Coastal Adaptation to Climate Change

Report on Local Government Planning Practice and Limitations to Adaptation

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For NIWA

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Disclaimer

List of Abbreviations Used

BA:	Building Act, 2004
CACC:	Coastal Adaptation to Climate Change Programme
CDEMA:	Civil Defence and Emergency Management Act, 2002
IPCC:	Intergovernmental Panel for Climate Change
MHWS:	Mean high water springs
LGA:	Local Government Act, 2002
LIM:	Land Information Memorandum
LTCCP:	Long-term council community plan
NES:	National Environmental Standard
NPS:	National Policy Statement
NZCPS:	New Zealand Coastal Policy Statement
RMA:	Resource Management Act, 1991
s(s):	section(s) (of an Act)

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Executive summary

The **Coastal Adaptation to Climate Change (CACC)** project, which is a three year study being undertaken by NIWA and partners, aims to create the necessary information and tools to enable adaptation by central and local government, and communities to the impacts of climate induced change on the coastal environment. This report on 'Local Government Planning Practice and Limitations to Adaptation' which will contribute to the above overall project, aims to provide an overview of current local government approaches to coastal adaptation to climate change.

The results are based on a questionnaire which was sent to 30 local authorities in 2009, with 24 responses being received. The responses from the local authorities were made by staff and were not endorsed by the respective politicians. The report has therefore protected the confidentiality of the responses made by not identifying specific councils.

Coastal areas in New Zealand have been under increasing development pressures over the past 18 years. In addition, in more recent years there has been a range of policy initiatives and legislative changes which have influenced approaches taken to coastal management.

Adaptation to climate change is defined as undertaking actions to minimise threats or to maximise opportunities resulting from climate change and its effects[1]. Local authority staff who responded to the questionnaire had a clear understanding of what adaptation to climate change in the coastal environment entailed. It was recognised that coastal natural hazards were likely to be exacerbated by the effects of climate change.

In general, local authorities' work programmes did not address adaptation to climate change as a specific work programme, however all were involved in work areas directly linked to the management of natural hazards. Of particular note were four local authorities that had specific climate change programmes of work and were developing specific strategies or plans for addressing climate change adaptation issues. There was a wide range of current work areas identified by the local authorities including planning, research and investigations, education and community involvement, liaison and works.

In recognition of the legislative changes affecting in particular the Resource Management Act (RMA), the Local Government Act (LGA), the Building Act (BA) and the Civil Defense and Emergency Management Act (CDEMA), local authorities were questioned on their existing and possible future approaches to managing adaptation to climate change. The NZCPS[2] has a key integrating role for the management of resources across MHWS (i.e. of the coastal marine area and the landward coastal environment). Local

[1] Ministry for the Environment, 2008.
[2] As at time of writing the 2008 draft had not been finalised.

authorities are required to 'give effect to' this policy through their policy statements and plans. Likewise due to the inclusion of climate change into Part II of the RMA, it is anticipated that all 2nd generation RMA plans would address climate change in more detail. It is also anticipated that there would be stronger integration between the key pieces of legislation identified above, in terms of managing adaptation to climate change. Local Authorities anticipated that their existing work programmes would continue into the future.

However when asked if the current approaches being undertaken were sufficient to adequately adapt to climate change of the 24 local authorities surveyed 15 responded in the negative[3] (i.e. that they considered their council was not doing sufficient to adequately adapt to climate change). This was also reflected in the generally low average rankings that local authority staff gave to their progress against the 10 key principles of good adaptation identified in the 'Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand'[4].

A range of limitations or barriers that impacted on local authorities undertaking adaptation to climate change in coastal environment were identified. The most commonly cited limitations for local authorities being involved in climate change adaptation were related to political 'buy-in' and to resourcing (both work priorities and finances). All local authorities indentified the following as limitations or barriers: political attitudes and awareness, community awareness and understanding, national guidance, risk information, and decision-making processes and timeframes. In addition territorial authorities commented specifically on resources and responsibilities (i.e. particularly the funding of infrastructure); while regional councils commented specifically on land use planning, the propensity for inaction and legal barriers.

One local authority commented that to overcome the inertia on adaptation to climate change would require a public-wide culture change or 'sea change', through more informed public debate. It was considered that a co-ordinated approach to achieving such a change would be required involving for example, government, councils, communities, banks, insurance agencies.

Through the questionnaire sent out, local authorities were asked about changes that would be required to enable coastal adaptation to climate change to be more readily accepted by their council. The local authorities identified a wide range of options to address these limitations or barriers. Common themes arising included: stronger national policy guidance, more robust data and locally specific information; increased community and political awareness, and additional guidance material.

This report is has provided a fundamental basis for understanding the institutional context of addressing adaptation to climate change in the coastal environment, along with informing the other work areas within the wider Coastal Adaptation to Climate Change project.

[3] 5 responded yes to this question, 4 did not respond or didn't know
[4] Ministry for the Environment 2008

Drawing on the information in this report and particularly on the matters raised by local authorities in section 6 of this report, the following recommendations are made to the CACC research team, as they progress the research project.

It is recommended that CACC develops **good practice guidelines** relating to:

- Good practice examples of how climate change and sea level rise is included into RMA planning documents, including effective cross-boundary management options
- Best practice methodologies for undertaking coastal risk assessments, including assessing probable consequences and consulting with 'at risk' communities
- An overview of the legal and practical issues of regional council land use controls
- Options for facilitating managed retreat
- Options for managing the inland migration of coastal wetland areas
- Good practice examples for undertaking a cost benefit analysis of management options
- Methodologies for monitoring the effectiveness of climate change and coastal hazard policies, including establishing national indicators (for comparative purposes)

(and in doing so, considering how to improve the interactive nature of such guidance material).

It is recommended that CACC considers, in light of the overall CACC project, the need for **further research** in the following areas:

- a **national monitoring framework** which would include
    - areas at risk
    - the rate of spread of coastal settlements
    - a data base on change in coastal land form
    - processes and drivers (e.g. mean and extreme sea level, storm surge, wave climate)
    - impacts from climate change

- methodologies for assessing the risk arising from the cumulative effects of climate change.

It is recommended that CACC considers, in light of the overall CACC project, whether **recommendations to other agencies** should be made in relation to:

- Resourcing site specific climate change impact data
- Resourcing higher quality first order **geodetic height information** and mean sea level height information (i.e. to better understand the relationship between the 'mean level of sea' compared to the height of land)
- Management options for climate-related pest incursions
- Effective options for facilitating managed retreat
- Training and/or information packages on climate change and on adaptation to:
    - Enhance public debate
    - Raise the awareness of local government politicians, RMA hearings committee decision-makers, Environment Court judges and relevant staff

- Clarifying public and private responsibilities and liabilities for taking actions in relation to hazard risk or a hazard event, including the issue of compensation and the level of information made available to property purchasers
- Developing a NZ Standard for coastal hazard identification methodologies.

1. Introduction

1.1 Overall Project[5]

The **Coastal Adaptation to Climate Change (CACC)** project is a three year study being undertaken by NIWA and partners, and funded by the Foundation for Science Research and Technology. This project aims to create the necessary information and tools to enable adaptation by central and local government, and communities to the impacts of climate induced change on the coastal environment. As well as providing a national perspective the project also focuses on a regional and local level. Hume, 2007[6] comments that the risk of coastal properties from coastal hazards continues to increase and there are substantive benefits in reducing this rising risk to infrastructure and properties through prudent and proactive adaptation.

The project has four key components:

- Building a national coastal vulnerability profile
- Engaging communities and institutional decision-makers
- Institutionalising adaptation
- Evaluating and monitoring uptake and performance of adaptation strategies.

A key outcome of this research will be more informed proactive communities and local authorities developing local adaptation strategies to climate change.

1.2 Aim of this report

This report on 'Local Government Planning Practice and Limitations to Adaptation' is prepared as a background document which will contribute to the above overall project, and in particular to the third bullet above.

The aim of this report is to provide an overview of the approaches local authorities are taking to coastal adaptation to climate change. This report therefore:

- provides an overview of the existing legislative framework influencing local authorities' practices;
- discusses the existing policy and management directions being taken by local authorities; and
- explores institutional perceptions of adaptation to climate change and the associated limitations or barriers.

By addressing these matters, this report will provide a foundation for the other projects which are being undertaken as a part of the wider Coastal Adaptation to Climate Change (CACC) project.

[5] Hume, T., 2007
[6] ibid

1.3 Methodology and Limitations

The methodology used to develop this report involved written and verbal responses to a questionnaire sent to local authority staff in 2009, along with a brief background literature review.

Open interviews were conducted by telephone or by email with staff from a pre-selected group of local authorities. The questionnaire (attached as Appendix 1) was sent to 12 regional councils, 4 unitary councils and 14 district/ city councils. All regional and unitary councils were selected to ensure a wide coverage of the nation. Within each region a random selection of district/ city councils was made. Of the 30 councils approached 24 responded (12 regions, 3 unitary and 9 district/city councils).

The literature review focused on a range of New Zealand material, including council web-sites, and covering various plans and strategies and other documents.

The questionnaire was forwarded in the first instance to planning staff, who in some cases involved other staff from within their organisation when responding to the questions raised. This resulted in a varying degree of detail received from different councils.

The responses received were staff responses only and were not officially endorsed politically by any of the councils which participated. This report therefore seeks to protect the confidentiality of the councils which responded, by outlining common themes and trends, rather than specifying individual councils.

This report presents general trends arising across all local authorities, unless otherwise stated. The exceptions are used to highlight any clear differences in responses made between regional, unitary or district/ city councils. Where the responses from the unitary and district/city councils have aligned, the trends have been presented as being representative of territorial authorities.

In addition, it is noted that the responses to the questionnaire made by council staff are valid in the context of the Resource Management Act 1991 (RMA) (and amendments) and the political situation as of June 2009.

1.4 Climate Change Assumptions

This report draws on the climate change information and assumptions for future impacts, as detailed in 'Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand'[7]. In particular, this includes reference to the Fourth Assessment Report from the Intergovernmental Panel for Climate Change (IPCC). Climate change is projected to impact on sea level and in some areas, tidal ranges[8]. In addition, possible changes in storm conditions (including the frequency and intensity of events and the potential tracks of cyclonic weather patterns) will increasingly affect coastal margins.

[7] Ministry for the Environment, 2008, Ch 2.
[8] Ibid.

1.5 Key Terms Used

In the context of this report and to ensure consistency across the various parts of the overall programme, the following definitions are used[9]:

Hazard: a source of potential harm to people or property. Examples are coastal erosion or inundation. Note a hazard does not necessarily lead to harm or damage.

Risk: The chance of an 'event' being induced or significantly exacerbated by climate change, that event having an impact on something of value to the present and/or future community. Risk is measured in terms of *consequence* and *likelihood*. It also has an element of *choice* by humans.

