HOUSING BUILT UPON SAND: ADVANCING MANAGED RETREAT IN NEW ZEALAND

JULIA HARKER*

I INTRODUCTION

A strong relationship with the coast pervades the New Zealand cultural identity. Historically this can in part be traced to Māori spiritual connections with the sea and reliance on marine environment as a food source[1], as well as colonial patterns of development to support coastal shipping of goods to, and people from, the British Empire[2]. This deep connection, has led to extensive coastal settlement with more recent 'sea change' movements helping drive a concentration of property development at the coastal margins.[3] However, this coastal lifestyle is now under threat from the impacts of sea level rise as a result of anthropogenic climate change.

Sea level rise projections up until 2100 range from 0.5 to 1 metre[4], but rises well in excess of 1 metre are still possible during this period[5], particularly if accelerated polar ice sheet loss continues.[6] Sea level rise will also continue beyond 2100, at a scale determined by the level of climate change mitigation adopted.[7] The risk to coastal land posed by sea level rise is heightened by accompanying coastal hazards, some of which are themselves exacerbated by climate change, including coastal storm inundation, rising groundwater levels, river flooding, tsunami and high astronomical tides.[8]

Sea level rise poses one of the most significant challenges for adaptation as increased coastal flooding, coupled with more frequent storm events, will jeopardise private and public assets at the coastal interface. As a nation with an extensive coastline, coupled with market

* Julia Harker, LLB (Hons), BA, LLM (Hons), Lecturer, Faculty of Law, University of Auckland.
[1] Chris D. Paulin 'Mäori Perspectives of Mäori fishing history and techniques' (2007) 18 Tuhinga, 11.
[2] Gavin McLean, 'Shipping' *Te Ara - the Encyclopedia of New Zealand*, http://www.teara.govt.nz.
[3] Claire Freeman and Christine Cheyne, 'Coasts for Sale: Gentrification in New Zealand' (2008) 9(1) *Planning Theory & Practice* 33-56; Statistics New Zealand, 'Internal Migration Report', 2009, http://www.stats.govt.nz/browse_for_stats/population/Migration/internal-migration/are-nzs-living-closer-to-coast.aspx.
[4] T.F Stocker., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.) "Intergovernmental Panel on Climate Change PCC Summary for Policymakers" in *Climate Change 2014: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2014).
[5] Ibid.
[6] Ibid.
[7] Ibid.
[8] Ibid.

pressures favouring coastal development, New Zealand[9] will be faced with considerable coastal adaptation challenges. A recent report by the New Zealand Parliamentary Commissioner for the Environment[10] has thrown the extent of these challenges into stark relief by identifying the vulnerable coastal areas and quantifying the likely impact of sea level rise on residential and commercial properties, as well as significant infrastructure.[11]

The potential impact of sea level rise in New Zealand raises questions regarding the effectiveness of current legal and policy frameworks for managing the coastal interface. While hazards at this interface, such as coastal erosion, storm events and flooding, are not new, current property and planning law responses will be tested by the need to adapt to sea level rise due to its unprecedented scale, enduring impact and uncertain time frame. It is essential that coastal adaptation to the impacts of climate change is comprehensively planned to avoid maladaptation and deleterious social and economic impacts for both coastal residents and the wider public.

This article will evaluate whether the current New Zealand legal and policy framework is equipped to address the impacts of sea level rise on coastal property, particularly where managed retreat is proposed as part of a suite of adaptation measures. The article draws from legal geography; bridging legal analysis and public policy in its place-based consideration of climate change adaptation and managed retreat.[12]

First the article will provide an overview of coastal adaptation measures, focussing on managed retreat. Then challenges from sea level rise for New Zealand, particularly in the urban centre of Dunedin will be introduced. The article will then assess the suitability of current planning law and policy approaches for managed retreat. Focus will then shift to the potential to acquire land for managed retreat purposes: including a critique of the current statutory acquisition and compensation processes. Finally the article will conclude by suggesting further research and policy directions.

