



# Managed retreat in New Zealand: revealing the terminology, approaches, and direction of local planning instruments

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# 1 Executive Summary

Severe natural hazard events, the projected impacts of climate change and development trends mean that New Zealanders and the assets and services they value and depend on, will be increasingly exposed to natural hazard risks. Managed retreat is an adaptive approach to risk reduction, where people, activities and assets are strategically relocated away from hazardous locations. For it to have an impact in practice, it is crucial that managed retreat is not just included in key planning documents, but is included in a way that provides a means to inform development decisions and supplies a clear direction to elected members, council staff, property owners, developers, infrastructure providers and the public. This report is a summary of research conducted in New Zealand as part of *National Science Challenge: Resilience to Nature's Challenges*. It is designed to answer three questions:

- To what extent is managed retreat included in local planning instruments?
- How is managed retreat discussed in local planning instruments?
- What level of direction is afforded to managed retreat in local planning instruments?

Our main findings are:

1. Approximately half of RMA planning instruments in New Zealand refer to managed retreat. If they do, it predominately applies to coastal hazards, rather than other hazards, such as land instability, earthquake faults, or inland flooding.
2. There is an inconsistency of terms used, such as managed retreat, relocate, soft-engineering, withdraw or setback. In almost every case, these are not further defined.
3. While it is commonly referred to in the singular, managed retreat policy approaches can be categorised as relating to five distinct 'categories' in local RMA policy and plans.
4. Planning instruments applying managed retreat are providing limited direction to enable it in practice.
5. A lack of implementation support exists for managed retreat policies, particularly in relation to relocatable buildings.
6. Clear links between local planning policy and other strategic documents (e.g. infrastructure plans or spatial plans) is important for the application of managed retreat. However, it was discovered there is a low recognition and a clear lack of strategic, coordinated provisions across various planning instruments operating in the same place. For example, only 14 out of 78 infrastructure strategies referenced managed retreat terms.

## 2 Introduction

Given climatic and development trends in New Zealand, managed retreat is an important managerial tool for decision makers, alongside protection works for reducing the physical impacts of natural hazards and accommodating measures to live with risk, whilst increasing society's ability to cope with natural hazards. The Protect, Accommodate, Retreat (PAR) logic emerged in the context of sea level rise management with the first Assessment Report of the Intergovernmental Panel on Climate Change (Dronkers et al., 1990; Thomsen, Smith, & Keys, 2012). This approach has developed in parallel to natural hazards thinking around avoidance and mitigation of risk, resulting in the following natural hazard management approaches (Figure 1). Managed retreat can also play a role in a fourth management strategy, known as adaptation pathways, a new planning paradigm for making decisions under conditions of deep uncertainty (Haasnoot, Kwakkel, Walker, & ter Maat, 2013).

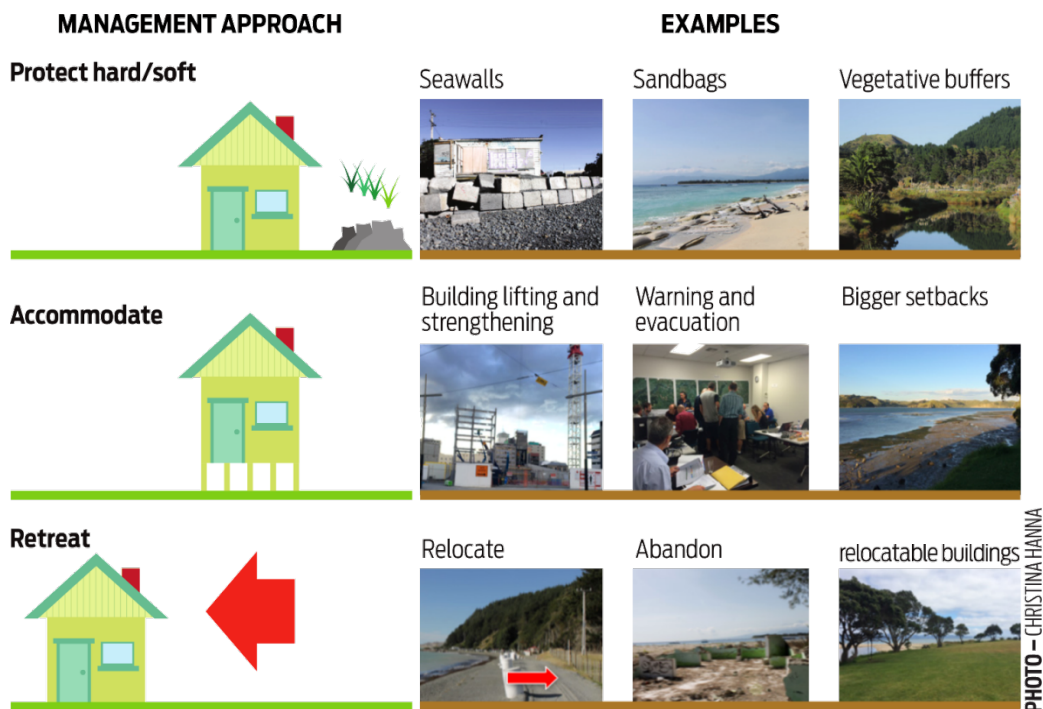


Figure 1: Protect, accommodate, retreat

To further develop the understanding of managed retreat and its tools for enablement, this research has investigated the extent to which managed retreat is included in relevant local planning instruments formed under the Resource Management Act 1991, the Local Government Act 2002, the Reserves Act 1977 and non-statutory management strategies and plans. The terminology of these instruments is analysed as well as the approaches taken to deliver managed retreat policy and the direction afforded for its implementation. Supplementary findings include

the recognition of recent managed retreat projects in New Zealand. This research is embedded within the Governance Programme of *National Science Challenge: Resilience to Nature's Challenges*, with the aim of assisting key governance actors (including those in government, civil society, and the private sector) to build community resilience in the face of escalating natural hazard risk. As an important option for communities at high risk of being impacted by natural hazards, managed retreat policies are of interest and are where this research is focused.

### 3 Methodology

The methodology for this research encompassed four linked stages and took place between December 2016 and July 2017, including:

1. A review of national and international academic literature regarding managed retreat via searches on the Waikato University Library website and hard copy resources, Google Scholar, NZ Research Commons and World Catalogue. It used the key words, 'managed retreat', 'managed realignment', 'community relocation', 'community abandonment', 'disaster resettlement', 'adaptive planning' and 'natural hazards'.
2. A review of national and international grey literature, such as technical planning and hazard management reports. This provided insights into practical knowledge of the application of managed retreat around the world.
3. Documentation of case studies found during the literature reviews, providing a summary of the global application of managed retreat, the differences in planning approaches, and the terminology used.
4. Comprehensive textual analyses of RMA and other local government planning documents.

Steps one-three enabled the development of search terms for the textual analysis of New Zealand planning instruments. A test analysis was carried out on 40 resource management plans to gain a base understanding of the New Zealand regulatory terms and plan formats. The key terms developed from the case study compilation were searched in the policy test, with key regulatory provisions recorded to determine the key regulatory terms. These methods resulted in the compilation of key terms (Table 1) as indicators for managed retreat provisions in New Zealand planning instruments. Two relevant terms (*italicised*) not present in the case study review were also added to the list as they had emerged out of the academic literature review (Barnett et al., 2014; Rouse et al., 2016).