Adaptation to climate change: Undertaking actions to minimise threats or to maximise opportunities resulting from climate change and its effects.

Climate change: a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer).

Coastal marine area: the area from MHWS seawards to the 12 nautical mile limit of the territorial sea.

Coastal environment: the coastal marine area plus an area inland where the coast has a significant influence (and which is generally defined locally in district plans and in some regional plans and regional policy statements).

In addition the following terms are used when referring to councils:

- **local authorities:** includes all regional, unitary, district and city councils
- **territorial authorities**: includes unitary, district and city councils
- **councils:** may be used generically to cover all local authorities or specifically within the given context.

[9] Ministry for the Environment, 2008. Glossary (for the first 4 terms defined). The last two terms are derived from the RMA and NZCPS respectively.

2.0 Planning Context

2.1 Contextual Changes

As identified by the Review of the New Zealand Coastal Policy Statement[10] , since the advent of the RMA in 1991, there have been some significant changes to the context in which coastal planning occurs.

In terms of coastal areas, some of the key changes in this planning context have included:

- increasing permanent populations locating in coastal areas
- increasing numbers of tourists and NZ visitors to beaches
- on-going and increasing demand for coastal subdivision
- increasing pressures for public access to and along the coast
- increasing pressures on natural character, with the Environment Court providing definitional guidance over time
- increasing awareness of climate change, coastal hazards, the effects of hazard events and the costs of responding
- increased community concern about development impacting on beaches and access to the beach
- increased community involvement in non-statutory management methods such as coast care initiatives
- increasing Maori and public participation in resource management issues
- a changing economic environment for New Zealand.

All these factors have combined to increase the management pressures and tensions experienced in coastal areas.

At a national level, there has also been a range of policy initiatives (subsequent to 1991) which have had either a direct impact on coastal areas or the potential to so. In particular, this has included[11]:

- various amendments to the Resource Management Act (RMA) including in particular, the introduction of climate change (in 2004) as an 'other matter' under Part II of the Act; and the requirement for subordinate plans to 'give effect to' those which are more influential in the hierarchy of plans.
- the gazettal of the first New Zealand Coastal Policy Statement (NZCPS) in 1994. In addition, a review of this NZCPS was commenced in 2004 (and at the time of this report has not been finalised).
- a draft national environmental standard (NES) on sea level rise (currently being developed by the Ministry for the Environment).

[10] Rosier 2005, p21
[11] These are not cited in any particular order of importance.

- the Hauraki Marine Park Act 2000, parts of which have the effect of a national policy statement for that area. This Act emphasises the need for co-ordinated management of the Hauraki Gulf along with its landward catchments, thereby emphasising cross-boundary management.
- the Foreshore and Seabed Act 2004, which was introduced to clarify ownership issues in the coastal marine area. A review of this legislation is currently being undertaken.
- a draft Oceans Policy which was commenced in 2003, with the intention to provide an overall co-ordinated management approach to all New Zealand oceans. (Note: to date this policy has not been finalised.)
- The Walking Access Act 2008, established the New Zealand Walking Commission, which has a leadership role to co-ordinates walking access within NZ.
- the Building Act which was reviewed and replaced with a new Act in 2004.
- the Civil Defence and Emergency Management Act 2002. This Act places a strong emphasis on reduction, readiness, response and recovery to hazard events. Resource management plans are expected to contribute significantly to the reduction of hazard risk and enable the resilience of communities through land use planning controls.
- a significant amount of work on the hazard risk from river flooding. This has resulted in a NZ Standard on Flood Risk Management (2008) and a draft National Policy Statement on Flood Risk Management.

2.2 Legislative Context

The legislative context for managing adpation to climate change in the coastal environment involves a range of legislation. There are four key pieces that are particularly relevant and these are briefly outlined in this section[12].

2.2.1. Resource Management Act, 1991 (RMA): The RMA establishes the legislative framework for the sustainable management of resources, including the coastal environment. The 'effects of climate change' is identified in s 7 as one of the 'other matters' that 'particular regard' must be given to, by those operating under the Act. The RMA sets out functions and responsibilities for national government and local authorities. Management functions for the coastal environment are shared between the Minister of Conservation, regional councils and territorial authorities.

National, regional and district policy statements and plans set the policy framework for managing the effects of activities. Within each region, the regional policy statement has a particular role in defining what the respective functions are for regions and territorial authorities, in regard to managing the adverse effects of natural hazards. This separation of functions between regions and territorial authorities, along with the jurisdictional boundary of MHWS is readily acknowledged as adding complexity to the integrated management of the water-land interface.

[12] Further detail on this legislation can be found in 'Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand', Ministry for the Environment 2008

The New Zealand Coastal Policy Statement (NZCPS) 1994 sets the national strategic policy direction for managing the coastal environment, including policy directives for coastal natural hazards and the management of coastal edge development (form and location)[13]. There are no additional national policy statements for climate change or coastal natural hazards management (although one is being drafted by the Ministry for the Environment for river flood hazards). The Hauraki Gulf Marine Park Act 2000 (sections of which have the effect on a national policy statement) emphasises a more co-ordinated approach to the management of the land-sea interface.

In 2004, the Department of Conservation commissioned an independent 10 year review of the NZCPS (as required by the RMA). The review of the 1994 NZCPS identified a lack of definition around 'appropriate use and development' in the coastal environment[14]. This is fundamental to the management of coastal hazard risk. Adaptive management approaches were included in the 1994 NZCPS through the precautionary principle and embedded into the natural hazards policies (Refer Appendix 2). Specific references were made to a rise in sea level and to abandonment and relocation as management options. However Jacobson's review of the natural hazards policies of the NZCPS[15] identified that many of the issues and barriers for managing coastal hazards were beyond the scope of the NZCPS to remedy on its own.

Following the 2003 amendment to the RMA, regional policy statements regional plans, the regional coastal plan and district plans must 'give effect to' this national policy (sections 62(3), 67(3), 75(3) RMA).

2.2.2. Local Government Act, 2002 (LGA): This Act sets out the framework for local government, and replaced the 1974 LGA. The 2002 LGA strengthened the focus on local democracy and the sustainable well-being of communities, by enabling local government to take a more flexible and responsive approach to the issues it faces[16].

The 2002 Act emphasises the four well-beings for a community – cultural, social, economic and environmental. It also requires councils to identify community outcomes and actions to achieve these outcomes through a 10 year work programme (i.e. through each council's long term council community plans - LTCCP). The 2002 LGA therefore gives local authorities a stronger mandate to undertake policy, works and services to achieve these community outcomes. While there are some core services that local authorities provide (such as functions required through other legislation), they also have the scope for undertaking discretionary functions or activities including for example, activities related to adaptation to climate change, provided they are endorsed through the community outcomes and LTCCP processes.

[13] Note: the NZCPS 1994 has been reviewed but at the time of writing this report the new NZCPS (draft 2008) had not been released. Appendix 2 sets out the 1994 policies and the 2008 proposed policies.
[14] Rosier, J., 2004.
[15] Jacobson, M., 2004.
[16] Local Government Know How, undated

2.2.3. Building Act, 2004 (BA): This Act which focuses on ensuring the safety and integrity of structures through construction and subsequent use is administered by the Department of Building and Housing, through Territorial Authorities.

In respect to natural hazards, s71 of the BA requires a building consent to be refused if works are proposed on land subjected to natural hazards, and adequate provision cannot be made to protect the land and buildings from natural hazards. Section 72 of the BA allows for a waiver if the building work does not exacerbate the natural hazard and if it is considered reasonable to grant the consents.

The BA process is complemented by the RMA process and in some instances a land use consent under the RMA is required along with a building consent under the BA. Where both consents are issued, the consent which has the more stringent controls prevails.

2.2.4. Civil Defence and Emergency Management Act, 2002 (CDEMA): This Act promotes the sustainable management of natural hazards and sets out a framework for emergency management. It focuses on a risk-management approach to natural hazards and emphasises reduction, readiness, response and recovery. Regional and territorial authorities are required to form a joint CDEM Group, which is responsible for preparing a CDEM plan. Such plans cover the hazards and risks to be managed and the actions necessary to do so. It is noted that the RMA and BA provide complementary roles to the CDEMA, and are fundamental to achieving a 'reduction' of risk through land use and building controls.

2.3 Summary Comment

Reflecting on the above contextual changes, it is evident that since 1991 (when the RMA was enacted), the rate and scope of changes in New Zealand in relation to the planning context for the coastal environment has been significant. This has included changes in thinking and approaches to coastal management, in particular for natural hazards and land use development. These contextual changes along with the consideration of climate change and adaptation to climate change will be fundamental to the development of local authority 2nd generation RMA plans.

It is also clear that there is a range of inter-linking legislation which contributes to the management of the coastal environment. While the RMA is the only piece that specifically mentions climate change, all other pieces of legislation incorporate provisions which require climate change to be considered

It is noted that the RMA on its own is not sufficient to address all the issues likely to arise from the contextual changes identified above. Thus a co-ordinated response to climate change and adaptation to climate change, by a range of public and private parties, is anticipated, using a variety of methods and tools under a range of legislation.

3.0 What is 'adaptation to climate change'?

3.1 Introduction

This section of the report provides a brief overview of what adaptation to climate change encompasses, in the context of the coastal environment. This section is by no means attempting to be comprehensive; rather its purpose is to provide a basis so that we can better understand the discussions arising in the following sections of this report[17].

On the coast, adaptation to climate change is primarily seen as a response to coastal hazard risk (sea level rise, coastal erosion and storm surge inundation), but it also encompasses habitat loss or the inland migration of habitat.

Two key approaches to responding to the effects arising from climate change include: (i) proactive planning or actions and (ii) reactive responses. Proactive planning involves putting policies, strategies and/or actions in place in advance, to avoid or reduce the potential risks from coastal hazards. This can involve both policy and works under a range of legislation as well as resource consents under the RMA, which are actioned in advance of the need to respond to a natural hazard event. Reactive responses look at options that address the effects of a hazard event once it has occurred, with a particular emphasis on protecting 'at risk' areas. Reactive responses generally involve works under a range of legislation and may include RMA resource consents for any defensive works or rivers control works. The following two sections briefly discuss these approaches further. It is noted that some of the ways for implementing these two options are common to both proactive and reactive approaches.

An overview is then provided of local authorities' views on adaptation to climate change in the coastal environment and on their current related work programmes, as summarised from the survey results. This provides the CACC project team with a baseline of information on the level of understanding across local authorities and on the range of work currently being undertaken. This will also be used to inform the discussion of limitations to adaptation to climate change faced by local authorities, presented later in this report.