II COASTAL ADAPTATION MEASURES: MANAGED RETREAT

Adaptation is defined in the Intergovernmental Panel on Climate Change's Fifth Assessment Report as:[13]

> The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial

[9] A. Reisinger, R.L. Kitching, F. Chiew, L. Hughes, P.C.D. Newton, S.S. Schuster, A. Tait, and P.Whetton, 'Australasia' in V.R. Barros, C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds) "Part B: Regional Aspects" in *Climate Change 2014: Impacts, Adaptation, and Vulnerability - Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2014) 1371, 1412.

[10] Parliamentary Commissioner for the Environment *Preparing New Zealand for rising seas: certainty and uncertainty* (Parliamentary Commissioner for the Environment, 2015).

[11] Ibid.

[12] Robyn Bartel, Nicole Graham, Sue Jackson, Jason Hugh Prior, Daniel Francis Robinson, Meg Sherval and Stewart Williams, 'Legal Geography: An Australian Perspective' (2013) *Geographical Research* 51(4), 339–353; Tayanah O'Donnell "Legal Geography and Coastal Climate Change Adaptation: the Vaughan Litigation" (2016) *Geographical Research*54(3), 301-312; Lule Bennett and Antonia Layard, 'Legal Geography: Becoming Spatial Detectives' (2015) *Geography Compass* (2015) 9/7, 406-422.

[13] V.R. Barros, above n 9, 1758.

opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.

In the context of sea level rise and other coastal hazards, coastal adaptation strategies have been classified by the IPCC as falling into three potential categories: protection, accommodation and retreat.[14]

The protection of development using engineered solutions has played a dominant role in coastal hazard management for centuries.[15] Protection aims to defend the coastline through hard engineered solutions such as seawalls, sea dikes, and storm surge barriers, and soft approaches such as dune nourishment and the re-establishment of salt marshes.[16]

Accommodation measures enable local communities to live in the coastal environment while reducing the exposure and/or sensitivity of developments and infrastructure to coastal risk.[17] Approaches include limited time frame development, flood hazard mapping, flood proofing, drainage systems and raising floor levels.[18]

Finally, retreat options may include unplanned retreat by allowing sea level rise and other coastal activities to take place without government interference, and planned or managed retreat, which is the focus of this article.[19] Managed retreat is a "collective term for the application of coastal zone management and mitigation tools" to move existing and planned buildings and infrastructure away from hazardous coastal margins.[20] This may be achieved through a range of measures, forming a continuum from the use of planning mechanisms to enable market-driven retreat, such as the notification of coastal hazards in property information, the use of progressive setback lines and planning instruments that restrict further development; to more interventionist methods such as coastal land acquisition. [21]

Managed retreat is often characterised as a form of 'transformational' adaptation that 'changes the fundamental attributes of the system'[22] in response to climate change. Kates et al identifies three forms of transformational adaptation: "those that are adopted at a much larger scale, that are truly new to a particular region or resource system, and that transform

[14] Derived from R. J.Nicholls, P.P. Wong, V.R. Burkett, J.O. Codignotto, J.E. Hay, R.F. McLean, S. Ragoonaden and C.D. Woodroffe, "Coastal systems and low-lying areas" in M.L Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2007), 315-356.;Kim S. Alexander, Anthony Ryan and Thomas G. Measham, 'Managed retreat of coastal communities: understanding responses to projected sea level rise' (2012) 55(4) *Journal of Environmental Planning and Management* 409.

[15] Roger H. Charlier 'History, Coastal Protection' in Schwartz M (ed) *Encyclopedia of Coastal Science* (Springer, Dordrecht, 2005).

[16] Wong, P.P., I.J. Losada, J.-P. Gattuso, J. Hinkel, A. Khattabi, K.L. McInnes, Y. Saito, and A. Sallenger, 'Coastal systems and low-lying areas' in "Part A: Global and Sectoral Aspects" in V. R. Barros, above n 9 361-409; Rhiannon J. Niven and Douglas K. Bardsley, 'Planned retreat as a management response to coastal risk: a case study from the Fleurieu Peninsula, South Australia' (2013) 13 *Regional Environmental Change,* 193-209.

[17] Niven, Ibid.

[18] P.P. Wong, above n 16.

[19] Ibid.

[20] William J. Neal, David M. Bush, Orrin H. Pilkey "Managed Retreat" in Schwartz M (ed) *Encyclopedia of Coastal Science* (Springer, Dordrecht, 2005).

