasts
- Adopting a sustainability strategy
- Developing an adaptation strategy
- Conducting site visits and evaluating risk
- Assessing impact of climate change on infrastructure
- Establishment of a targeted working group, identifying key values for coast protection
- Budgeting to investigate options for flood alleviation
- Beach re-nourishment.

One participant discussed a situation where hard protection has been installed and extended since the 1950s, but where erosion has continuously outflanked the revetment, severely damaging a road along the foreshore. The council has since decided to leave the road permanently closed, despite community demands to extend protection and reinstate the road.

Another participant stated that a resource consent for a seawall (obtained by the regional council but never constructed) is being transferred to a community group so they can construct and maintain it. Regional councils were reported as generally being not directly involved; they provide technical assistance and expertise to territorial authorities and communities.

One local authority already has plan provisions relating to managed retreat, and has ensured that most dwellings have been built subject to s 72 of the Building Act in order to mitigate against potential future liability.

Costs and responsibility

Infrastructure costs

As all councils that participated in the survey had coastal land within their boundaries, it was anticipated that all would face increased infrastructure costs due to sea-level rise.

However, only three-quarters (73 percent) said their organisations were facing increased costs. These participants were asked how the increased costs would be met. The responses generally fell into the following four groups:

- Those who are unsure of what the costs will be and how they will be met
- Those who believe they can manage through general and/or targeted rates
- Those who are calling for a National Climate Change Adaptation Fund
- Those who have already set aside disaster relief funds, or are budgeting for increasing infrastructure costs.

One participant said their organisation has raised their lending debt cap through their 2018-2028 LTP in recognition of increasing infrastructure costs. One raised a concern about the ability of their community to pay off a loan. Another participant wrote extensively about the nature of increasing costs, listing the types of costs as water supply, wastewater services, storm-water services and assets, land drainage services and assets, roads, footpaths and cycle-ways. One participant stated they had set aside \$17.7 million for construction of a seawall.

Cost apportionment for adaptive responses

In general, participants were hesitant to say who they thought should pay for different types of adaptive response. There was a roughly 50 percent non-response rate for this section. Some participants said the questions on apportionment of cost and responsibility were too simplified relative to the complexity of the issues.

Of the responses received, there was a strong preference for responsibility being dependent on the circumstances and worked out on a case-by-case basis.

Infrastructure

For infrastructure, participants thought the network owner/operator should generally take responsibility. Other suggestions were local authorities, central government agencies, central

government, and/or shared responsibility between those entities (and presumably, in many cases, these entities will be the owner/operator). A third of responses stated that central government should have some role in assisting with infrastructure funding, with some suggesting this should be through a climate adaptation fund.

Providing information

Participants indicated that providing information about the effects of climate change and sea-level rise should be a shared function of local and central government. One participant said there should be an independent, reputable source of information funded and overseen by central government. A regional council suggested this function should be undertaken by a Crown research institute.

Coastal protection works

It was generally considered that the beneficiary should pay for coastal protection works. However, some participants thought that local and central government should assist, depending on the public/private benefit of the works.

Managed retreat

There were divergent views on who should pay for managed retreat. Some thought that the cost should be shared between the owner, local government and central government; others thought it should be the sole responsibility of the owner and insurance companies. Several participants thought this called for a case-by-case analysis.

Some participants recognised that less affluent communities may not be able to pay. A number of responses suggested a central government fund would be a potential solution. One participant thought that people who acquire property with knowledge of hazard risk should be responsible for funding their own retreat, whereas those affected by a severe and previously unknown hazard should receive help from the public sector.

Private property considerations

Physical damage to private property and reduction in property values were generally seen as the responsibility of private individuals, although some saw varying responsibility for local and central government.

Participants had mixed views on credit and insurance retreat. The majority thought that both issues should be the responsibility of private individuals, but several participants thought that dealing with insurance retreat should be a shared responsibility between individuals and central and local government. Two participants thought these issues should be the responsibility of “someone else” and one participant thought credit retreat should be a shared responsibility.

Disproportionate rating bases

Most participants agreed that provincial coastal towns are facing a bigger burden to respond to the effects of sea-level rise, proportionate to their rating base. There were varying views on how this should be managed, with some seeing increased involvement and funding from central government (including through the establishment of a national climate adaptation fund) as the best option. Others thought the burden might be best managed at a local level with the assistance of national direction and tools to implement guidance. A minority thought that private individuals needed to take personal responsibility and arrange their own finance.