Table 1: Key search terms

Managed retreat terms (case study)	Regulation terms (policy test)
<ol style="list-style-type: none"> <li>1. Managed retreat/retreat/planned retreat</li> <li>2. Managed realignment/realign</li> <li>3. Relocate/relocation</li> <li>4. Setback/set back/set-back</li> <li>5. Adaptation/adaptive management</li> <li>6. Abandon</li> <li>7. Purchase offer/purchase</li> <li>8. Acquisition/acquire</li> <li>9. Buy/buy-out</li> <li>10. Resettlement</li> <li>11. <i>Pathway</i></li> <li>12. <i>Strategy</i></li> </ol>	<ol style="list-style-type: none"> <li>1. Relocatable</li> <li>2. Rebuild</li> <li>3. Reconstruct/ion/re-construct/ion</li> <li>4. Replace</li> <li>5. Damage/d</li> <li>6. Alter/alteration</li> <li>7. Addition/s</li> <li>8. Protection</li> <li>9. Extension/s</li> <li>10. Setback/set back/set-back</li> <li>11. Remove</li> </ol>
<b>*Unique terms found during the analysis</b>	
<ol style="list-style-type: none"> <li>13. Exit strategy</li> <li>14. Soft-engineering</li> <li>15. Withdraw/al</li> </ol>	<ol style="list-style-type: none"> <li>12. Transported</li> <li>13. Shift</li> </ol>

Textual analysis was carried out using O’Leary’s (2010) process of collecting, reviewing, interrogating and analysing the relevant documents. Documents were collected from Council websites and reviewed using the key search terms. The review used both discrete term searches and broad analysis of relevant document chapters. For all planning instruments, each of the key terms were searched and where relevant policies were found, these were recorded in full. Documents were checked twice for accuracy and where no or few results could be found, a full investigation of the text was carried out to avoid the limitation of using key terms. In a couple of cases, unique terms\* were found during the broad analysis and these were identified and added to the search list. All documents reviewed prior to the finding of the new terms were re-reviewed.

Textual analysis of RMA planning instruments was carried out in December 2016 - March 2017. The sampling frame for the data collection included operative and proposed regional policy statements, regional plans, regional coastal plans and district plans. In total, 150 documents from 17 regional councils and 67 territorial authorities were collected, reviewed, interrogated and analysed. Textual analysis of other local government planning instruments was carried out in April-July 2017. The sampling frame for this analysis included all publicly available Council management strategies, asset management plans, long-term plans, spatial plans, structure plans and resilience plans. Iwi management plans are outside the scope of this analysis and are addressed in other National Science Challenge Governance works (Saunders, 2017).

Due to the absence of empirical literature on managed retreat policy, a ‘general inductive approach’ was employed to identify the relevant and frequently occurring themes and categories (Pila, Mond, Griffiths, Mitchison, & Murray, 2017; Thomas, 2006). Therefore, to carry out the data analysis, datasets were reduced into explicit spreadsheets, using analytical codes based on interpretative themes (Hay, 2010) including terminology, policy and regulation categories and natural hazard types. The reduced datasets enabled specific analysis of provisions, and the ability to compare between instruments. Quantitative content analysis was carried out to determine the terminology, definition, hazard type and document date counts.

With the policy categories coded, conceptual frameworks were developed as the basis for deeper analysis. For the RMA instruments, six key categories were revealed, five approaches that occurred frequently, and a sixth that captured unique policy approaches (Figure 7). The conceptual framework analysed the individual policy wording and categorised the provisions found, depicting them along a continuum of relatively limited to more active policy, according to analytical codes. This is a useful technique to help provide insights into the potential strength of policy. The collection and review of other local government instruments resulted in much fewer documents (39) with the majority taking a similar, high-level approach. Therefore, the following framework (Figure 2) was developed to encapsulate the ways in which managed retreat is treated in these non-RMA plans. Documents were coded according to the four categories of the framework; consider, promote, facilitate and require.

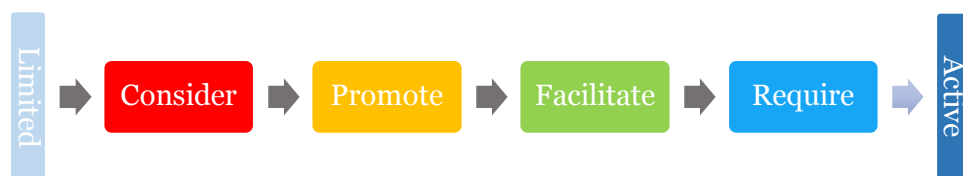


Figure 2: Local government planning instrument conceptual framework

## 4 Statutory background

The management of natural hazards in New Zealand is not strictly linear, as multidimensional roles and responsibilities build upon a network of governance. Natural hazards are managed under a wide umbrella of legislation, namely the Resource Management Act 1991 (RMA), Local Government Act 2002 (LGA), Civil Defence and Emergency Management Act 2002 (CDEM), Building Act 2004 and Local Government Official Information Act 1987. These pieces of legislation devolve power and responsibilities to authorities to contribute to the sustainable management of natural hazards. Statutes that offer mechanisms to develop managed retreat policy and regulation include the RMA and the LGA.

As shown in the first level of the RMA devolution hierarchy (Figure 3), central government may declare National Policy Statements (NPS) and National Environmental Standards (NES) among other policy and regulations. The Minister for the Environment is to have regard to a range of guidelines to determine whether it is appropriate to prepare a NPS for local and international environmental factors (Palmer, 2012). Currently, no statement or standard has been created specifically for natural hazards, but the New Zealand Coastal Policy Statement 2010 (NZCPS) provides guidance on coastal hazards. Regional Policy Statements (RPS) and Regional Plans set the basis for which District Plans are developed by territorial authorities to control land-use.