[21] Niven above n 16; Laura Tinker, 'Managed Retreat from Coastal Erosion: the movement of people and their coastlines' Master of Planning Thesis, 2013.

[22] V.R. Barros, above n 9, 1758-1759.

places and shift locations."[23] Managed retreat may arguably fit within all three forms of transformational adaptation and can be specifically categorised as a type of "anticipatory transformational adaptation" or adaptation that occurs in advance of significant harm.[24] As will be seen in the New Zealand context, anticipatory transformational adaptation faces many barriers including: uncertainty surrounding the risk of climate change hazards and the benefits of adaptation; cost; and institutional and behavioural factors that "protect existing resource systems and policies."[25]

Transformational adaptation contrasts with incremental adaptation such as coastal protection structures, where the "central aim is to maintain the essence and integrity of a system or process at a given scale."[26] The IPCC[27] has stressed that a purely incremental approach has the potential to make 'later transformational changes increasingly difficult'[28] and that:[29]

> Consideration of transformational adaptation becomes critical where long life- or lead-times are involved, and where high up-front costs or multiple interdependent actors create constraints that require coordinated and proactive interventions ... Deferring such adaptation decisions because of uncertainty about the future will not necessarily minimize costs or ensure adequate flexibility for future responses, although up-front investment and opportunity costs of adaptation can present powerful arguments for delayed or staged responses…

Protective works can be a more attractive option for government in the short term: avoiding legal challenges that would arise from planning controls, and in some instances the cost of hard engineered structures such as sea walls may be borne by private citizens in line with a 'user pays' economic model.[30] However, there are financial and legal risks in following such a short term approach. Financially, managed retreat is predicted to be less expensive over the long term than hard engineered protection works.[31] From a legal perspective, Bell identifies that local government may potentially be liable in negligence for consenting coastal defence structures that are inadequate or adversely affect neighbouring properties.[32]

At the other end of the spectrum a 'do nothing' approach or unplanned retreat has its own risks. While not promoted in urban areas, such an approach is seen in small New Zealand coastal settlements such as Haumoana in the Hawke's Bay and Waitara in Taranaki, where to date local government has taken a 'do nothing' approach by refusing to fund coastal protection works.[33] It is important that a 'do nothing' unplanned approach to retreat not

[23] Robert W. Kates, William R. Travis, and Thomas J. Wilbanks, 'Transformational adaptation when incremental adaptations to climate change are insufficient' (2012) *Proceedings of the National Academy of Sciences* 109(19), 7156–7161.
[24] Ibid.
[25] Ibid, 7158.
[26] V. R. Barros, above n 9, 1758-1759.
[27] Reisinger, above n 9.
[28] Ibid, 1412.
[29] Ibid, 1412-1413.
[30] Justine Bell-James 'Coastal defence structures – legal risks and legal .opportunities' (2016) 21 *Local Government Law Journal* 16.
[31] Nick Abel, Russell Gorddard, Ben Harman, Anne Leitch, Jennifer Langridge, Anthony Ryan, Sonja Heyenga, 'Sea level rise, coastal development and planned retreat: analytical framework, governance principles and an Australian case study' (2011) 14 *Environmental Science and Policy* 279.
[32] Bell-James, above n 30.
[33] Kate Gudsell 'Wave goodbye: Tide rising on Haumoana', Radio NZ, 26 July 2016; Robin Martin 'East Beach residents fear beach homes will wash away', Radio NZ, 25 July 2016.

become the default response due to government failure to adequately plan for coastal hazards.[34] This may result in significant individual financial losses for property owners from forced abandonment of buildings, as well as a loss of community and other social impacts.[35]

In many locations managed retreat may reduce the potential for maladaptation[36] based on misperceptions that hard engineered structures will prevent harm to property and individuals, sometimes referred to as the "safe development paradox".[37] The cost of emergency relief should also be considered when assessing managed retreat responses, given that catastrophic events are observed to trigger 'natural disaster syndrome'[38] or 'a moral compulsion for governments to provide disaster assistance, resulting in the costs of repairs and rebuilding of damaged property being absorbed by the wider community'.[39] Manning et al have identified this phenomenon in New Zealand in the 'leaky building' crisis, Canterbury earthquakes, and Pike river mine disaster, providing evidence of an 'historic legacy where private risk is transferred to the public as a direct result of inadequate planning and regulation of risk, and private interests pressuring decision-makers.'[40]