One participant stated that some coastal cities are also facing a very high level of risk due to sea-level rise; the disproportionate burden is not just an issue facing provincial settlements. At one end of the spectrum are the small coastal towns where the population directly affected by sea-level rise is small, but the ability to raise funding through general or targeted rates is insufficient to fully assist displaced residents. At the other end are the populous and low-lying cities, where the number of affected residents will be high, but the rating base is much larger.

The following options to address disproportionate rating burdens were identified:

- Development of a national climate adaptation fund
- 'Top-up' funding from central or local governments when/where needed by less affluent communities
- Central government to become involved in collective leadership/multi-agency approach
- Rates remission strategies
- Polluter pays principle: fossil fuel industry contributing to poorer areas; subsidies for clean energy initiatives
- Promote personal responsibility; Councils could offer land for retreat purposes
- More direction from central government in planning rules to help councils pre-empt cost of relocation
- National direction and policy
- Accurate and well publicised information on hazards
- Providing tools to local government to implement guidance, plus financial assistance if retreat is required
- Private finance
- Funding through Provincial Growth Fund, Tourism Infrastructure fund, or NZTA.

Regional and unitary councils had the following additional comments:

- One questioned whether the local government structure, with numerous small territorial authorities, is fit for purpose in light of the huge, complex issues presented by climate change and sea-level rise
- Equity between existing and future ratepayers should be carefully considered
- Accurate and widely publicised information on hazards is necessary to prevent future investment in vulnerable areas
- Early engagement and long-term planning is critical.

Central government

Direction and involvement

Our preliminary research indicated a strong desire from local authorities, and territorial authorities in particular, for clearer direction and leadership from central government. There was particular concern that individual responses to sea-level rise impacts would lead to duplicated resourcing and national inconsistency in approach.

Participants were asked whether their organisation receives enough direction from central government on sea-level rise and climate change. Nearly three quarters (73 percent) of participants said they do not. Most participants also commented that central government intervention should be already happening and should at least begin immediately. One participant's opinion was:

“[T]he apparent absence, to date, of central government in leading a vital discussion around the cost shares – or in this context, the broader issue of how responsibility for addressing the issue should be shared – associated with [how] climate change will play out, in practice, is a critical failure on the part of the government.”

A regional council participant said this was especially important because the magnitude of the issue is one that territorial authorities are struggling to respond to.

Seventy-six percent expected central government to get involved with the management of climate change and sea-level rise at a local level. Participants largely supported the immediate implementation of central government funding, policies, national direction, legislation, discussion and mechanisms to assist with local government response. One said that the quality

and timing of direction needs to be improved, taking account of changes or improvements in understandings of science and technology.

One participant said that, although their organisation receives enough direction, the quality and timing of the direction or information need to be improved. They added that regular updates are needed to take account of changes or improvements in understanding of science and technology.

Although there was strong support for central government involvement at a local level, participants made it clear that they envisaged something less than complete central government intervention. The inference from this is that participants want assistance from, or collaboration with, central government, but they do not want to lose power in the process. This is reinforced by the fact that many participants desired stronger decision-making powers.

A unitary council participant said that, while they don't consider there is enough central government direction, they also didn't expect central government to get involved with the management of sea-level rise and climate change. They suggested that there should be liaison with local authorities on a local level in order to better understand the relevant issues. A regional council said they received enough direction from central government, but that they do expect central government involvement in management of sea-level rise and climate change in the future, either at a national level or where impacts will extend beyond regions.

Responses to this part of the survey were the most consistent between participants. The strongest message from the survey responses is that local authorities desire more commitment, involvement and direction from central government.

Improving adaptive response ability

Participants were asked whether any of a list of options would improve their organisation's ability to respond to the effects of sea-level rise and climate change. These options were:

- More substantive policies (e.g. 10-year emission reduction)
- Conferring greater powers to local government, e.g. ability to red-zone certain areas and make non-contestable decisions
- National direction from central government requiring councils to address sea-level rise and climate change in their long-term plans
- A national policy statement or national environmental standard on natural hazards
- Central government creating risk maps

- Central government clarifying apportionment of responsibility between central government, regional and unitary councils, and territorial authorities.
- Other.

The percentage of participants that agreed with each option is recorded in the table below. Financial support and a national climate adaptation fund were the most commonly identified other options.