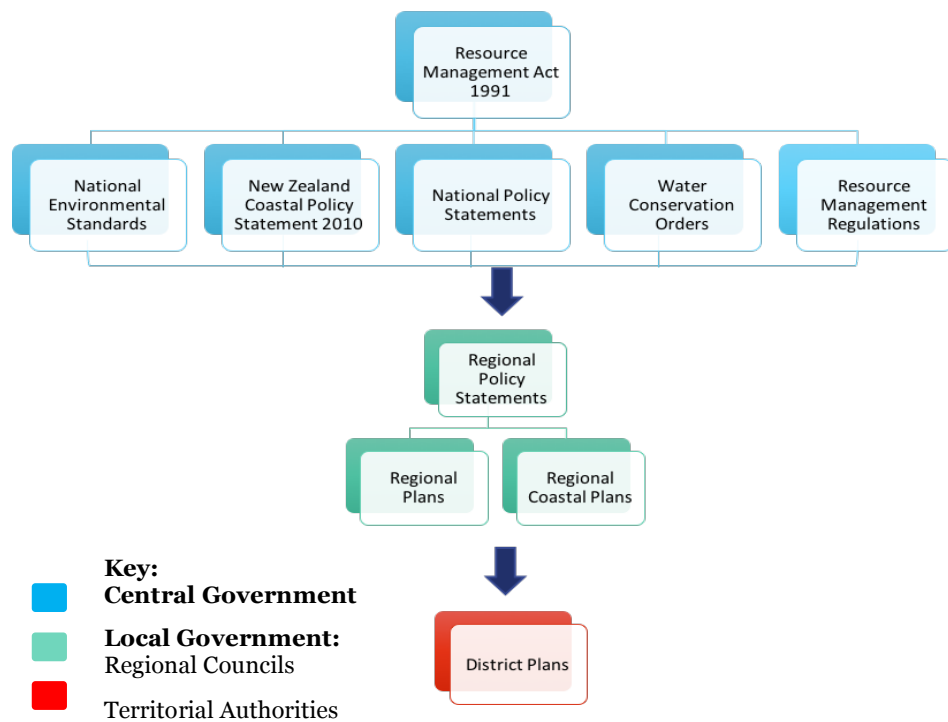


Figure 3: Resource Management Act 1991 hierarchy

For coastal hazards, the Minister of Conservation has responsibilities to administer the NZCPS. In areas potentially affected by coastal hazards in the next 100 years, Policy 25 of the NZCPS requires that redevelopment, change in land use (including managed retreat) and design for relocatability is encouraged to reduce the risk of adverse effects from coastal hazards. Policy 25(d) also encourages the location of infrastructure away from areas of hazard risk, where practicable. Policy 27 requires that in areas of significant existing development which are likely to be affected by coastal hazards, a range of options for reducing risk are

assessed, including the promotion and identification of long-term sustainable risk reduction approaches (such as relocation of existing development or structures at risk). Regional and territorial authorities must give effect to the NZCPS through their policies, plans and resource consent decisions.

The RMA mandates the functions of regional and district councils, requiring regional councils to control land use for the avoidance or mitigation of natural hazards (s30) and territorial authorities to control actual or potential effects of the use, development or protection of land, including for the purpose of avoiding or remedying natural hazards (s31). The RMA does not require local authorities to remedy natural hazards themselves, but to manage the use of land and the effects of the use of land. Local authorities can do this by way of policies, plans and consent processing. Both the RMA and LGA recognise the connections between sustainability in communities and the reduction of natural hazard risk.

The LGA outlines the key functions, obligations, restrictions and powers of local authorities and enables the engagement of the community in decision-making. Relevant sections of the LGA are its purpose (s 10), the requirement to have particular regard to the contribution that core services make to avoid or mitigate natural hazards (s 11A), the mandatory preparation of long term plans (s 93-97) and as part of this, the adoption of 30-year infrastructure strategies (s 101B). The Building Act and Local Government Official Information Act support sustainable management of natural hazards by ensuring safe building standards and enabling public availability of official information held by local authorities. In addition to the legislation mentioned, the Reserves Act 1977 also has a role to play, requiring under s 41(3) that management plans "provide for and ensure the use, enjoyment, maintenance, protection, and preservation, as the case may require, and, to the extent that the administering body 's resources permit, the development, as appropriate, of the reserve for the purposes for which it is classified." Where natural hazards have an impact on reserves, management plans can determine the approach for mitigating their effects and can be used as a tool to meet objectives and policies of RMA plans.

Outside of the statutory umbrella, planners and environmental managers can draw on other tools for hazard management, including non-statutory plans and guidelines. Although these tools are not legally binding, they are often used by local authorities as a means to coordinate land use planning and other sectors involved in resource management.

## 5 Hazard management setting

Managed retreat is commonly applied to areas experiencing coastal hazards risk, however it is also an important approach for other hazard risks, such as inland flooding. Within both textual analyses, similarities were found between the types of hazards that managed retreat is applied to. While managed retreat can refer to any hazard, as depicted in Figures 4 and 5, the majority of provisions are targeted at managing coastal hazards.

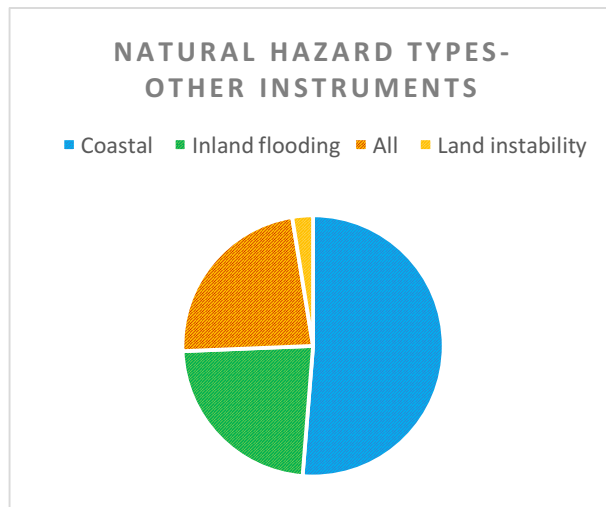


Figure 4: Natural hazard types – Other local government planning instruments

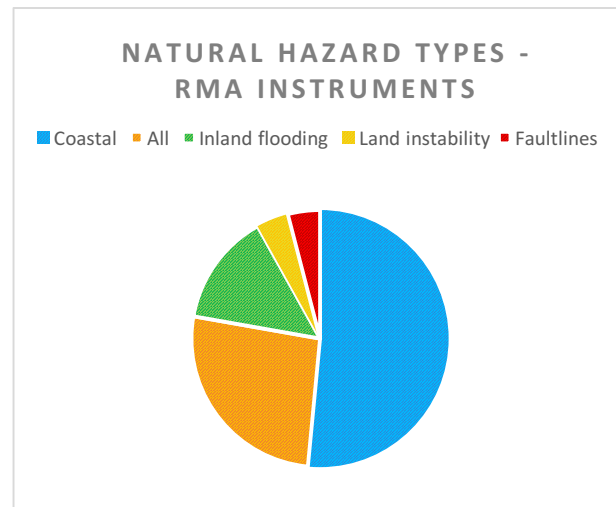


Figure 5: Natural hazard types – RMA instruments

Many plans consider ‘all hazards’ when applying managed retreat policy and rules, however it is clear that there is a coastal hazard focus for managed retreat in New Zealand. For the RMA instruments, this dominance is likely due to references to managed retreat within the NZCPS (objective 5 and policies 25 and 27). Managed retreat provisions may also be predominantly present in coastal locations due to the slow nature of coastal risks such as sea level rise, where adaptation over time is more achievable through district plan regulation.