Managed retreat may also have significant benefits for coastal ecosystems and public access to the coastal environment, particularly if it is part of a broader integrated coastal management policy. Coastal defences impose burdens on the environment and the community. First, by degrading coastal and intertidal habitats and the ecosystem services they provide, such as flood protection[41]; and second, by limiting public access to the coast and eroding beaches which have important recreational, social, economic and cultural value for the community.[42]

From a practical perspective, managed retreat could be implemented through a number of legal tools, including: planning controls prohibiting or restricting further coastal development; rolling easements; managed realignment where engineered defences are deliberately breached,[43] and the acquisition of property by government.

Forms of managed retreat have been implemented in a number of jurisdictions, with mixed success:

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[34] Niven, above n 16.
[35] Parliamentary Commissioner for the Environment, above n 10.
[36] The glossary of the AR5-WGII report proposed to define maladaptation as: 'Actions that may lead to increased risk of adverse climate related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future': Barros, above n 9.
[37] RJ Burby, 'Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing about Wise Governmental Decisions for Hazardous Areas' (2006) 604 *The Annals of the American Academy of Political and Social Science*, 171.
[38] H Kunreuther, 'Reducting losses from catastrophic risks through long-term Insurance and mitigation' (2008) 75(3) *Social Research* 905, 912.
[39] Justine Bell, *Climate Change and Coastal Development Law in Australia* (Federation Press, 2014), 19.
[40] Martin Manning, Judy Lawrence, Darren Ngaru King and Ralph Chapman, 'Dealing with changing risks: a New Zealand perspective on climate change adaptation' (2015) 15(4) *Regional Environmental Change* 581, 587.
[41] R. K. Turner, D. Burgess, D. Hadley, E. Coombes, and N. Jackson, 'A Cost-Benefit Appraisal of Coastal Managed Realignment Policy' (2007) 17(3-4) *Global Environmental Change* 397.
[42] Tayanah O'Donnell and Louise Gates, 'Getting the balance right: A renewed need for the public interest test in addressing coastal climate change and sea level rise' (2013) 30 *Environmental and Planning Law Journal* 220; Ministry of Agriculture and Forestry, *Mapping the values of New Zealand's coastal* waters (2009); Mike Raybould and Neil Lazarow, *Economic and Social Values of Beach Recreation on the Gold Coast* (Cooperative Research Centre for Sustainable Tourism, 2009); Niven above n 16.
[43] Turner, above n 41.

- Planning controls were implemented by Byron Shire Council in NSW, requiring both existing and proposed development to be relocated when 20-50 metres from an erosion escarpment. However, this policy has since been abandoned due to immense political pressure and legal action[44] as a result of its inconsistent application and implications for coastal property values.[45]
- Rolling easements, where the landward boundary of private land automatically retreated with sea level rise, were used in Texas to allow vegetation lines to relocated landward and allow the public to use dry sand.[46] This was subsequently defeated by the Texas Supreme Court for failing to compensate property owners.[47]
- Managed realignment has been successfully implemented in UK coastal areas such as Abbots Hall, Essex where a 3.5 kilometre sea wall was removed to allow for expansion of the salt marsh. This proved more cost effective than maintaining the existing sea wall, and provides ecosystem services including wildlife habitat and wave energy absorption.[48]
- Acquisition of land in areas subject to flooding, though not explicitly for adaptation purposes, has been funded by the Federal Emergency Management Agency under its Hazard Mitigation Grant Program, as part of a long-term strategy to protect people and property from future hazard events.[49]

Despite its many benefits, New Zealand central and local government have historically been reluctant to implement managed retreat as part of coastal adaptation planning[50], favouring protection and accommodation methods.[51] This is reflective of the significant existing barriers to managed retreat, including: community perceptions; cost of relocation; and loss of property. Research in the Waikato region found broad public support for managed retreat as an adaptation policy, particularly where this preserved access to beaches. However, managed retreat was not favoured by directly affected property owners, who expressed a desire to occupy their properties unless forced to leave by coastal hazards.[52] Some academics have concluded that such scepticism could arise from a lack of understanding of managed retreat processes. This could be improved through consultation and engagement with the community over managed retreat.[53] The cost and the loss of property resulting from managed retreat are perhaps the most significant barriers to its implementation. Despite the potential long term