3.2 Proactive Planning

This approach to managing potential coastal hazard risk is fundamentally about strategic decision-making for the future. It involves managing landward coastal subdivision, use and development in a way which allows for the natural beach (sediment and wave) processes to occur without restrictions from development and without causing a hazard risk.

[17] Refer to Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand, Ministry for the Environment, 2008, for a more in depth discussion.

For 'greenfield' sites[18], this is clearly about either avoiding any built[19] development in potential hazard risk areas or ensuring the hazard risk is managed to an acceptable level. This is generally achieved by zoning in RMA regional and district plans, to avoid development in areas of high risk and to allow some development in other less 'at risk' areas, provided building or infrastructure design takes into account the future potential risks.

In 'existing developed' areas[20], proactive planning aims to avoid exacerbating the potential hazard risk. To achieve this, adaptation options may include avoiding intensification and/or avoiding redevelopment designs that have the potential to increase the risk to land and property from coastal hazards. This can be addressed through:

- land use plan provisions (such as development set back lines, buffer zones, restricting intensification in high risk areas; alternative layouts for infrastructure e.g. avoiding services located parallel to coastal edge)
- planned or managed retreat (a strategic decision to withdraw, relocate or abandon assets at risk[21])
- Building Act requirements (such as minimum floor levels, raised building platforms, infrastructure location, re-locatable building designs)
- works and services policies (such as any infrastructure up-grades being located away from the coastal edge; alternative options considered in terms of future hazard risk; advance planning to relocate known vulnerable services)
- 'soft' engineering protection works (such as beach nourishment and plantings)
- 'hard' engineering protection works (such as seawalls, groynes, breakwaters)
- Emergency management processes and community awareness.

3.3 Reactive Responses

This approach to managing coastal hazard risk is fundamentally about responding to an actual or imminent threat from a coastal hazard event. It primarily involves 'holding the line' in order to protect property and infrastructure by restricting coastal processes.

For 'greenfield' sites, there is generally no requirement to undertake any actions to manage the coastal edge, if there is a storm event which could cause erosion or accretion. That is, erosion or accretion are natural processes of the coastal edge and can continue to occur without being impeded by built development. Likewise any inundation would recede in time and while there may be short-term flooding of land, there is no hazard risk to people or built property.

[18] The term 'greenfield' sites refers to areas of land that are not developed by buildings or infrastructure and may include rural land, reserves, or native vegetation.
[19] Note: in the context of this report "built" is defined broadly to include any structures or facilities made by people and fixed to land.
[20] The term 'existing developed areas' refers to landward coastal areas that have been built on, and may include buildings, infrastructure, roads etc.
[21] Environment Waikato, unpublished, p2.

In 'existing developed' areas, a reactive response generally involves defending the property or infrastructure, increasing the resilience of property (e.g. through design and location), removing the buildings or infrastructure, or allowing them to be damaged/ destroyed. While some such works may be undertaken in advance of a hazard event, most are undertaken in response to a weather event and are undertaken either as emergency works[22] or immediately after the event has occurred. Adaptation options include interventions such as:

- 'hard' engineering protection works at the coast (such as sea walls, buried backstop walls, groynes, sand bags, sand sausages)
- engineered off-shore barriers (such as artificial reefs, break waters)
- 'soft' engineering protection options (such as beach nourishment and plantings which build ecosystem resilience)
- planned or managed retreat (a strategic decision to withdraw, relocate or abandon assets at risk)[23]
- illegal works (such as dumping of rubble, trees and other such material as barriers to the waves)
- Emergency management processes and community awareness.

A risk of reactive adaptation is that of maladaption, i.e. that the adaptation response chosen causes a further hazard risk or prevents potential adaptation options from being available to be taken in the future.

3.4 Local Authority Views on Adaptation

The above background provides a brief basis for the CACC Project team when considering adaptation to climate change. In undertaking the survey of the local authorities, staff were asked about their understanding of adaptation to climate change. The responses received are summarised below and provide a baseline on the level of understanding across local authorities.

The local authorities surveyed showed that there was a sound understanding among council staff on what adaptation to climate change in the coastal environment entails. There was a strong emphasis placed on the need to plan 'proactively', recognising that sea level rise and the effects of changing weather patterns were likely to exacerbate existing coastal hazard risks.[24]

A distinction was also drawn between *adaptation* (initiatives and measures to reduce vulnerability and increase resilience of human and natural systems) and *mitigation (*actions to reduce greenhouse gas emissions and to enhance carbon sinks, aimed at reducing the extent of global warming). It was recognised that regardless of progress made on mitigation, there would be on-going coastal natural hazard issues which would be exacerbated by climate change effects.

[22] As provided for by the RMA (ss330 – 331)
[23] Environment Waikato, unpublished, p2.
[24] All councils were aware of the document 'Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand', Ministry for the Environment, 2008, and 22 out of 24 were aware of the summary document 'Preparing for coastal change: A guide for local government in New Zealand', Ministry for the Environment, 2009.

The inevitable tension between protecting property and protecting beach areas was recognised (and it was acknowledged that protecting one was in general, at the expense of the other). It was also noted that seldom are people's lives at risk from coastal erosion hazards. A common thread arising from the responses to the questionnaire was the need to understand natural systems (such as waves, sediment, currents) and the preference to allow the systems 'room to adjust', before engineered solutions were implemented.

It was also noted that more communities were likely to be confronted by adaptation decisions in the future. In this respect, it was frequently commented that increasing community awareness of climate change impacts and an understanding of 'acceptable risk' would be critical in helping to modify people's expectations about future subdivision, use and development in the coastal environment.

Another common theme arising from the questionnaire responses was that the sustainable management of coastal resources needed to address environmental, social, economic and cultural concerns. This is reflective of the wider focus of the LGA to meet community outcomes, and the need for local authorities to draw on provisions from other legislation, in order to effectively address adaptation to climate change.

4.0 Local Authority Approaches to Adaptation

4.1 Introduction

This section of the report presents responses to the questionnaire (Appendix 2) to describe what councils are currently doing and their intended path into the future for managing climate change in the coastal environment. The section firstly considers generic work areas, followed by a closer focus on the four key pieces of legislation (RMA, LGA, BA, CDEMA). The section then comments on how local authority staff rank their council against a set of 'good practice' adaptation principles. Overall this section provides a national overview of how local authorities are working with these pieces of legislation to provide a management framework for adaptation to climate change in the coastal environment.

4.2 Current and Future Work Programmes

While two thirds [25] of local authorities did not address climate change or adaptation to climate change in the coastal environment as a specific work programme, they generally had a range of current work areas that were directly linked to coastal natural hazards, and which included consideration of the potential for climate change to exacerbate the effects from such hazards. That is, climate change was seen as an 'exacerbator' of existing problems that were being faced. Most work programmes therefore tended to be driven by hazard-related work prerogatives and not specifically by climate change.

Key work areas commonly identified from the questionnaires as currently being undertaken by local authorities (and which were seen as being related to adaptation to climate change in the coastal environment), included the following:

4.2.1 Planning: Current work programmes include: hazard mapping (new and updated information) and associated planning provisions; growth planning; asset management planning; tsunami planning; review of floor level requirements; joint or combined RMA coastal plans; specific climate-related plans; CDEMA reduction and 'critical lifelines' work; RMA emergency works policy.

In terms of future work programmes, all local authorities identified that they would be involved in a review of their RMA planning documents. (It is noted 9 local authorities had plans under review, while 5 identified they had 2nd generation plans operative or in the RMA statutory process plans). New matters identified for inclusion into future RMA plans were: outcomes from growth strategies and ways to build resilience into communities (e.g. guidance on seawalls; soft engineering options; 'greenfield' sites, habitat migration, catchment based approaches); embedding the new NZCPS and the expected National Environmental Standard (on sea level rise) into the plans; and taking a stronger stance on risk management approaches (including residual risk) (e.g. specifying risk assessment methodologies for consent applications).

[25] 11 out of 17 responses.

In addition, three local authorities noted that were intending to consider using regional land use controls in hazard areas, to enable stronger integration with territorial authorities in the management of areas at risk from coastal natural hazards. While two regional councils noted that they already have regional plan provisions covering coastal land affected by hazards.

In terms of future work programmes related to the CDEMA, CDEM Groups will be required to review their plans in the near future (with 5 local authorities identifying that this review process had been started). Eight local authorities commented that this would involve including climate change issues into their plans, and possibly more focus on the reduction of natural hazard risk and on the resilience of communities (which would require stronger links to RMA plans).

Four councils identified that they were undertaking specific climate change strategies or plans (under the RMA or LGA mandate). One territorial authority identified that within their strategy one focus would be on the ability of infrastructure (e.g. roads close to rivers/ sea, stop banks, sand dunes) and emergency services (e.g. fire fighting) to withstand the potential impacts of climate change. One region is developing a regional plan: climate. Another territorial authority is commencing a pilot project to investigate the impact of climate change on a limited coastal area and nearby inland areas, focused on adaptation needs. It is anticipated that this would provide the template for a city-wide assessment and indicate where detailed work would be useful. Results from this pilot will be used to inform how relevant plans and policies would be updated.

4.2.2 Research and investigations: Currently this area of work involves: review of climate data at a regional or local level (e.g. high intensity rainfall and storm surge predictions, research into relative changes in sea level rise against tectonic movement); base line and trend monitoring (e.g. LIDAR; erosion data; beach profile surveys, estuarine changes, tide gauges, camera monitoring, hazard risk indicators, hydrodynamic and productivity modelling); identifying hazard risks and vulnerabilities; investigations into the use of an artificial reef (to abate severe wave actions); tsunami scenario and risk modelling; contributing to national research projects (e.g. adaptation of lowland/coastal dairy farming to threats and opportunities associated with climate change); review of building standards (e.g. floor levels, wind shear standards); investigations into urban development options for low-lying coastal locations; options for managed retreat; non-market economic valuation studies.

In terms of future work areas, all local authorities expected a continuing involvement in information gathering, with several emphasising the need for more detailed work such as area specific mapping and review of existing hazard zones. One regional council noted that enhanced coastal monitoring systems, capable of measuring key variables or indicators to support policy development were required.

As further climate change data became available, three local authorities commented that policies and standards relating to infrastructure, asset renewal and design standards would be reviewed, and that an 'up-dated' allowance for climate change and climatic variability would be incorporated into relevant activities.

4.2.3 Education and community involvement: Current work areas include: coast care and dune care programmes; working with land owners and communities on soil stabilisation and habitat restoration

(including mangrove removal); production of information sheets on potential climate change impacts (e.g. for landowners adjoining beaches); working with communities and/or individuals to assess hazard response options.