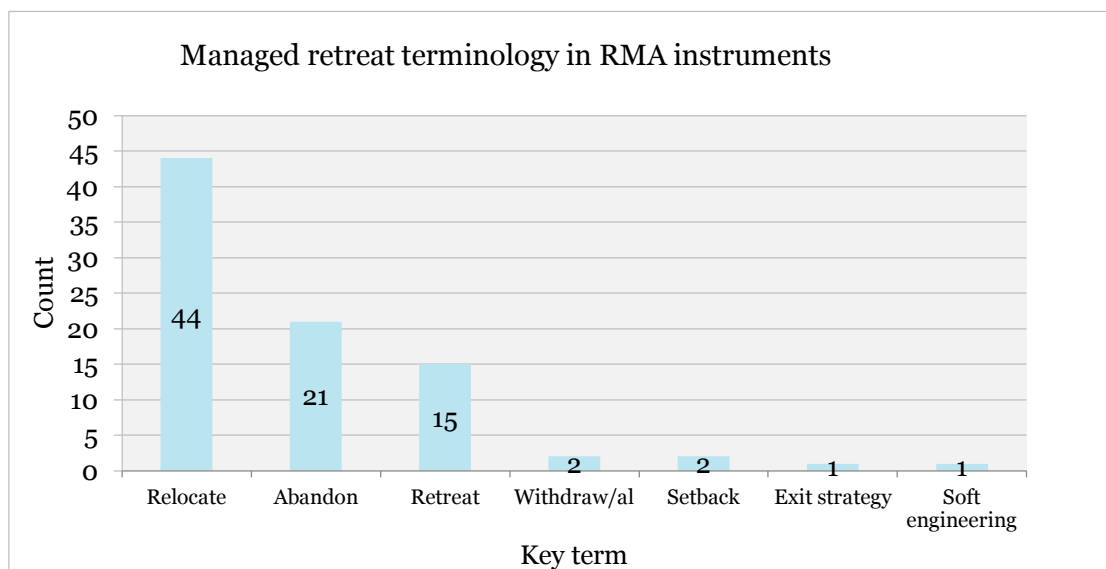
## 6 Analysis of RMA instruments

### 6.1 Inconsistent terminology and definitions

The RMA Quality Planning Resource (2016c) recognises that consistency within and between plans increases certainty and familiarity and results in better experience of users across the board. This is an important consideration, particularly for the use of a technical term such as managed retreat. Nolan (2011) and The RMA Quality Planning Resource (2016a) also state that

the definition or glossary chapters within RMA plans are critical to interpretation, administration and enforcement and are among the most referred-to sections.

Within RMA instruments, the most prevalent terms used to apply managed retreat were (in order of most common) relocate/relocatable/relocation, abandon/abandonment and managed retreat/retreat/planned retreat (*Figure 6*). Other terms found to describe managed retreat include ‘withdrawal’, ‘setback’, ‘exit strategy’ and ‘soft-engineering’.



*Figure 6: Terminology count for New Zealand policy and plans*

Out of 150 instruments, 75 documents included one or more of the key terms. Where managed retreat terms were present, a count was provided once per key term found. Some documents used a range of terms, and the count includes this variability. The following table provides a breakdown of the instruments that applied managed retreat terms, demonstrating the near even divide of retreat and relocate terminology in regional policy statements, the low level of recognition for managed retreat in regional plans and the dominance of relocate terminology in regional coastal plans and district plans. District plans show this dominance due to the greater number of territorial authorities and also their inability to extinguish existing use rights, leaving them with a stronger focus on retreat of new development via relocatable building design requirements (therefore commonly referencing relocate rather than retreat).

Table 2: Managed retreat terms by instrument type

	Instrument type	RPS	Regional Plans	Regional Coastal Plans	District Plans	Total
Managed retreat terms	Retreat	7	0	3	5	15
	Relocate	12	2	11	19	44
	Abandon	5	1	9	6	21
	Withdraw/al	1	0	0	1	2
	Setback	1	0	1	0	2
	Exit strategy	1	0	0	0	1
	Soft engineering	1	0	0	0	1

The common use of the words ‘relocate’ and ‘abandon’ represent the policy approach taken in most plans. However, where relocation or abandonment of assets are recognised as risk reduction options, the research revealed that this is typically considered on a case by case basis - not as part of adaptive, integrated strategies. Of the 16 operative and proposed regional policy statements that featured the key terms (five did not), seven used the term retreat and twelve used relocate (with three of these instruments using both retreat and relocate). Where retreat was used (managed retreat, planned retreat or just retreat), the majority (57%) became operative or proposed in 2016 and 86% were operative or proposed between 2012-2016. Where the term or affixes of the term, relocate, were used, only three instruments were produced in 2016, and 58% became operative or proposed between the years 2012-2016. Therefore, in terms of the regional policy statements, the more recent documents are beginning to use of the use the retreat terminology but relocation remains slightly more popular overall.

Overall, 15 documents specifically refer to managed retreat, yet not one formally provides a definition for it. Three documents include the term managed retreat as examples when defining terms ‘Exit Strategy’, ‘Soft Engineering’ and ‘Soft Protection’, however no explanation is given as to what managed retreat involves. The Northland Regional Policy Statement 2016 delivers a succinct explanation of managed retreat as “relocation, removal or abandonment” (Northland Regional Council, 2016b, p. 120) and the Waikato District Plan 2013 describes managed retreat as “moving buildings away from danger areas” (Waikato District Council, 2013, p. 5.5.1). Although these attempts go further than many, they do not recognise the complex nature of managed retreat, nor the “long-term, strategic” approach required

(Reisinger, Lawrence, Hart, & Chapman, 2015, p. 293). It is also important to distinguish that managed retreat applies to people, activities, infrastructure and assets, as well as buildings.

This analysis helps demonstrate the need for a consistent definition of managed retreat in RMA policy and plans. Only one plan, the Hawkes Bay Regional Coastal Environment Plan 2014 clearly defined managed retreat as: “*Any strategic decision for the co-ordinated removal, relocation or even abandonment of public and private assets at risk of being impacted by coastal hazards...*” (Hawke’s Bay Regional Council, 2014, p. 46). Furthermore, the policy explanation provided a thorough description of managed retreat, including the various scales it can occur across and a range of options for implementation. This is the only comprehensive example of communicating managed retreat to plan users, including implementation options, however it does not formally recognise the definition within ‘*Section 1.3 Definitions*’ of the Plan, providing it within the policy explanation.

This research shows how managed retreat in New Zealand planning instruments is subject to inconsistent terminology, a lack of definitions, and a poor fit with wider strategic approaches. The significant lack of consistent and clear interpretive guidance on managed retreat in New Zealand policy and plans is a key issue for its enablement. While it is acceptable for there to be local variability in the application of policy and regulation, there shouldn’t be significant variability or ambiguity in the definition of key terms. This inconsistency reflects the lack of national guidance provided on natural hazard management in New Zealand and its emergent nature. To enable robust and clear interpretation of the approach across New Zealand, a definition of managed retreat at the national level is paramount and should be included (with further explanation) within the National Policy Statement on natural hazards that is currently being drafted.

## **6.2 A variety of policy approaches**

The inductive analysis resulted in the emergence of five key approaches for enabling managed retreat under local RMA plans, with a sixth category capturing various distinctive approaches (Figure 7).