Central government to clarify apportionment of responsibility between central government, regional and territorial authorities	82%
Greater decision-making powers, a national policy statement or national environmental standard on natural hazards	76%
National direction requiring local authorities to address climate change and sea-level rise in their long-term plans	70%
More substantive government policies received	64%
Central government risk mapping	55%

Adaptation barriers

Barriers

Participants were asked whether they considered that there were legal barriers that made their organisation's role more difficult in adapting to sea-level rise and climate change, and what those barriers were. Two-thirds of participants said there were such barriers. The following list represents the main issues identified:

- The NZCPS is too idealistic, ignoring the benefits that protection can effectively provide
- The RMA does not adequately provide managed retreat mechanisms
- Conflict between Building Act and RMA: double standards and different timeframes
- Potential council liability for upholding plan rules, uncertain liability for policy actions or inactions
- Overly litigious RMA processes and the resulting fear of incurring legal and other costs
- The Building Act allows people to build in hazardous areas with minimal deterrence
- A lack of red-zone-style legislation for councils

- Service withdrawal is made difficult by the LGA
- Existing use rights are difficult to extinguish
- The rigidity of RMA plans; appeal rights mean that they are vulnerable to challenge
- A lack of clarity about institutional roles and response mechanisms
- Determining acceptable/unacceptable degrees of risk, and when to vacate
- Rendering land incapable of reasonable use; open to legal challenge
- No clear direction on who pays
- No ministerial oversight on how NZCPS policies are incorporated into district plans
- Policies to support difficult decisions are not strong enough
- Conflict between balancing development against hazards directives
- Uncertainty in sea-level rise estimates
- Measures available to acquire land are draconian and outdated; they may not be suitable for climate change purposes
- Purchasing hazardous properties is unaffordable due to the high value of coastal land

Land rights

The issue of private property rights emerged from responses as a discrete theme. Existing use rights conferred to landowners under the RMA may only be extinguished at a regional level. This means territorial authorities must rely on regional councils to curtail such rights. One participant mentioned that land tenure is problematic and suggested that alternative types of tenure should be investigated. Another participant thought compulsory land acquisition measures were draconian and dated, and that local authorities could not afford to acquire coastal land in this way.

Legislative issues

The Building Act 2004 and RMA were commonly cited for causing legislative barriers to climate adaptation, because they create two sets of inconsistent standards. One participant considered that the Building Act allowed landowners to develop in high-risk areas of existing titles with minimal deterrence. The RMA was thought to create overly litigious processes by conferring rights of appeal.

Several participants commented on the LGA, saying that it makes service withdrawal difficult, even when that is needed for the purposes of adaptation to sea-level rise.

Comments from regional and unitary councils included that:

- lack of “red zone”-style legislation for councils and government to use in relation to sea-level rise was a gap
- the RMA not clearly allocating responsibility between regional councils and territorial authorities creates a situation where both authorities wait for the other to respond and to manage the effects of climate change and sea-level rise, causing delays if any action occurs at all
- policies to support difficult decisions such as managed retreat are not strong enough in balancing the RMA and NZCPS, and there is also a conflict between balancing development against hazards directives. They commented that this could be resolved with clarification that the NZCPS prevails over the National Policy Statement on Urban Development Capacity.

Planning and decisions

The ability to uphold district plan rules was perceived to be difficult due to inherent uncertainties and insufficient support from central government. It was noted that RMA plans are difficult to change and vulnerable to legal challenge when the science is not exact. There is a definite concern that local authorities may be held liable for policy actions or inactions. This is coupled with a high awareness that local authorities may be challenged by landowners on the basis of their land being made incapable of reasonable use. Another issue is determining exactly what constitutes unacceptable risk levels, and when land must be vacated. The inability for local authorities to make non-contestable decisions was also seen as a barrier to adaptation.

The lack of clarity over who should pay, and the parameters of institutional roles, were frequently cited as barriers to climate adaptation.

A regional council participant mentioned how uncertainty around the timeframe and amount of sea-level rise and adaptation options made decision-making in consultation with communities very difficult.

Addressing barriers to adaptation

A key theme in participants' ideas for addressing barriers to adaptation is that action needs to be taken by central government. The following list summarises the participants' main ideas for action (in no particular order):

- Amend the NZCPS to reflect the MfE Guidance
- Recognise that government is the central regulator and implement that
- Central government to take a bold legal position
- Develop consistency between relevant Acts
- Building Act to provide conditions to better mitigate risk on high-risk hazard sites
- Adopt a national position for local plans to deliver on
- Make the plan development process easier
- Adopt a national hazards framework
- Adopt clearer government policy, and more directive policies in this area
- Reduce the influence of politics on decision making
- Amend the RMA
- Apportion specific responsibility via legislation
- Adopt a National Environmental Standard on coastal hazard management
- Develop a contingency/adaptation fund
- Obtain national political consensus for adaptation and on particular measures.

Many issues arose from funding, and a common suggestion for addressing barriers to adaptation was for the development of a climate adaptation fund, and/or top-up funding by central and local government.