In terms of future work programmes all local authorities anticipated that their current work programmes would continue. Two local authorities commented on their intention to work more collaboratively with communities and to increase public awareness of climate change issues. While one council noted that internal workshops for staff on adaptation to climate change would possibly be repeated. One region noted that improved monitoring would also increase people's understanding of the effects of climate variability and extreme weather events on the coastal environment, which in turn could lead to an improved adaptation response and promotion of risk avoidance processes.

4.2.4 Liaison: Current work programmes include: linking civil defence and RMA work programmes; inter-council projects and working with government agencies. For example, one region has formed a joint region and district/city 'Natural Hazards Forum', which is working towards establishing clear policy and actions aimed at reducing the impacts of all natural hazards within that region.

Fifteen local authorities acknowledged climate change as being embedded into their LTCCPs through a range of work programmes. One local authority made the comment that they expected their LTCCP would be used more proactively in the future to outline their council's stance on climate change.

4.2.5 Works: Current work programmes include: maintenance and upgrades of infrastructure (particularly where they are vulnerable to climate change impacts and includes breakwaters and seawalls); estuarine and dune restoration and protection; review of the adequacy of flood protection works in or alongside tidal waters; catchment and river works; management of erosion rates and sediment flows which impact on beach building processes and flooding; beach renourishment; management of public lands as buffer zones. One council commented that their engineering code of practice was being reviewed in order to better integrate adaptation to climate change into their council's decisions on infrastructure.

In terms of future work programmes all local authorities expected such works to continue.

4.2.6 Summary Comments

There is a wide range of local authority work programmes and activities which involve consideration of the impacts of climate change in the coastal environment. Obviously not all local authorities undertake all actions, with some councils being far more actively involved in such work areas than others.

Most local authorities identified that they would probably continue with the same approaches/ techniques into the future, but with more thought given to the effects of climate change in respect of exacerbating existing hazards and the need to avoid new ones.

Land use planning controls are primarily addressed through RMA district plans. Five local authorities noted that they currently have, or intend to consider having in the near future, regional land use

controls in coastal hazard areas. This has the effect of enabling regional councils to manage 'existing use rights' in these areas.

It is noted that there is little work being undertaken in relation to the adaptation option of retreat. Three councils commented on the difficulties of addressing options for retreat, in existing 'hazardous' areas.

4.3 Adaptation under the RMA

From a **territorial authority perspective** there are three key provisions of the RMA that inform the way the coastal edge is managed. These include:

i) the management presumption for land is that unless there is a rule in the District Plan requiring a resource consent to be obtained, any activities on land are permitted
ii) territorial authorities have as a key function (under s31 RMA) the control of land use effects for the purpose of the avoidance or mitigation of the adverse effects of natural hazards; and
iii) the district plan must give effect to any NZCPS, national policy statement and regional policy statement. (s75 RMA).

From the survey undertaken, six councils (out of 12 district/ city and unitary councils) commented that were few or no provisions relating to climate change or to adaptation to climate change, in their current RMA district plans. However where appropriate, information held by regional councils on coastal natural hazards (which included consideration of climate change) was used by the territorial authorities in consent decision-making.

In terms of managing the effects of natural hazards, district plans varied in the range of provisions used. Methods such as hazard zones, hazard maps and associated planning provisions, were commonly noted. One local authority commented on existing policies on avoiding development in active beach zones, one provided for habitat migration, and one referenced a requirement to consider a 50cm sea level rise. One council in particular has policy directives which, (in recognition of the highly erodible nature of their coast), seek to avoid development or protection works in soft sediment areas and to promote coastal urban expansion in areas with a solid rocky base.

Another example provided was from one of the unitary councils. This council has undertaken significant coastal hazards work: they have identified the criteria for assessing hazards, undertaken a broad scale assessment of areas sensitive to coastal hazards, and mapped these areas (ranging from 50 – 130metres in width) along the coast. District plan policy states that development within these areas may require a hazard assessment as part of a resource consent application. This council has also commenced a programme of detailed coastal hazard assessments of erosion, landslip and inundation for medium-high priority areas. These zones form overlays in the district and coastal plans and have associated policies and rules (ranging from prohibiting subdivision and new buildings to making coastal protection works and building discretionary).

From a **regional council perspective** there are four key provisions of the RMA that inform the way regional councils manage the coastal edge. These include:

i) the management presumption for the coastal marine area is that no activities can be undertaken unless there is a rule in the regional coastal plan permitting the activity or a resource consent is obtained
ii) regional councils have as a key function (under s30 RMA) the control of land use effects including the avoidance or mitigation of natural hazards
iii) the regional coastal plan must give effect to any NZCPS, national policy statement and regional policy statement. (s67 RMA); and
iv) the regional policy statement must state which local authority level is responsible for the management of land for the purposes of avoiding or mitigating natural hazards (s62 RMA).

Five of the 12 regional councils which responded had little or no references to climate change or to adaptation to climate change in their operative regional policy statements or regional coastal plans (with two making the comment that 'adaptation' as a concept did not exist when the first generation plans were being developed)[26].

All regional councils did however address natural hazards in their policies and rules, with 8 commenting that they had specific references to sea level rise, and/or increased storminess as well as to migration inland of natural features. In addition, 9 commented that they proposed a precautionary approach (where there was limited knowledge of hazard risks) and one focused on ensuring resilience to climate change was built in to the management regime for all resources. For many regional councils the RPS also set an expectation that hazard areas and their management would be built into district plans.

It should be noted that the importance of the RPS as an integrating document which provides guidance to both regional and district plans, has been increasingly recognised since the first generation RPS were developed. Thus the 2nd generation of RPS has the potential to provide a stronger strategic view of the desired future for managing adaptation to climate change in each region.

All five of the 2nd generation regional level regional policy statements and/or regional coastal plans that have been prepared to date have included references to climate change and adaptation to climate change, (including for example, reducing risks from coastal hazards, avoiding buildings on land vulnerable to coastal hazards, incorporating sea level rise projections, and taking a precautionary approach to managing the effects of climate change). One council commented that adaptation to climate change was dealt with via planning controls to ensure that an assessment was made on the most appropriate place to site a development and to build in such a way as to minimise the effects from

[26] Note While the word 'adaptation' was not used specifically in the NZCPS, policies 3.4.2 to 3.4.6 (as shown in Appendix 2) are nevertheless adaptation initiatives, along with many of the current work programme activities outlined in section 4.2 above.

climate change and natural hazards. Five councils mentioned that they had or intended to introduce land use controls for buildings in coastal hazard areas.

Summary comment

It is important to consider these questionnaire results in light of the following comments:

i) The timing of existing plan development:
Most local authorities developed their current RMA plans over different time periods. Many district plans were rolled over from the pre-1991 regime into the RMA era, well in advance of the national policy directives being set in the 1994 NZCPS. Likewise, regional policy statements and regional coastal plans were being developed concurrently with the 1994 NZCPS, and generally concurrently or out of line with district plans. Hence there was an obvious mismatch in planning cycles, in spite of the RMA plan hierarchy.

ii) Legislative changes and plan reviews:
While the 1991 RMA required all councils to address natural hazards management, climate change was only introduced into Part II RMA in 2004. The focus on climate change and potential impacts and on adaptation has only gained currency in recent years, and is now much more accepted as an issue to be addressed.

Likewise in 2003 the RMA was amended to require subordinate plans to 'give effect to' the higher level policy documents. This is a much stronger directive than the previous wording of 'have regard to' and will influence the 2nd generation of plan development. Nine local authorities have commenced their 2nd generation RMA plans, while the review of the NZCPS has yet to be finalised[27] and in some instances, in advance of the RPS being finalised. However, one local authority commented that they had only just made their 1st generation plans operative (and therefore may not be required to review them for a further 10 years[28]).

iii) Jurisdictional boundaries:
There is a jurisdictional boundary of MHWS between regional and district functions, which often leads to a tension in managing the landward activities in a manner that is integrated with natural coastal processes, particularly erosion and particularly in areas with existing subdivision, use or development within identified hazard areas.

In addition, there is a tension between the functional responsibilities for managing natural hazards, as both regions and territorial authorities have responsibilities under the RMA (ss 30 and 31). The RPS has a directive role to determine responsibilities in more detail (s 62).

[27] As at the time of writing, the 2008 proposed NZCPS had not been finalised.

[28] Section 79 RMA requires local authorities to commence a review of the provisions of their operative policy statements or plans if they have not been subject to a review or change in the previous 10 years.

4.4 Adaptation under the LGA

From the survey results, 9 local authorities[29] considered that climate change in the coastal environment was a core part of their LGA business, with all those responding noting that there was some reference to climate change in their council's LTCCP. However, none of the respondents commented on whether that specifically included adaptation measures for the coastal environment. Generally climate change was factored into a range of different work areas as mentioned in section 4.2 above.

Although the LGA provides a mandate for local authorities to consider adaptation to climate change only four councils identified specific work programmes and budgets (such as for example, the preparation of background work and planning documents relating to the impacts of climate change).

4.5 Adaptation under the BA

Of the 12 territorial authorities surveyed, 11 stated that hazard areas were recorded on Land Information Memorandum (also called LIM reports) and used in building consent decisions. Building controls were then used to set minimum floor levels and determine the location of buildings on a site, or to require other adaptive actions. However one council commented that where there were high levels of uncertainty about hazard data, there was a reluctance to add this information to LIM reports, due to potential legal implications.

While it is noted that the regional councils do not have any functions in the coastal environment under the BA, most regional councils were involved in providing information (such as, hazard assessments, setback lines, inundation levels, design comments etc) to territorial authorities to assist them in their policy making and BA consent decision-making roles.

In terms of the effectiveness of linkages between the RMA (land use consents) and the BA (building consents), opinions were varied. Some councils considered there was no problem in the meshing of these two pieces of legislation (e.g. one council used the district plan hazard zones as a trigger for setting building controls), while 4 considered that the two pieces of legislation would benefit from legislative changes that would provide greater integration or clarification. Examples raised for improving effectiveness included:

- clarifying the appropriate use of different time frames - while the BA anticipates a 50 year building life, typically under the RMA local authorities consider coastal process changes over a 100 year time period and generally apply a 1% annual exceedence probability to flood events (i.e. design based on a 1% chance of an event occurring in any one year).
- both acts have difficulty dealing with the issue of managing land use affected by residual risk, i.e. land affected by 'overtopping' of defensive structures

[29] out of 15 responses

- there is an inability for councils to require a higher standard or longer timeframe than that specified in the BA (e.g. the BA only requires developments to avoid or mitigate natural hazard events that have a 2% annual chance of occurring (which corresponds to the lifespan of a building being approximately 50 years) however, the BA does not provide for councils to implement longer timeframes as a precautionary approach to managing coastal hazards).
- from a process perspective, there was a concern about the order of processing consents when a BA permit and an RMA consent were both required. (E.g. issuing a building consent implies approval; however a land use consent (processed second in order) may decline the activity).
- the BA has limited scope to consider off-site effects of building works (such as catchment impacts), or how building works 'fit' with any broader adaptation strategy.