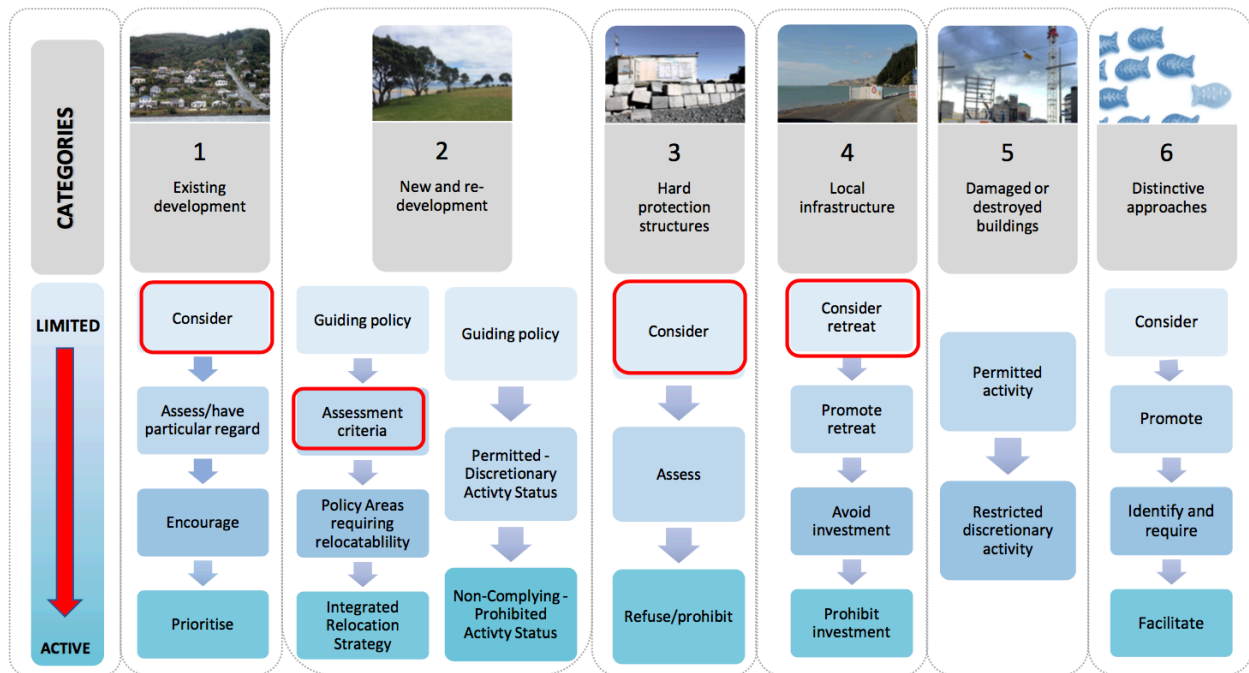


Figure 7: Conceptual policy framework

Category one includes policy for hazard mitigation where managed retreat is considered, assessed, encouraged or prioritised as an option. Although this approach is not exclusively coastal, its emergence may be related to NZCPS Policy 27(1)(a), however few instruments were found ‘promoting and identifying long-term sustainable risk reduction approaches’ such as managed retreat – the majority ‘consider’ it as an option. Category two encompasses the regulation of new and re-development in hazard zones and the requirement for relocatable building design. Again, although this category is not strictly coastal, the policies found are likely to stem from NZCPS Policy 25 (a), (b) & (c). Regulation of hard protection structures is the third category found, which clearly emerges from the NZCPS (Policy 25(e) & 27(1)(d)). Specific infrastructure provisions found were placed within category four, which again, may have linkages to Policy 25(d) of the NZCPS. Distinctive instruments included the use of non-statutory tools to enable manage retreat (see table 3), with one particularly unique approach taken by the Waikato Regional Policy Statement 2016:

#### 6.2.4 Coastal development setback (existing development)

*Regional plans shall identify the circumstances when it is appropriate to require existing development along the coast to be relocated, and shall include provisions for this relocation, to be sufficient distance from the coastal edge to allow for the following:*

*b) avoiding natural hazards; (Waikato Regional Council, 2016)*

Essentially, this highly directive provision works to trigger the process of determining when existing coastal development in the Waikato Region (that is subject to natural hazards) shall be relocated. While other regional councils have been reticent to extinguish existing use rights, this is a possible outcome of this RPS via implementation within its regional coastal plan (Berry & Vella, 2010). This provision highlights the potential regulatory role to be taken by regional councils in enabling managed retreat. Extinguishing of existing use rights in the most hazard prone areas, (requiring the relocation of existing buildings) may be tested under section 85 of the RMA. Such an approach is likely to result in case law, but essentially the question will come down to “the level of risk which is posed to a particular property (supported by scientific information) and whether it could be considered ‘reasonable’ to build on that property given the level of risk” (Berry & Vella, 2010, p. 36). Waikato Regional Council is currently developing the relevant regional plan provisions to give effect to this provision and therefore this policy approach is not yet enabling managed retreat in practice, however its intention is to do so, when appropriate. This is a very unique approach as it is the only RPS in the country to require regional plans to identify the circumstances that retreat is appropriate. As the Waikato RPS is a recent document (2016), Waikato Regional Council has two years (from the operative date) to give effect to this provision.

Whilst illustrating the policy approaches discovered, the conceptual policy framework (Figure 7) also delivers a hierarchy of provisions, from more limited to more active, within each category, indicating the dominant variations of each approach, according to the level of direction afforded. As shown in red, key approaches consistently found within New Zealand RMA documents (categories one, two(a), three and four) are predominantly using relatively limited provisions to enable managed retreat. This means that even where a managed retreat policy (by whichever definition) is present in New Zealand RMA instruments, it tends to give arguably, weak strength and direction. For example, under ‘existing development’ policy (category one), managed retreat was predominately a matter for ‘consideration’, rather than ‘encouraged’ or ‘prioritised’. In simple terms, from a planning perspective, to ‘consider’ is not as strong as to ‘prioritise’. More detail on the different categories and the direction given is provided in Table 3.

Table 3: RMA provision categories and direction setting codes

<p><b>Category 1 – Natural hazard mitigation policy for existing development</b></p> <p><u>Category 1 includes policies that identify managed retreat as a natural hazard mitigation option.</u>  <b>Category codes:</b>  <i>Consider</i> managed retreat as an option or simply note it as a potential approach.  <i>Assess/have particular regard</i> to managed retreat as an option  <i>Encourage</i> managed retreat as an option  <i>Prioritise</i> managed retreat above other options</p>
<p><b>Category 2 – Regulation of new and re-development</b></p> <p><u>Category 2 includes provisions requiring relocatable design of new buildings and the regulation of new and re-development in vulnerable locations.</u>  <i>Category 2a</i> is tiered from the use of guiding policy, to assessment criteria in plans, to policy areas that specifically require relocatable building design and finally, to relocation strategies that facilitate relocation with trigger points, consent conditions and monitoring.  <i>Category 2b</i> is tiered from the use of guiding policy, to permissive or restrictive activity statuses to regulate re-development and in some cases, prohibit it.</p>
<p><b>Category 3 – Regulation of hard protection structures</b></p> <p><u>Category 3 comprises the regulation of hard protection works</u>  <b>Category codes:</b>  <i>Consider</i> managed retreat as an alternative  <i>Assess</i> alternatives such as managed retreat  <i>Refuse</i> resource consent applications or <i>prohibit</i> hard protection structures</p>
<p><b>Category 4 – Infrastructure management</b></p> <p><u>Category 4 entails the management of infrastructure assets</u>  <b>Category codes:</b>  <i>Consider</i> ‘appropriate mechanisms’ to manage infrastructure risk (including managed retreat)  <i>Promote</i> strategic withdrawal of infrastructure in hazard prone areas  <i>Avoid</i> or <i>prohibit</i> further infrastructure investment</p>
<p><b>Category 5 – Regulation of the re-building of materially damaged or destroyed buildings as a result of a natural hazard</b></p> <p><u>Category 5 includes regional plan provisions that do not allow re-building of damaged or destroyed buildings as of right, to encourage managed retreat over-time.</u>  <b>Category codes:</b>  The activity status of regulatory provisions determines the direction of provisions in Category 5, with <i>permissive</i> to <i>restrictive</i> controls.</p>
<p><b>Category 6 – Distinctive approaches</b></p> <p><u>Category 6 encompasses entirely unique approaches found within the analysis.</u>  <b>Category codes:</b>  <i>Consider</i> mitigation options such as managed retreat (when working with landowners to identify and implement adaptation measures)  <i>Promote</i> plan changes to encourage voluntary relocation  <i>Identify</i> in Regional Plans when it is appropriate to <u>require</u> managed retreat  <i>Facilitate</i> managed retreat through a structure plan process</p>