Regional and unitary council suggestions included:

- Amend section 128 of the RMA, as it is not sufficiently broad to review consent conditions
- Establish district council performance profiles in relation to NZCPS implementation
- Include clear statutory provisions in the Zero Carbon Act assigning responsibilities between actors on climate change.

Legal liability

Participants were asked whether their organisation had refrained from acting on coastal climate hazards, or from choosing a particular adaptation measure, for fear of being challenged in court.

Four participants (12 percent) said their organisations had refrained from acting and several others stated that this was a consideration relevant to their decision-making processes. One organisation has been unwilling to “draw a hard line in the sand” with hazard information because there may be pushback by property owners. Another participant said that they had softened some rules in their district plan in order to avert an appeal.

As mentioned earlier, fear of legal challenge is a barrier to climate adaptation in Australia;⁸ many participants thought the litigious nature of RMA processes, and concern over liability for policy, were barriers to their adoption of adaptation measures.

⁸ Above n 1.

Appendix 1: Comments on the survey process

Survey format

The survey was longer than we had originally intended. To mitigate the length, we designed questions so that participants could select from a list of possible answers and add comments if desired. The majority of questions asked for written answers, or were partly multi-choice and partly written. One question asked participants to complete a blank table with percent values.

This mix of question formatting, although designed to streamline the answering process, made the survey design complicated. Without access to sophisticated software, the easiest option was to use a Microsoft Word document. The flexible nature of a Word document meant that a singular survey design could be suitable for physical and electronic completion.

Only six of the participants hand-wrote their responses. Those completing it electronically reported that the Word document was not user-friendly, with displaced question fragments, question numbers, font, text size and colour. We supplied a PDF of the survey to remaining participants with instructions for using Adobe Acrobat 'fill and sign' function as an alternative means of answering.

Survey length

The uncompleted survey document consisted of 12 A4 pages and 27 questions. Some questions asked participants to go into depth by explaining their answers. The ability to answer electronically gave participants the scope to write as much or little as they wanted.

Some wrote a lot and went into considerable detail; one person wrote more than 3000 words. Typed responses were generally within 1000-2000 words, whereas handwritten responses were around 1000 words or less.

Several people communicated that they were unable to complete the survey due to time constraints or workload. It is likely that other non-participants were in a similar position. This was not necessarily a flaw with the survey itself; it reflects the pressure and workload of local authority staff.

Method of identifying participants

We had intended to distribute the survey via an external organisation with a large mailing list of local government representatives. It became clear during the ethics approval process that this method would not be possible. The method of identifying survey participants therefore became more complex. There was no accessible list containing all the names, job roles and contact details of prospective participants.

Each individual local authority was contacted directly through their generic email addresses, or through online inquiry forms where email details were publicly unavailable. The email informed recipients of the nature of the survey and asked each local authority for the contact details of a relevant team member. People with expertise relating to coastal hazards and planning were requested as ideal participants.

The initial email request received a poor response rate until followed up by phone calls.

One problem was that smaller local authorities seldom had a staff member with relevant expertise to answer the survey comprehensively. On the other hand, larger organisations, especially regional councils, often had entire teams of people with relevant expertise, and in a few cases the survey response was a collaborative effort by multiple staff members. This meant that it was not possible to ensure consistency between survey participants.

The arms-length approach taken for identifying participants meant that there was little room for controlling or choosing participants.

Chief executive consent

A formality arising from ethics requirements was the need for participants to obtain consent from the head of their organisation to complete the survey. To implement this, the chief executive from every participant local authority was emailed directly. The email contained a letter addressed to the chief executive, outlining the survey process and asking them to provide consent to the relevant employee (who we had identified through the process discussed above). This process was not ideal and led to delays and some confusion in completing the surveys.

It also created the potential for defensive answers by participants who may have been concerned that their chief executive or team manager would review their responses. There is no evidence that this did occur, but the survey data was more optimistic than expected.

Participants and their chief executives were informed that their identities would not be disclosed, nor would the identity of organisations be attributed to responses.

Time for responses

The total time between surveys being sent out and the last being received was six weeks. (This included some individual extensions requested.) As the survey was lengthy, participants may have benefited from a longer answering period.

It is noted that many local authority staff members were still on annual (summer) leave when survey went out, or were busy dealing with backlogs of work that had accumulated through the holiday period. One chief executive claimed their organisation was so under-resourced that they did not have time to consider completing a survey.

Bibliography

Legislation and regulations

Building Act 2004.
Civil Defence and Emergency Act 2002.
Local Government Act 2002.
New Zealand Coastal Policy Statement.
Resource Management Act 1991.