Summary Comment

While there are ways of working to mesh the RMA and the BA together, there are nevertheless some barriers to controlling buildings in existing and potential future coastal hazard areas. It is understood that the current review of RMA provisions is looking at the alignment of the two pieces of legislation.

4.6 Adaptation under the CDEMA

Form the results of the questionnaire, 8 local authorities[30] commented that they had not built climate change and in particular the effects of climate change on coastal hazard risks, into their CDEM Group Plans. However, 5 noted that this would be looked at in forthcoming reviews. One council commented that in its review of their CDEMG Plan, a chapter on reduction of hazard risk would be included, with priorities identified for reducing the impact of climate change on existing hazards. Two councils commented that climate change was seen as an 'exacerbator' of many of the current natural hazards (i.e. acknowledging that climate change would potentially change the frequency and intensity of existing natural hazards but would not create any new hazards).

Four local authorities commented that the CDEM Group plans had a key role in identifying hazards that posed the greatest risk to communities, and in co-ordinating responses between the RMA, BA and CDEMA. In the context of adaptation to climate change, it was generally considered that any strategies should be developed within the combined legislative framework of these three statutes. In addition, appropriate levels of funding would be required to be embedded into LGA plans.

There was no consistency nationally on how local authorities ranked coastal hazard risks in terms of hazard priorities. For 2 local authorities coastal erosion, sea level rise, storm surge and inundation and/or tsunami were amongst the highest priority hazard risks, whereas 4 commented that they were ranked lower or did not feature at all within their CDEM Group plan. However, this most likely reflects differing local circumstances, which in turn would result in different priorities for hazard risks.

[30] Out of 16 responses

Summary Comment

While the CDEMA anticipates a co-operative approach to the management of hazard risks, this is not being driven from the current CDEM Group plans. The need for an integrated approach between the CDEMA and the RMA is recognised, but to date has not effectively occurred. However due to the relative timing of the preparation of existing RMA plans and the CDEM Group plans, this is not surprising. A more integrated approach is anticipated for 2nd generation RMA and CDEMA plans.

4.7 Adaptation Principles

A series of adaptation principles were outlined in the 'Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand'[31] and are listed in Table 1. The guidance manual stated that these common themes and characteristics have led to good adaptation.

As part of the survey, local authorities were therefore asked to rate their council on the principles as shown in Table 1. A scale of 1 to 5 was used with 1 being poor and 5 being excellent. While there is an obvious level of subjectivity and it is difficult to draw firm conclusions from the results, there are clearly some interesting trends and variations that are commented upon below.

Principle 1: Working in partnership with coastal communities was undertaken to varying degrees by all levels of local authorities. This may have been reflective of the community pressures and adaptation issues being faced by some councils.

Principle 2: Understanding existing risks and vulnerabilities to coastal hazards and climate change and their critical thresholds: Some unitary and regional councils ranked their council as being 'very good to excellent' in respect to this principle, while some districts and regions ranked this below average.

Principle 3: Identifying the most adverse coastal hazards and compounding climate change risks and prioritising actions to manage the most vulnerable areas. All types of local authorities indicated a similar range in ranking this principle.

Principle 4: Incorporating adaptation considerations into decision-making for all new and existing developments within the coastal environment. All unitary councils ranked this principle the same, while the regional and district councils has a similar range.

Principle 5: Recognising the changing risks over time and building in phased approaches to adaptation and Principle 6: Identifying and promoting no-regrets, low regrets and win-win adaptation options.
As an overall result, both these principles were ranked below average, while again exhibiting a range in rankings by the various local authorities, but with territorial authority results being consistently lower (although one ranked this as 'excellent'.

[31] Ministry for the Environment, 2008, p42.

Table 1: Ranking of Good Practice Principles[32]

Principle	Range of Ranking District	Range of Ranking Unitary	Range of Ranking Regional	Average
1. Working in partnership with coastal communities	2 - 4	2 - 4	2 - 4	3
2. Understanding existing risks and vulnerabilities to coastal hazards and climate change and their critical thresholds	2 - 4	3 - 5	2 - 4	3.3
3. Identifying the most adverse coastal hazards and compounding climate change risks and prioritising actions to manage the most vulnerable areas	2 - 4	3 - 4	2 - 4	3
4. Incorporating adaptation considerations into decision-making for all new and existing developments within the coastal environment	1 - 5	3	1-4	2.7
5. Recognising the changing risks over time and building in phased approaches to adaptation	1 - 4	2 - 3	1 - 4	2.8
6. Identifying and promoting no-regrets, low regrets and win-win adaptation options	1 - 3	1 - 3	1- 4	2.5
7. Adopting sequential and risk-based approaches to decision-making regarding coastal development	1 – 5	1 - 4	2 - 4	2.8
8. Identifying and avoiding actions and decisions that will make it more difficult to cope with coastal hazard and climate change risks in the future.	1 - 4	1 - 2	2 - 4	2.8
9. Defining indicators to monitor the effectiveness of planning provisions and the effectiveness of adaptation measures	0 - 3	1 - 2	1-5	1.8
10. Providing public education and information on climate change and adaptation	1 - 3	1 - 2	1-4	2

Principle 7: Adopting sequential and risk-based approaches to decision-making regarding coastal development; and Principle 8: Identifying and avoiding actions and decisions that will make it more difficult to cope with coastal hazard and climate change risks in the future. While the overall results for both of these principles showed a below average ranking, it is interesting to note that territorial and unitary authorities had extremes in the ranges of the rankings (with a low range indicated for unitary authorities), while the regional councils ranked them average or above.

Principle 9: Defining indicators to monitor the effectiveness of planning provisions and the effectiveness of adaptation measures. This was ranked consistently lowly by all local authorities (except for one

[32] Ibid

regional council that ranked this as 'excellent'), resulting in an overall average ranking of 1.8. This suggests that indicator monitoring is a significant gap.

Principle 10: Providing public education and information on climate change and adaptation. This was ranked 'average or below' by all local authorities. This suggests that this is a significant gap and/ or local authorities are reluctant to take a lead in public education.

4.8 Summary Comments

This chapter of the report focused on the existing approaches to adaptation to climate change taken by local authorities under various pieces of legislation and the possible future approaches that might be taken. From this general overview it is clear that local authorities intend to continue into the future with the existing work programmes that focus on managing the effects of natural hazards.

The linkages between the RMA, LGA, CDEMA and BA were not regarded as being particularly strong or effective. However, it was anticipated that the next generation of RMA and CDEM Group plans would be more effective in achieving stronger integration. Likewise, it was also recognised that an integrated approach (which would cross many pieces of legislation and involve a wide range of parties) would be required to 'action' adaptation to climate change.

Table 1 showed that there were some key areas where further work would be required to achieve adaptation to climate change in the coastal environment. This is supportive of the wider Coastal Adaptation to Climate Change Programme, of which this report is a part, and in particular of work being undertaken on indicators and public information.

In addition, when asked if the current approaches being undertaken were sufficient to adequately adapt to climate change of the 24 local authorities surveyed 14 responded in the negative[33] (i.e. that they considered their council was not doing sufficient to adequately adapt to climate change). This reinforces the results depicted in Table 1: Ranking of Good Practice Principles.

[33] 5 responded yes to this question, 3 did not respond or didn't know

5.0 Limitations or Barriers to Adaptation

5.1 Introduction

Arising from the responses received to the questionnaire, this section of the report provides an overview of the limitations or barriers faced by local authorities when implementing coastal adaptation to climate change.

Due to the different mandates for managing coastal natural hazards under the RMA, the following section is separated into two parts. Firstly, those matters that were commonly raised by all local authorities are listed. Secondly, those matters that were raised only by either the territorial authorities or the regional authorities are identified. The responses from the unitary authorities have been collated with the territorial responses due to the similar nature of matters raised.

5.2 Common limitations or barriers

The following matters were commonly identified by territorial, unitary and regional authorities:

5.2.1 Political attitudes and awareness: Political attitudes influenced to what extent adaptation to climate change was addressed in a council. Where there was a lack of belief in climate change, or where there was a variable level of understanding and knowledge, there was generally a reluctance to commit resources to or set priorities for this area of work, particularly as there was no national directive to do so. Four local authorities noted that there was a political willingness within their council to take a lead on this issue and to resource work programmes accordingly. However 4 other councils commented that there was a reluctance to be proactive, rather awaiting progress by other councils.

In terms of RMA resource consents decision-making, it was noted that there is often a political reluctance to make hard decisions that would be in opposition to community or financial pressures (e.g. a rock wall is regarded as an easier and cheaper solution than relocation of assets at risk) or which would involve long-term thinking (e.g. an unwillingness to confront the implications of long-term financial commitments - refer to section 5.3 for an example on inter-generational equity).

Another political factor identified in the questionnaires as influencing decisions relating to adaptation to climate change in the coastal environment was the three-year election cycle. It was noted that this timeframe tends to result in short to medium term thinking, compared to the effects of climate change and coastal processes which are often assessed over decades and centuries.

5.2.2 Community awareness and understanding: The level of knowledge and understanding within communities is varied and not well developed, making it difficult for affected individuals or communities to engage in a discussion of the issues in a way that would enable them to take responsibility for determining the preferred actions for the future of their settlements.

Generally there is a low level of understanding of 'natural processes' and an expectation that councils will 'protect' private property rights and public reserve land (i.e. 'hold the line' against coastal erosion). Most communities were seen to be extremely resistant to ideas of retreat, relocation or judicious development on coastal margins, particularly when there is no obvious or imminent hazard threat. It is difficult to address a long-term issue (such as climate change effects) when the individuals or communities have not experienced and/ or do not expect to experience any hazard events 'in their lifetime' (i.e. climate change is perceived by individuals and/or communities as a theoretical projection which they cannot relate to).

5.2.3 National guidance: Given the political and financial issues raised in the first bullet point of this section, local authorities considered that the NZCPS did not provide sufficient guidance for decisions on the need to balance natural processes with the individual's and/or community's social and economic interests (i.e. it is does not clarify what weighting should be given to the protection of land, buildings and infrastructure compared to the protection of natural processes and beach amenity). Further national policy guidance was considered necessary to clarify management directions, given that increasingly in the future, the coastal margins will undergo a change in hazard risk from climate change. Likewise, due to increasing pressures for coastal development, national guidance on the acceptable extent of coastal development versus protected or undeveloped areas, was also considered to be essential.

Filling these national policy gaps was viewed as a way to increase consistency in responses by councils, empower any stance taken by councils and would clarify the legal predominance of private property rights compared to the rights of the public domain. This did not mean over-riding local decisions for local conditions (i.e. the need to recognise physical geography, social constraints and local resources), rather it was about giving some firm directives on what is the national 'bottom line' for managing these coastal areas.