Overall, the textual analysis found that ~50%\* (\*approximate as plans are continually being updated) of resource management policy and plans in New Zealand are applying managed retreat in one or many ways. Among these instruments, there are a few that provide strong

direction, however the majority are delivering limited policies and regulation with insufficient interpretation and implementation support. We also discovered that a dominant approach is relocatable design of buildings, highlighting the stronger presence of enabling future retreat of new development, rather than existing development.

Implementation guidance within plans is an indicator of plan quality (Baer, 1997; Godschalk & Berke, 2009). Such guidance was generally lacking in RMA instruments, with only one plan clarifying what the implementation of managed retreat could involve and just a few comprehensively detailing the requirements for relocatable building design. Particularly in provisions under Category two (a), better guidance is required to determine what the term relocatable entails, as well as requiring a comprehensive relocation strategy and imposing resource consent conditions to ensure relocation is achievable for the subject site/s and that it transpires when required. Continual monitoring of the environment and the consented land use activities is also vital to ensure that adaptation occurs prior to harm to people and assets.

Overall, the predominantly limited direction found within resource management plans reflects the adaptation deficit that is recognised in New Zealand and abroad, which can partly be attributed to institutional and governance barriers including poor leadership, communication, limited jurisdiction and resource constraints at the local level (Harker, 2016, p. 79). Whilst managed retreat is emerging in the RMA planning discourse, its enablement is questionable. As recognised by Lawrence et al. (2015, p. 304) New Zealand's legislative framework has not been effective in curbing expansion and intensification of coastal development and settlement on flood plains. Development rights in New Zealand are generally granted in perpetuity, resulting in legacy developments which are highly inflexible to a changing environment. The responsibility to manage the effects of natural hazards and prepare communities to adapt to climate change is delegated to local government. However as argued by Harker (2016, pp. 79-80) many local authorities in New Zealand do not have the financial capacity to sufficiently map areas affected by natural hazards, let alone fund significant adaptation strategies for existing development, particularly when confronted with community resistance. Due to this, local authorities may favour responding in ways that provide the most cost-efficient and beneficial results to property owners in the short-term, rather than longer-term options such as managed retreat.

White and Haughton (2017) have also recognised that with regard to natural hazards, there is a political propensity to privilege present generations over those in the future, which provides a significant challenge for longer-term resilience. Consideration of broader temporal scales was noted during the textual analysis, with a few policies stating that the evaluation of

managed retreat and other risk reduction options must be given particular regard to over a 100-year planning timeframe (*Bay of Plenty Regional Council, 2014, p. 131*). Providing this broad time-frame delivers a fairer assessment of mitigation options.

The assessment of hazard mitigation options was a key theme found within the policy categories, to determine whether managed retreat is an ‘appropriate’, ‘technically viable’ or ‘feasible’ option. This approach is worth noting as it indicates a potential barrier for managed retreat. Overall, fourteen plans referred to the need for an assessment of costs and benefits and many others referred to the need for general assessment, highlighting that the methodologies and timeframes of tools such as cost-benefit analysis are important, as they may be the principal reason behind why managed retreat is, or is not fully considered, let alone implemented. It must also be noted that cost-benefit analyses forecast the impacts of a decision in the future and therefore there will always be uncertainty surrounding the estimated impacts. To be comparable, costs and benefits must be calculated and expressed in the same units of measurement and within a common point in time (The New Zealand Treasury, 2015). As a result, such assessments could give more weight to dominant human values such as economic prosperity, as it is difficult to monetise values such as natural character and ecosystem services.

The RMA analysis shows that while it is common to talk of managed retreat in the singular, the term can be applied in a plural way in planning. It must also be recognised that managed retreat can be implemented as part of an adaptation strategy, where a range of approaches are applied to achieve risk reduction over time. For example, managed retreat is not necessarily an alternative to protection works or accommodation/mitigation measures if it is integrated into a pathways approach that might start with protect, then progress through mitigation measures towards retreat over-time, as shaped by the nature and scale of the development at risk. The six categories in figure 7 demonstrate that it is more accurate to refer to managed retreat as an umbrella term that can encompass various approaches applicable over different scales, issues, and locations. Each of which may require specific guidance and support. It further shows how there is a tendency for relatively weak policy that may not provide a strong direction. Some progressive examples were found in RMA documents, where managed retreat is encouraged, prioritised or facilitated, or alternatives were prohibited, however it was never specifically required. The presence of these provisions, although representing the minority, highlight the opportunity to provide greater direction for managed retreat as a mitigation approach, where appropriate. Irrespective of the level of direction afforded to managed retreat in New Zealand, improvement is required for interpretation and implementation support to provide consistency and clarity to plan users and to ensure that implementation is not only

attainable, but enforced when necessary. These key themes also emerge in the analysis of other local government instruments, to be discussed next.

## 7 Analysis of local government instruments

Other local government tools used for managing natural hazard risk include long-term plans, asset management plans, reserve management plans and non-statutory plans and guidelines (The RMA Quality Planning Resource, 2016b). This second textual analysis applied the same methodology as the analysis of RMA documents.

### 7.1 Inconsistent terminology and definitions

As found in the RMA documents, the most prevalent terms used were managed retreat and relocate (Figure 8). In two reserve management plans, the term soft-engineering was used as an overall reference to the terms relocation and managed retreat, and the term realign was used once to describe the relocation of stopbanks in an infrastructure strategy. Although the local government plans have demonstrated a slightly stronger use of ‘retreat’ over ‘relocate’, the consequence is not a more coordinated or strategic approach - it simply reflects a variance in terminology choice.