New Zealand Government materials

Auckland Council, *Coastal Management Framework for the Auckland Region* (2017).
Climate Change Adaptation Technical Working Group, *Adapting to Climate Change in New Zealand: Recommendations from the Climate Change Adaptation Working Group* (2018).
Department of Conservation, *NZCPS 2010 guidance note: Coastal Hazards* (December 2017).
Hawke's Bay Regional Council and others, *Clifton to Tangoio Coastal Hazards Strategy 2120* (2016).
Local Government New Zealand, *Climate Change and Natural Hazards Decision Making Toolkit* (2018).
Local Government New Zealand, *Local government position statement on climate change* (2017).
Ministry for the Environment, *Climate change effects and impact assessments: A Guidance Manual for Local Government in New Zealand – 2nd Edition* (2008).
Ministry for the Environment, *Coastal Hazards and Climate Change: Guidance for Local Government* (2018).
New Zealand Government, *Disaster Insurance Policy: A White Paper* (1989).
Parliamentary Commissioner for the Environment, *A Zero Carbon Act for New Zealand: Revisiting 'Stepping stones to Paris and beyond'* (2018).
Parliamentary Commissioner for the Environment, *Preparing New Zealand for rising seas: Certainty and Uncertainty* (2015).
Productivity Commission, *Local government funding and financing* (2018).
Regional Policy Statements, Regional Plans, District Plans (council-specific).
Te Uru Rakau Forestry New Zealand, *The One Billion Trees Programme: Our future, our billion trees* (2018).
Thames Coromandel District Council, *Coastal Management Strategy* (2018).
The Treasury, *Guide to Social Cost Benefit Analysis* (2015).
The Treasury, *The Case for New Climate Change adaptation funding Instruments (lecture by Jonathan Boston and Judy Lawrence)* (2017).
Waikato Regional Council, *Coastal inundation tool* (2019).

Secondary sources

Australian Government Productivity Commission, *Barriers to Effective Climate Change Adaptation* (No. 59, 19 September 2012).

Jonathan Boston and Judy Lawrence, *The Case for Climate Change Adaptation Funding Instruments* (Institute for Governance and Policy Studies, IGPS Working Paper 17-05; New Zealand Climate Change Research Institute, NZCCRI 17-01 Wellington, August 2017).

Insurance Council of New Zealand, *Protecting New Zealand from Natural Hazards: An Insurance Council of New Zealand Perspective on ensuring New Zealand is better protected from natural hazards* (Position Paper, October 2014) ('Natural Hazards Perspective').

David A. Fleming, Ilan Noy, Jacob Pástor-Paz and Sally Owen, *Past trends in weather-related insurance in New Zealand* (Motu Economic and Public Policy Research, Motu Working Papers 1-9, 2018).

Belinda Storey and others *Insurance, Housing and Climate Adaptation: Current Knowledge and Future Research* (Motu Economic and Public Policy Research, Motu Note #17, 2017).

Belinda Storey and others *Insurance, Housing and Climate Adaptation: Current Knowledge and Future Research* (Motu Economic and Public Policy Research, Motu Note #27, 2017).

Laura E. Tinker *Managed Retreat from Coastal Erosion: The Movement of People and their Coastlines* (2014).

Te Runanga o Ngai Tahu *Te Tahu o Te Whariki: Anchoring the Foundation: Climate Change Strategy* (2018).

The Royal Society of New Zealand *Climate change implications for New Zealand* (2016).

Simpson Grierson, *Councils' Ability to Limit Development in Natural Hazard Areas* (Legal Opinion for Local Government New Zealand, February 2010).

Simpson Grierson *Councils' Ability to Limit Development in Natural Hazard Areas* (Legal Opinion for Local Government New Zealand, April 2010).

Simpson Grierson *Liability Risks for Councils Re Coastal Hazard Information* (Legal Opinion for Local Government New Zealand, February 2010).

United Nations *Sendai Framework for Disaster Risk Reduction 2015-2030* (2015).

Other project reports by the authors

Catherine Iorns, *Case Studies on Compensation after Natural Disasters* (Deep South National Science Challenge, 2018).

Catherine Iorns, *Treaty of Waitangi duties relating to adaptation to coastal hazards from sea-level rise* (Deep South National Science Challenge, 2019).

Iorns Magallanes, CJ & J Watts, *Adaptation to Sea-Level Rise: Local Government Liability Issues* (Deep South National Science Challenge, Wellington, 2019). 242pp.

Vanessa James, Catherine Iorns and Jesse Watts, *The Extent of EQC's liability for damage associated with sea-level rise* (Deep South National Science Challenge, 2019).