5.2.4 Risk information: The lack of information on the level of risks most likely to be experienced in localised areas (and the certainty of this information) was considered to be a major limitation (i.e. there is a need to translate the theory into probable effects on the ground). The lack of clarity around the magnitude of impacts for a given area makes it difficult to balance risks versus costs and benefits.

It was recognised that this detailed information would be required in order to develop useful planning provisions, but there were concerns at the 'astronomical' cost of obtaining such information. It was noted that communities and decision-makers did not appreciate that 100% accurate or complete data will never be attainable. In this respect it was considered that the precautionary approach needed to be more strongly supported. In addition, the uncertainty about climate change variables opens up local authority's decisions about adaptation matters to legal challenge (with associated costs). Risk-averse councils do not wish to defend climate change in the environment court.

5.2.5 Decision-making processes and timeframes: A number of matters of concern were raised in respect to decision-making processes and timeframes:

i) under the RMA there are significant time delays before plan provisions take effect (i.e. from proposed to operative stages) and there is a lag effect between national, regional and district policy development (i.e. subordinate policy is required to 'give effect to' 'higher level' policy, but the development of plans are either overlapping or out of step).

ii) at the resource consent and policy development levels, the outcomes can be affected by: the extent to which the reporting officer/ policy advisor appreciates hazard risks; arguments put by applicants/ submitters; and the attitudes and level of understanding of the hearing committees. Both decision-making processes (consents and plans) are subject to the Environment Court, where it is perceived as being difficult to get the concepts of risk levels (probabilities, consequences etc) and adaptation acknowledged, and to defend them effectively. It is considered that through both council and court levels of decision-making there is a general reluctance to say 'no' to development, in spite of legislated natural hazards functions and responsibilities (RMA, BA and CDEMA). In some cases, this was also noted as poor implementation of existing policies.

iii) the RMA and BA timeframes tend to focus on the present and short term futures (10 years from RMA plans; up to 30 years for RMA resource consents; 50 years for the life of a building) rather than on the prediction timeframes for the future (upwards of 100 years). This is seen as a major barrier to addressing the long-term effects of climate change.

iv) given the political election cycle of three years, the RMA plans and LTCCPs (planning cycles of 10 years), can potentially be amended within any political term (3 years). This can exacerbate any long-term decision-making requirements for coastal adaptation. Likewise, given that the impacts of climate change are expected to occur over a long time period, land use decisions undertaken today with more weighting given to present-day interests, are likely to result in future problems, as is currently being experienced in many coastal settlements. Planning for climate change should be intergenerational and most local authorities supported a planning horizon of 50 – 100 years when considering the impacts of climate change on the coastal environment.

5.3 Matters raised by territorial and unitary authorities

Another limitation or barrier specifically raised by territorial and unitary authorities was:

5.3.1 Resources and responsibilities. In addition to the issue of a council's available resourcing for internal work programmes, (as commented on under the first bullet point of this section) is the barrier of funding for any adaptation measures required (such as for physical works, research and design and consents costs). Availability of funding also influences the option that might be chosen for adaptation actions.

Funding for adaptation measures also raises the issue of inter-generational equity. One example provided was that the current ratepayers were still paying for the replacement of now obsolete

infrastructure, while at the same time they might be expected to pay for new infrastructure to adapt to future climate change. This is a significant burden on current ratepayers (and particularly so for councils with a small rating base).

There is a need to identify where the responsibility lies for financing such adaptation measures (e.g. individual property owner (including insurance), councils, and/or government (including EQC)). Market forces generally fail to reinforce where the responsibilities lie for buildings in hazard areas (e.g.: the insurance industry and central and local government sends mixed messages to land owners/premium holders thus altering expectations for cover/protection and resilience). There is a lack of national guidance on this matter, and varying expectations from within communities.

5.4 Matters raised by regional authorities

Other limitations or barriers specifically raised by regional authorities were:

5.4.1 Land use planning: This was commonly identified as a key limitation by regional councils. The land use planning function primarily lies with territorial authorities, although regions retain an advocacy and information role. The extent and value of existing coastal development is such that territorial authorities are generally committed to protecting private property and infrastructure and cannot afford relocation options. In addition, market demand for coastal development is leading to a rapid expansion of coastal property as well as increasing capital costs. To address this demand, some regional councils have taken a regulatory role for coastal land which is subject to natural hazards. This provides for a direct level of control over land use planning in these areas, including the option to extinguish existing use rights.

5.4.2 Propensity for inaction: Allied to the comments above in 5.2 on the reluctance to make 'hard' decisions, there is a propensity for councils, communities and individuals towards inaction based on: a hope that extreme events won't occur (even though they are predicted to do so); more immediate issues pressing (it's not a priority); the cyclic nature of past coastal erosion (resulting in the hope that the problem will go away); the slow rate of sea level rise (compared with natural variations); and the cost of changing buildings or infrastructure.

5.4.3 Legal barriers: There were three particular legal limitations or barriers commented on:

i) There is a gap in the integration between management of natural hazards under the BA and under the RMA. It was considered that the presence of the s72 BA provision[34] in the building consent decision-making process, made it easier to say 'yes' to building proposals, rather than considering the sustainability of the building in the context of future potential natural hazards.

ii) The statutory link between the RMA and the CDEMA was identified as being weak, in terms of managing a reduction in hazard risk through land use controls.

[34] Section 72 of the BA allows for a waiver if the building work does not exacerbate the natural hazard and if it is considered reasonable to grant the consents.

iii) It was considered that there was a lack of guidance on where legal liability rested when there was a hazard event (i.e. the liability of acting/not acting and liability for past decisions).

5.5 Summary Comments

A wide range of limitations or barriers were identified by the local authorities through the responses made to the questionnaires. The most commonly cited limitations or barriers across all levels of councils were political 'buy-in' and resourcing (both work priorities and finances). In addition, the controversial nature of climate change (among both scientists and politicians in particular) was identified as a key barrier to undertaking adaptation actions, along with issues such as responsibility for actions and funding of responses.

One council commented that the level of knowledge and understanding of climate change and adaptation strategies, both within council and in the wider community, was varied and not particularly well developed. Therefore, until climate change has gained greater currency, adaptation strategies would not become core business for all councils (i.e. a lack of public pressure generally results in a lack of political will to act).

One council commented that to overcome the inertia on adaptation to climate change would require a culture change or 'sea change'. That is, this is not an issue for councils to deal with alone; rather it would require a co-ordinated approach involving government, councils, communities, banks, insurance agencies etc. In addition it was considered that a 'rethink' of property rights in natural hazard areas and of the general expectation of government support in the event of a disaster, should be widely debated.

6.0 Future Directions

6.1 Introduction

Through the questionnaire local authorities were asked about changes that would be required to enable adaptation to climate change in the coastal environment to be more readily accepted by their council. This section of the report therefore identifies the suggestions made for moving this area of work forward. All three levels of councils identified similar matters and are therefore addressed together in this section of the report.

6.2 National policy guidance

There was a common theme relating to the need for stronger national policy guidance on adaptation to climate change[35]. This would assist in guiding politicians and informing communities, as well as encouraging a more consistent approach to be taken nationally. It was noted that political acceptance for a long-term problem was hard to maintain given the 3-year political cycle.

Options suggested included:

- a central government cross-party, long-term agreement on the approach that should be taken to managing coastal adaptation and the spread of coastal settlements
- specifying: the level of effects to be managed (e.g. through setting criteria, including defining a long-term focus), the level of protection to be provided (e.g. through thresholds; defining responsibilities of property owners); the priority to be awarded private interests versus amenity and beach values, within the context of an ever changing hazard risk-scape
- defining more clearly who is responsible for taking actions for hazard events. This includes government, councils, landowners, community, insurance, civil defence, EQC etc. One council queried whether it was indeed the council's responsibility to stop development on coastal land at risk given that it is only risk to property and not to life (i.e. a lesser priority than transport management of road deaths)
- financial and expert assistance with defending adaptation measures through the Environment Court
- the use of an NES for sea level rise which would set specific or minimum standards to be met, was strongly supported
- use of NES or NZ Standards for setting 'best practice' hazard identification methodologies (to avoid this being debated through the courts); as well as for methodologies for assessing impacts of wind energy and estimating extreme event occurrence

[35] Note: Rosier, 2004, p11, identified the NZCPS as being 'only partially effective in influencing district plans and subsequent land use planning decisions within the coastal environment'.

- review of legal and institutional impediments: one council commented that standards alone would not resolve this issue and that there needed to be a systematic review of legal and institutional impediments in order to better address them. For example, the strength of property rights of any hazard risk situation is an extreme hurdle to overcome in making any realistic long-term adaptation to climate change
- other legislative issues identified for investigation included: the adequacy of current law and government policies regarding compensation; the adequacy of information available for potential property purchasers (e.g. should there be a mandatory requirement for purchasers to receive a LIM report before signing any property purchase agreement?)
- funding from central government to assist with information and data as well as for plan changes, particularly for local authorities with significant areas under hazard risk threats or with low ratepayer bases.
- national monitoring programme on the rate of spread of coastal development and protected areas.

6.3 Information

There was a common recognition for the need for more robust data on coastal hazards to be available, and particularly at a local area level. Funding for this was seen as a major barrier for most local authorities, and it was considered that there could be economies of scale if some of this work was undertaken nationally.

Areas for more information collection included:

- information on the degree of risk and on the magnitude and likelihood of impacts, including plotting of probable consequences of some 'official' level of effect
- options for building sea level rise and climate change into planning strategies and policies
- methodologies for coastal risk assessments
- further understanding of pest implications and management options
- indicators for measuring policy effectiveness; advice on appropriate monitoring indicators and techniques (based on geomorphic principles), to assist providing for nationally consistent data; national monitoring of progress being made (i.e. to assess climate change impacts over time and beyond political cycles as well assessing effectiveness of policies, adaptation measures being implemented and cumulative effects which are often not dealt with well)
- further monitoring of processes/ drivers (mean and extreme sea level, storm events, wave climate, storm surge) in order to better understand hazard exposure
- coastal landform monitoring to build a coastal change data base
- more focus on predictive science (rather than just reactive)
- higher quality first order geodetic height information and mean sea level height information to be investigated nationally (i.e. it is essential to know the relationship between the 'mean level of sea' compared to the height of land. Most geodetic height information in coastal communities was derived from land based trig heights, with an estimated error rate of plus or minus 0.5metres. This

combined with 'mean sea level' variations at different sites, results in difficulties in accurately assessing likely impacts.