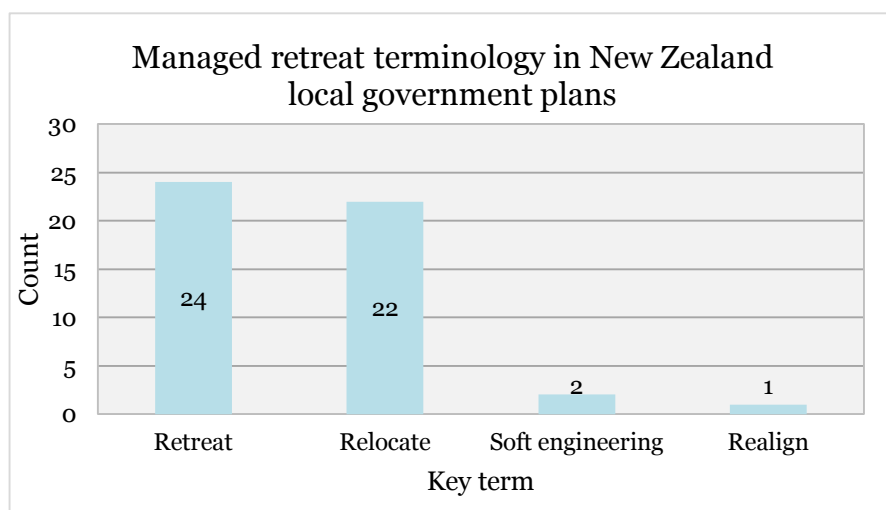


Figure 8: Managed retreat terminology in local government plans

Also found within the analysis was the South Taranaki Infrastructure Strategy 2015-2025, which referred to managed retreat as an approach to manage investments when experiencing a declining population (South Taranaki District Council, 2015). This

strategy delivers insight to the fact that there is not just an inconsistency of terms within the natural hazard sector, but that it is used within other sectors to describe the withdrawal of service, as well as to describe natural processes such as shoreline retreat in other circumstances. The fluidity of ‘retreat’ terms in both context and application justifies the need to provide better clarity by use of definitions.

## 7.2 Approaches

Overall, 39 council documents were found to reference managed retreat, including management strategies, reserve management plans, long-term plans, infrastructure strategies, asset management plans, spatial plans, a resilience plan and a structure plan. The majority (30) of these are limited in their direction, highlighting the need to *consider* the option of managed retreat. Five documents *promote* managed retreat as a mitigation approach and just three seek to *facilitate* its use more strongly. In no circumstance was there a *requirement* to implement managed retreat. In line with the RMA analysis, most instruments provide a limited level of direction, considering managed retreat as an option, with little to no interpretation or implementation guidance. Some of the instruments considering managed retreat are high-level, strategic documents. It is considered that this level of direction is appropriate at the strategic scale, however, for documents managing smaller spatial scales, a greater level of detail and direction is necessary. Five documents promoted managed retreat above alternative options, with some making use of a hierarchical approach. Three instruments took the overall direction further by determining implementation methods (New Plymouth Coastal Reserves Management Plan 2006 (as amended June 2015) or setting aside funds (Environment Canterbury Long-Term Plan 2015–2045 and Hasting’s Long-Term Plan 2015-2045) to facilitate a managed retreat process.

Both textual analyses have highlighted that there is a lack of formal direction for managed retreat of local infrastructure assets. In this analysis, just 7/78 local authorities included managed retreat terms in their asset management plans. There was a small improvement for infrastructure strategies with 14/78 authorities including retreat terms in their long-term plans. These numbers demonstrate the low level of recognition, let alone direction for managed retreat in local government asset and infrastructure instruments. The small number of instruments found overall (39) also verifies the low level of attention towards managed retreat in non-RMA planning instruments. Precluding managed retreat from these instruments will ensure that it remains a marginalised approach.

## 8 Supplementary findings

### 8.1 Managed retreat projects

Additional to the planning instruments found, several other council documents referring to managed retreat were uncovered during the review. Although these documents were not in the initial scope of the analysis, and have not been captured by the quantitative assessments,

they are useful as they help to uncover the status of managed retreat in New Zealand. Three active council projects highlight current work focused on achieving managed retreat, in a range of ways.

Firstly, the Waikato District Council Sunset Beach Erosion Project 2016 was developed to facilitate the relocation of council assets at risk of coastal erosion. An assessment of possible adaptation options carried out by consultant, GHD, resulted in the recommendation to implement managed retreat (GHD, 2014). A community engagement process was established to determine the type of retreat to be applied and the specific trigger points to initiate this (GHD, 2015). It was determined through this process, that if erosion continues to occur at Sunset Beach, the community hall will be relocated to the Port Waikato rugby grounds and beach access car parking will be retained, (if possible) with new parking constructed as close to the existing car park as possible (Waikato District Council, 2016). Actions for the short, medium and long-term have been set out within the project documentation to facilitate the managed retreat process.

Following the catastrophic Matata debris flow in 2005, Whakatane District Council has been investigating a range of options to mitigate the natural hazard risk. In 2015, Council staff worked as part of a Consensus Development Group to investigate hazard mitigation options, identifying a voluntary managed retreat option as the best way forward. The Council is currently progressing the retreat package for properties (16 occupied and 18 vacant sections) exposed to a high-annualised loss of life risk from future debris flows (Whakatane District Council, 2016). The voluntary retreat package has been offered to property owners on a one-time basis, with the acquisition of properties based on independent valuations and further discretionary compensation available for matters such as legal and relocation fees (Whakatane District Council, 2016). Although the retreat strategy is voluntary, a supporting workstream is also in progress to initiate a Plan Change to the Regional Land and Water Plan to extinguish existing use rights in the high debris flow risk area.

The third project is the Kaeo flood risk reduction project. An initiative of this project includes assisting with the relocation of people from high risk homes via financial subsidy, to encourage retreat from the floodplain, among other measures (Northland Regional Council, 2013). In 2010, the Department of Internal Affairs approved \$500,000 of funding for the entire project with \$257,000 allocated to flood vulnerable homes. By August 2016, works had been completed on eight out of fourteen properties, including the demolition of two dwellings, the raising of four dwellings, removal of one dwelling and the registration of an encumbrance on the

title of one dwelling to prevent use for accommodation. A variation to the funding agreement was applied for in August 2016 to include flood vulnerable homes in the Whangaroa Catchment however Northland Regional Council was not successful in this request (Northland Regional Council, 2016a). It is unknown whether further works will be progressed for this project.

The textual analysis also found five other council projects in New Zealand that are considering managed retreat to address rising sea levels, coastal erosion, river flooding or earthquake and rock avalanche hazards (Table 4). These projects are early in their respective processes, where initial scoping of a range of mitigation options, including managed retreat, is being carried out. These examples provide insight to the status of managed retreat in New Zealand. When looking deeper into the documentation, it is clear that for most locations, a large amount of time and resources is required to obtain strong evidence, scope options and engage with the community before committing to an adaptation strategy or regulation. Project documentation also recognises alternative forms of managed retreat implementation, uncovering processes that are occurring outside or in parallel with planning frameworks, such as land acquisition schemes.