6.4 Community and political awareness

Looking to the future there was a strong focus on the need for some national leadership on scientifically robust public education and awareness raising, particularly for politicians, coastal communities and individuals. It was considered that local authorities would be better placed to achieve climate change adaptation strategies if there was a general acceptance of and better understanding of the reasons for undertaking the strategies; and understanding of the costs and benefits for individuals and the wider community over a longer timeframe.

The need for politicians to better understand the implications of adaptation to climate change over a longer time frame (rather than just the 3 year political cycle) was a re-occurring theme. The two key drivers for local authority actions are generally national directives or community demand. Therefore education needs to be targeted such that politicians and communities have a better understanding of the complexity of climate change impacts and in particular beach processes.

However it was also noted by some Councils that education can only be secondary to a strong national policy direction, otherwise it is not effective in overcoming individual and community demands when a hazard event occurs (i.e. all parties need information to be able to take responsibility for themselves for the existing and future risks).

As well as understanding the issues, one council commented that there was an advantage in having a 'political champion' for climate change issues. Likewise one council noted that events causing damage to property generally had the greatest influence on promoting improved responses to addressing the resultant risk to the community. Therefore any increase in the frequency of extreme weather events is the most likely reason for any increased action towards adaptation.

Education materials need to be targeted at actions that could be taken to achieve adaptation at the individual property level, the community level and the local authority level (i.e. a focus on vulnerability and risk management). It was noted that within the community framework industries, businesses, insurance and utilities should also be specifically involved.

6.5 Guidance material

A common theme arising from the responses to the questionnaire was the suggestion for a 'toolbox' of methods and options that could be used in different hazard scenarios and examples of actions taken or processes used by various councils within NZ and internationally. This sharing of information would have economies of scale if done nationally and would avoid local authorities having to 'reinvent the wheel'. There was also a comment regarding the packaging of such guidance and a request that it be more interactive and accessible, in order to more readily find answers to questions. One council

commented that while best practice guidance was considered useful, it was also considered that where at all possible specific matters should be built into an NES (refer to comments under 6.2 above).

Other matters raised that guidance material could cover included:

- implementation indicators and auditing check lists
- best practice guidelines or examples for consulting with 'at risk communities'
- detailed information on how to assess the costs and benefits of different adaptation options
- specifics relating to how to implement managed retreat (including legal and financial implications)
- case law on implementation issues and on extinguishing 'existing use rights' under s30(1)(c)(iv) RMA[36]
- methodologies for a cost benefit analysis of management options
- guidance on managing in a context of uncertainty
- guidance on management of coastal wetlands (including funding to enable them to migrate inland)

6.6 Summary Comments

From the above suggestions on possible changes, it is evident that there is a significant amount of work that could be undertaken nationally to assist councils in implementing adaptation to climate change in the coastal environment. However it is also recognised that there are local variations in risk and vulnerability, in staff capacity and in the associated communities. Therefore local authorities also need to retain flexibility in management approaches, in order to adopt the best response for a particular community. This expresses the obvious tension between seeking national guidance and wanting local flexibility. In this respect two councils highlighted that the changes to the RMA s7(i)[37] and existing guideline documents were sufficient national guidance at this stage, and that future plan changes would address this matter.

Along with acknowledgement of the increasing pressures for coastal development and the increasing potential for impacts from climate change, it was also noted that once development occurs in hazard prone areas, there is a general expectation that councils will protect and/or allow for redevelopment and/or expansion. A general lack of resources for addressing further work in adaptation to climate change in coastal areas was also noted, in spite of the above pressures.

[36] This clause provides regional councils with the function of controlling land use for the purpose of the avoidance or mitigation of natural hazards.
[37] This clause introduced 'the effects of climate change' as an 'Other Matter' requiring local authorities to 'have particular regard to' it.

7.0 Conclusions

This research sits within the wider Coastal Adaptation to Climate Change (CACC) project, which is due to conclude in September 2011. Key proposed outcomes of this wider programme are:

- more informed proactive communities and councils developing local adaptation strategies to climate change
- information and tools available to enable adaptation by central and local government and communities

The four key components of the CACC project are:

- Building a national coastal vulnerability profile
- Engaging communities and institutional decision-makers
- Institutionalising adaptation
- Evaluating and monitoring uptake and performance of adaptation strategies.

This research set out to provide an overview of the approaches local authorities are taking to adaptation to climate change in the coastal environment, now and in the foreseeable future. It therefore contributes primarily to the component on 'institutionalising adaptation'. It provides a basis for assessing the approaches local authorities are taking to adaptation to climate change and canvases the barriers or limitations that are faced, along with suggested ways to move forward for the future.

A total of 30 local authorities were contacted to participate in this research, with responses being received from 24 (12 regional councils, 3 unitary councils and 9 territorial authorities). The responses received were from staff and were not politically endorsed nor necessarily representative of the Council's position. As such the confidentiality of participants has been protected in the presentation of this research. There were few areas where differences were noted in the responses from the different types of councils. However responses were separated out in some instances.

Five key findings from this research include:

1 Contextual change: Over the period since 1991 when the RMA was introduced there have been a plethora of changes in nature and size of coastal communities as well as in the legislative and policy framework for climate change and natural hazards management. This context will contribute to a change in the way that local authorities will address coastal hazards through their 2nd generation RMA plans. There is also a recognised need for stronger integration between the four key pieces of legislation (RMA, LGA, BA, CDEMA) that relate to the management of natural hazards in the coastal environment, in order for further progress to be made on adaptation to climate change.

2 Understanding of adaptation: Local authority staff surveyed had a sound understanding of what adaptation to climate change entails and readily acknowledged that coastal communities would likely to be at greater risk from coastal hazards in the future. It was also acknowledged that methods for dealing with future 'at risk' communities would require a co-ordinated approach across various pieces of legislation and various agencies.

3 Work programmes: Local authorities undertake a significant range of activities that contribute to adaptation in the coastal environment, with all expecting to continue this work into the future. The local authority level of involvement in such work is strongly influenced by political attitudes and available funding. Only four councils identified climate change as being specific core business, while most others considered climate change to be an 'exacerbator' of existing hazards and is therefore considered as a part of hazard-related work streams.

The importance of the RPS as an integrating document for managing natural hazards was well acknowledged, particularly in respect of managing hazards across jurisdictional boundaries. The value of controlling land use in hazard zones, through regional council functions in their 2nd generation RMA plans was also noted. However there appeared to be no work being undertaken on the adaptation option of retreat. The need for localised information on hazards was seen as fundamental to effective planning for coastal hazard areas. However there were concerns raised about the certainty and affordability of this information.

There was recognition that there needed to be a stronger link between the RMA and CDEMA plans, particularly to maximise the 'reduction' principle of hazards management. While the RPS was seen to have the stronger statutory basis for managing land use matters, the CDEM Group plans have a significant co-ordinating role. It was generally considered that any adaptation to climate change strategies should be developed within the combined policy frameworks of these two plans.

Likewise, the need for a stronger link between the RMA and BA consents processes was noted.

4 Adaptation principles: The document 'Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand'[38] identified 10 key principles that have led to good adaptation. The local authorities were asked to rank their council against these principles. While there were wide variations in responses, the average results across all respondents indicated that further work was required to achieve good adaptation practices. Most local authorities did not consider their council was doing sufficient to adequately adapt to climate change on the coastal environment.

5 Limitations or barriers to adaptation: The most commonly cited limitations or barriers identified by local authorities included political 'buy-in' and resourcing (funding and work priorities). Other key limitations or barriers identified included:

[38] , Ministry for the Environment 2008.

- Political attitudes to and belief in climate change influenced the extent to which adaptation was addressed within a council. Political reluctance to consider long-term timeframes associated with climate change and associated long-term adaptive solutions, was also commented upon.
- Community awareness and understanding of climate change and natural coastal processes was noted as being varied and not well-developed. There was also a perception that individuals and communities had a general expectation that councils would protect private property rights.
- A lack of national guidance on the balance to be sought between protection of property and infrastructure and protection of beach values (i.e. private property rights vs. public domain), was raised as a concern given the increasing pressures of coastal development.
- A lack of information on the risks from climate change likely to be experienced in localised areas was considered to be a major limitation, particularly for developing effective planning provisions. While the uncertainty about climate change data was acknowledged, some local authorities did not wish to try and defend this data through the Environment Court.
- In terms of decision-making processes and timeframes a number of concerns were raised including: the mismatch between the timing of various national, regional and district RMA plans; RMA consents and policy decisions are influenced by the level of understanding of hazard risks; there are difficulties in getting risk and adaptation concepts acknowledged in the Environment Court; RMA and BA timeframes (30 years for RMA consents, 10 years for RMA plans, 50 years for building consents) are not aligned and do not take into account the long-term planning framework of 50-100 years more appropriately required for considering climate change; the political cycle of 3 years can also potentially impact on long-term planning.
- Resources available to undertake internal work programmes as well as any adaptation works was raised as a major barrier for local and unitary authorities. Responsibility for funding such works was also queried along with the inter-generational equity in paying for such works.
- Land use planning responsibilities retained by territorial authorities limited the opportunity to extinguish existing use rights in hazard risk areas. Some regional councils were addressing this matter by undertaking land use responsibilities in these areas.
- The propensity for inaction of councils, communities and individuals based on priorities, costs, the understanding of risk, and the slow rate of climate change impacts was noted as a battier to actions.
- The weak legislative linkages between the RMA and the BA, the RMA and the CDEMA were noted, along with the lack of clear guidance on where liability lay for action/ lack of action when there was a hazard event.

Overall, it was considered that informed public debate was required to increase the level of people's level of knowledge and understanding of climate change and potential effects in the coastal environment. It was also considered that until adaptation to climate change had gained greater 'currency', it would not become a core business area for local authorities. In addition, a co-ordinated

approach involving government, councils, communities, banks, insurance agencies etc, would also be required.

The local authorities identified a wide range of options to address these limitations or barriers. While it was recognised that there were areas where national assistance would be of benefit, it was also considered that local authorities need to retain the flexibility of dealing with localised issues.

This report has therefore provided a fundamental basis for understanding the institutional context of addressing adaptation to climate change in the coastal environment, along with informing the other work areas within the wider CACC project. The report also makes the following recommendations.

8.0 Recommendations

Drawing on the information in this report and particularly on the matters raised by local authorities in section 6 of this report, the following recommendations are made to the CACC research team, as they progress the research project.

8.1 Best practice guidelines

It is recommended that CACC develops **good practice guidelines** relating to:

- Good practice examples of how climate change and sea level rise is included into RMA planning documents, including effective cross-boundary management options
- Best practice methodologies for undertaking coastal risk assessments, including assessing probable consequences and consulting with 'at risk' communities
- An overview of the legal and practical issues of regional council land use controls
- Options for facilitating managed retreat
- Options for managing the inland migration of coastal wetland areas
- Good practice examples for undertaking a cost benefit analysis of management options
- Methodologies for monitoring the effectiveness of climate change and coastal hazard policies, including establishing national indicators (for comparative purposes) and using such information to help improve guidance material.