*Table 4: Council projects in progress*

<b>Local Authority</b>	<b>Project</b>	<b>Status</b>
Waikato District Council	Sunset Beach Erosion Project 2016	Active
Whakatane District Council	Awatarariki Fanhead Voluntary Retreat Offer 2016 (Matata)	Active
Northland Regional Council	Kaeo Flood Risk Reduction Business Case 2010	Active
	<b>Draft/future works</b>	
Nelson City Council	Tahunanui Coastal Erosion Study 2016	Scoping
Western Bay of Plenty District Council	Living with the Changing Tides Inner Harbour and Coastal Erosion Management Policy 2017	Scoping
Hawke's Bay Regional Council & Hastings & Napier District Councils	Clifton to Tangoio Coastal Hazards Strategy 2120	Scoping
Rangitikei District Council	Whangaehu Flood Resilience Uplift Project	Scoping
West Coast Regional Council & Westland District Council	Franz Josef Hazard Mitigation Cost-Benefit Analysis	Scoping

To represent the status of managed retreat, Figure 9 synthesises cases where it is being actively scoped or facilitated in New Zealand, either by way of a strategy or project, combined with known cases of managed retreat implementation in New Zealand since 2000. Figure 9 does not refer to the policy enablement of managed retreat as this is too complex to map, however it highlights the circumstances where practical application of this approach is advancing.

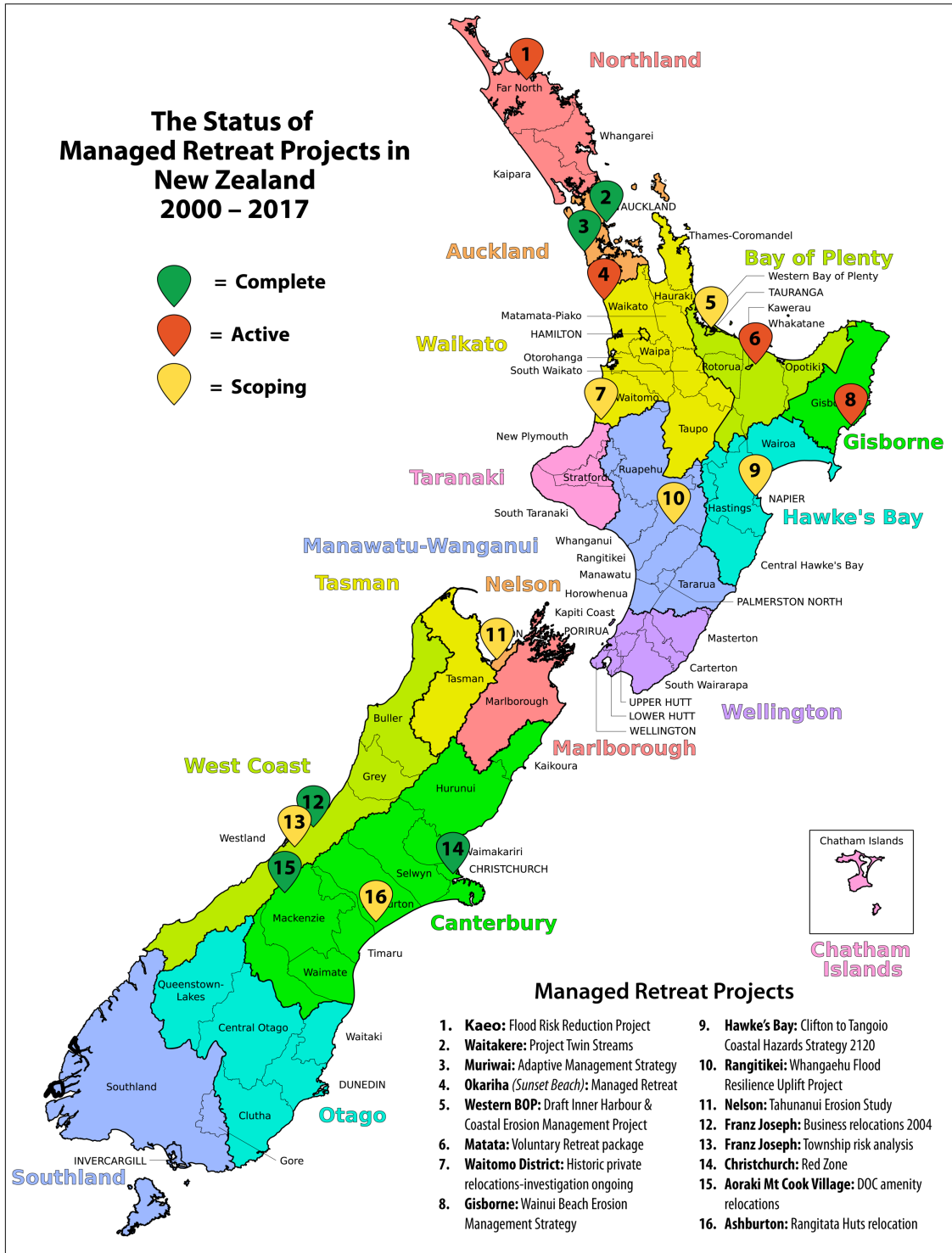


Figure 9: The status of managed retreat projects in New Zealand. Base map adapted from Korakys (2017).

## 9 Conclusion

Keeping the numerous social, economic and political barriers in mind and recognising that discourse and in particular, policy and regulation works to shape reality, this research helps explain why managed retreat has been so rarely applied in New Zealand to date. Approximately fifty percent of RMA plans consider, promote or facilitate managed retreat by way of policy and regulation. Very few (39) other local government planning instruments were found to reference managed retreat. Where it is being applied, both textual analyses concluded that the majority of planning instruments are delivering limited provisions to enable managed retreat across New Zealand. This is not a judgment of whether managed retreat should be facilitated or more strongly promoted, but a recognition of a barrier to its implementation.

Terminology analysis found that in RMA instruments, ‘relocate’ dominates ‘retreat’ but in other local government instruments the opposite occurs –although to a lesser degree. A lack of interpretive support exists across all instrument types, with only one comprehensive definition and explanation found amongst a plethora of variables to the term managed retreat. Not only are there numerous key terms, but diverse approaches for enablement of managed retreat. Within the RMA analysis, five key approaches (and one distinctive category) emerged, all of which may require specific guidance for implementation. This included policy to employ managed retreat for natural hazard mitigation, regulation of new development with the requirement that it be relocatable, and regulation of re-development to encourage managed retreat over-time. Other categories included policy and regulation controlling hard protection structures, strategic infrastructure provisions, which were present, but rare, regional re-building regulations following natural hazard damage and finally, a distinctive category capturing ad hoc methods. Within these categories, a wide variance in application and direction exists but most commonly, managed retreat is considered at best. Amid terminology and interpretation inconsistencies, implementation support was also lacking, particularly in Category two (a). While some plans provided a high level of direction as to what a relocatable building comprises, when relocation must occur and how it shall be provided for, safeguarded and monitored, most were silent on these matters. It is expected that these concerns would otherwise be dealt with by consent conditions, however it is more transparent for the requirements to be provided within the assessment criteria as part of a relocation strategy, to ensure consistent and clear guidance to both developers and the consenting regime.

The analysis found that across New Zealand, managed retreat is most commonly applied to mitigate or avoid the risks of coastal hazards, when it could be applied to a wide range of

hazard risks. Another missed opportunity at present is the lack of attention towards infrastructure retreat across RMA plans, long-term plans and asset management plans. Overall, very few strategic or focused provisions were found. With long life spans and responsibilities to service to the public, managed retreat is a potentially significant approach to avoid harm to infrastructure and assets and the services they support.

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