8.2 Further Research

It is recommended that CACC considers, in light of the overall CACC project, the need for **further research** in the following areas:

- a **national monitoring framework** which would include
    - areas at risk
    - the rate of spread of coastal settlements
    - a data base on change in coastal land form
    - processes and drivers (e.g. mean and extreme sea level, storm surge, wave climate)
    - impacts from climate change

- methodologies for assessing the cumulative effects of climate change risk

8.3 Future Work Areas

It is recommended that CACC considers, in light of the overall CACC project, whether **recommendations to other agencies** should be made in relation to:

- Working with Ministry for the Environment, Ministry of Civil Defence and Emergency Management, Department of Internal Affairs, Ministry of Agriculture and Fisheries, Biosecurity NZ, Land Information NZ and Local Government NZ to share the learnings from this research and discuss ways in which the overall CACC project could contribute to future programmes of work
- Resourcing site specific climate change impact data
- Resourcing higher quality first order geodetic height information and mean sea level height information (i.e. to better understand the relationship between the 'mean level of sea' compared to the height of land)
- The efficiencies of having national LIDAR coverage of the coastal zone, which is essential to planning for sea level rise
- Management options for climate-related pest incursions
- Effective options for facilitating managed retreat
- Training and/or information packages on climate change and on adaptation to:
    - Enhance public debate
    - Raise the awareness of local government politicians, RMA hearings committee decision-makers, Environment Court judges and relevant staff.
- Clarifying public and private responsibilities and liabilities for taking actions in relation to hazard risk or a hazard event, including the issue of compensation and the level of information made available to property purchasers
- Developing a NZ Standard for coastal hazard identification methodologies
- National auditing of progress towards coastal adaptation to climate change.

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Appendix 1: Questionnaire

ADAPTATION TO CLIMATE CHANGE IN THE COASTAL ENVIRONMENT

Questionnaire

1. CURRENT APPROACHES

a) What do you understand 'adaptation to climate change' to be in respect of the coastal environment?

b) Does your Council have any work programmes associated with climate change in coastal areas? Do they specifically address adaptation ?

c) With respect to the coastal environment and under the **RMA,** what approach is taken to climate change in your current planning documents?

(e.g. objectives, policies/ rules/ consent conditions/ identified hazard risk areas)

(i) Do any of these plan provisions promote adaptation to future climate change?

(ii)When is/are your 2nd generation plan(s) due to be proposed?

d) With respect to the coastal environment and under the **LGA**, what approach is taken to climate change?

(e.g. is climate change factored into infrastructure design or in infrastructure upgrades/ is any risk analysis undertaken for coastal hazards / are any prevention actions such as dune planting undertaken?)

(i) Is adaptation to climate change seen as a part of the Council's core business?

(ii) Is adaptation to climate change specifically referred to in the LTCCP?

e) With respect to the coastal environment and under the **Building Act**, what approach is taken by your council to climate change?

(e.g. identifying hazards on LIM reports, set floor levels, restrictions on design)

(i) How well does the BA and RMA mesh in terms of managing adaptation to climate change?

f) With respect to the coastal environment and under the **CDEM Act** what approach is taken by your council to climate change?

(i) Is the effect of climate change on coastal hazard risks specifically identified in the CDEM Group Plan?

g) Are there any other policy areas or work programmes that your Council undertakes that include consideration of climate change, in the coastal environment?

(e.g. roading, reserves management, protection works, emergency events)

h) Do you think these current approaches (as discussed through questions b to g above) are sufficient to adequately adapt to climate change?

i) In respect of the coastal environment, how well would you rate your council on the following matters: (scale of 1 to 5 – 1 being poor, 5 being excellent):

- Working in partnership with coastal communities
- Understanding existing risks and vulnerabilities to coastal hazards and climate change and their critical thresholds
- Identifying the most adverse coastal hazards and compounding climate change risks and prioritising actions to manage the most vulnerable areas
- Incorporating adaptation considerations into decision-making for all new and existing developments within the coastal environment
- Recognising the changing risks over time and building in phased approaches to adaptation
- Identifying and promoting no-regrets, low regrets and win-win adaptation options
  - (i.e. no regrets – policies and decisions that will pay off immediately under current climate conditions; low regrets – low-cost policies, decisions and measures that have potentially large benefits; win-win – policies, decisions, measures that help manage several issues at once and bring additional social and environmental benefits)
- Adopting sequential and risk-based approaches to decision-making regarding coastal development
- Identifying and avoiding actions and decisions that will make it more difficult to cope with coastal hazard and climate change risks in the future.
- Defining indicators to monitor the effectiveness of planning provisions and the effectiveness of adaptation measures
- Providing public education and information on climate change and adaptation

2. IMPEDIMENTS TO CLIMATE CHANGE ADAPTATION

a) What are the 'things' that restrict or limit your council from responding to adaptation to climate change? & Why are they restrictions/ limitations?

Some examples could be –

- cost of changing infrastructure
- timeframes for RMA versus BA
- political cycles
- political stance or philosophy (e.g. opposed to use of terminology such as adaptation? Opposed to concepts of climate change?)
- legal barriers
- community attitudes/ awareness
- work priorities
- resources available (e.g. money and/or technical skills)
- information available on level of risks

b) What else influences the approach taken by your council to adaptation to climate change?

c) What would need to change for adaptation to climate change to be more accepted into your Council's work? & Why?

3. LOOKING TO THE FUTURE

a) What approaches or techniques to adaptation to climate change in the coastal environment are being talked about informally/ formally within the Council for incorporation into future policy?

Some examples could include:

- Second generation plans – change in approach?
- RPS - land use controls?
- Infrastructure renewal policies?
- Influence of CDEM Group plans?
- Engineering or building design standards?
- Risk identification?
- Emergency works policies?

b) In terms of the future, what planning timeframes do you think Councils should be considering for coastal-related climate change issues?

c) Is there a need for more or stronger national policy guidance on adaptation to climate change in the coastal environment, over and above the NZCPS?

(i) If so, what and how should it be delivered?

Examples could include:

- National Policy Statement on adaptation to climate change
- National Environmental Standard(s) on specifics such as sea level rise
- legislative changes

4. RESOURCES NOW AND IN THE FUTURE

a) What additional 'resources' or 'changes' would you like to have/ see to help your council manage adaptation to climate change in the coastal environment?

e.g. legislation changes, national policy, public education

(i) Are best practice guidelines useful?

(ii) What topics or specific aspects should they cover?

b) Are you aware of the following resources?

(i) MFE document Coastal Hazards and Climate Change: A Guidance Manual for Local Government in NZ (2nd edition 2008); or

(ii) MFE's blue summary booklet 'Preparing for Coastal Change' (2009)

Thank you for your help with this questionnaire

Appendix 2: Extracts from the Operative and Proposed NZCPS[39]

1. Provisions from the gazetted NZCPS 1994

3.4 Recognition of Natural Hazards and Provision for Avoiding or Mitigating Their Effects

Policy 3.4.1

Local authority policy statements and plans should identify areas in the coastal environment where natural hazards exist.

Policy 3.4.2

Policy statements and plans should recognise the possibility of a rise in sea level, and should identify areas which would as a consequence be subject to erosion or inundation. Natural systems which are a natural defence to erosion and/or inundation should be identified and their integrity protected.

Policy 3.4.3

The ability of natural features such as beaches, sand dunes, mangroves, wetlands and barrier islands, to protect subdivision, use, or development should be recognised and maintained, and where appropriate, steps should be required to enhance that ability.

Policy 3.4.4

In relation to future subdivision, use and development, policy statements and plans should recognise that some natural features may migrate inland as the result of dynamic coastal processes (including sea level rise).

Policy 3.4.5

New subdivision, use and development should be so located and designed that the need for hazard protection works is avoided.

Policy 3.4.6

Where existing subdivision, use or development is threatened by a coastal hazard, coastal protection works should be permitted only where they are the best practicable option for the future. The abandonment or relocation of existing structures should be considered among the options. Where coastal protection works are the best practicable option, they should be located and designed so as to avoid adverse environmental effects to the extent practicable.

2. Provisions from the 2008 NZCPS (draft)

COASTAL HAZARDS

Policy 51 Identification of hazard risks

Policy statements and plans shall identify areas in the coastal environment that are potentially affected by coastal hazards (excluding tsunami), giving priority to the identification of areas at high risk. Hazard risks shall be assessed over at least a 100-year timeframe, having particular regard to:

(a) short-term natural dynamic fluctuations of erosion and accretion;

[39] Note: In both documents there are also a range of other policies that relate to subdivision, use and development, and which would assist in the management of natural hazard risks.

(b) long-term trends of erosion or accretion;
(c) slope stability or other geotechnical issues;
(d) the potential for natural coastal features and areas of coastal hazard risk to migrate as a result of dynamic coastal processes, including sea level rise; and
(e) the effects of climate change on:
(i) matters (a) to (d) above;
(ii) storm frequency, intensity and surges; and
(iii) coastal sediment dynamics;
taking into account the most recent available national guidance on the likely effects of climate change on the region or district.

Policy 52 Subdivision and development in areas of hazard risk
In areas potentially affected by coastal hazards, local authorities shall:
(a) avoid new subdivision and residential or commercial development on land at risk from coastal hazards;
(b) avoid redevelopment, or change in land use, that would increase risk from coastal hazards; and
(c) encourage redevelopment, or change in land use, that would reduce risk from coastal hazards, including:
(i) managed retreat, by relocation, removal or abandonment of existing structures;
(ii) replacement or modification of existing development to reduce risk without recourse to hard protection structures, including by designing for relocatability or recoverability from hazard events.

Policy 53 Natural defences against hazards
Local authorities shall provide for the protection or restoration of natural features in the coastal environment that protect land uses from coastal hazards.

Policy 54 Protection structures
When considering the potential use of hard protection structures in response to coastal hazard risk, local authorities shall:
(a) promote alternative responses, including soft engineering solutions and the relocation, removal or abandonment of existing structures;
(b) take into account the expected effects of climate change, over at least a 100- year timeframe; and
(c) evaluate the likely public costs and benefits of any proposed hard protection structure, and the effects on the environment, over at least a 100-year timeframe.

Where hard protection structures are considered to be necessary, local authorities shall:
(d) generally avoid the location of such structures in the coastal marine area;
(e) promote the location of hard protection structures on private land, rather than public land, where the purpose is to protect private land;
(f) ensure provision for the continuation or restoration of public access to and along the coastal marine area at high tide; and
(g) ensure structures are designed to minimise consequential erosion.