[44] *Vaughan v Byron Shire Council* [2009] NSWLEC 88.
[45] Niven, above n 16.
[46] J Titus, 'Rising seas, coastal erosion and the takings clause: how to save wetlands and beaches without hurting property owners' (1998) 57(4) *Modern Law Review* 1279.
[47] Richard J. Mclaughlin, 'Rolling Easements as a Response to Sea Level Rise in Coastal Texas: current status of the law after Severance v. Patterson' [2011] 26(2) *Journal of Land Use* 365*; Severance v. Patterson 370 S.W.3d 705 (Tex. 2012).*
[48] Institution of Civil Engineers, 'Managed realignment at Abbotts Hall, Essex' https://www.ice.org.uk/disciplines-and-resources/case-studies/managed-realignment-at-abbotts-hall-essex
[49] Federal Emergency Management Agency, 'Hazard Mitigation Grant Program' https://www.fema.gov/hazard-mitigation-grant-program.
[50] Tinker, above n 21; Christopher Turbott and Andrew Stewart, 'Managed Retreat from Coastal Hazards: Options for Implementation' (Environment Waikato Technical Report 2006/48, April 2006).
[51] Tinker, above n 21.
[52] Turbott, above n 50.
[53] Alexander, above n 14; Paula Blackett, Erin Smith, Helen Rouse, Terry Hume, Darcel Rickard, Anne Hume, Rob Bell, Doug Ramsey, Jim Dahm, Peter Wishart, Peter Singleton & Vernon Pickett 'How can we engage with coastal communities over adaptation to climate change?: A case study in Whitianga on the Coromandel Peninsula' (2010) New Zealand Planning Institute; Georgina Hart 'Vulnerability and adaptation to sea-level rise in Auckland, New Zealand', The New Zealand Climate Change Research Institute, 2011.

cost savings discussed above, the removal or relocation of buildings is an expensive exercise, particularly where new sites must be purchased,[54] and ultimately results in the loss of valuable land to the ocean.[55] The allocation of relocation costs is also inherently fraught: should the cost be borne by those directly benefitting from the retreat[56] or spread to the wider community given its public benefits?[57]

Despite these barriers, it is evident that managed retreat will need to be a part of coastal adaptation measures in New Zealand given the scale of sea level rise many coastal areas will face.

III SEA LEVEL RISE IN NEW ZEALAND

Given its expansive coastline[58] and concentrated population along the seaboard,[59] it is unsurprising that New Zealand has a long history of managing hazards at the coastal interface, particularly coastal erosion and storm surges. Historically local authorities and members of the public have utilised hard engineered responses such as sea walls to protect coastal residents and infrastructure. This has been accompanied by preventative planning measures whereby local authorities have utilised hazard lines and zoning to notify the public and restrict development, such as at Waihi Beach where coastal erosion and inundation areas are identified in the Western Bay of Plenty District Plan.

Despite this legacy, the extent and scale of the hazard identified in the Parliamentary Commissioner for the Environment's 2015 report *Preparing New Zealand for Rising Seas: Certainty and Uncertainty* ("PCE Report") raises many future challenges for coastal hazard management in New Zealand, particularly in urban areas. The report utilises admittedly incomplete LiDAR[60] surveys to predict the likely impact of sea level rises of 1.5 and 3 metres.[61] It found that 68,170 buildings with a replacement cost of $19bn and a residential population of 133,265 are located at 0-1.5 metres, while 166,750 buildings with a replacement cost of $52bn and a residential population of 281,902, as well as 1,014 critical facility buildings are located at 0-3 metres.[62]

The PCE Report identifies Dunedin as one of the urban centres most vulnerable to sea level rise, particularly in the areas of Harbourside and South Dunedin ("South Dunedin"). Dunedin provides an excellent case study of the challenges facing many coastal parts of New Zealand.[63]

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[54] Turbott, above n 50.
[55] Turbott, above n 50; Alexander, above n 14.
[56] Abel, above n 31.
[57] Alexander, above n 14.
[58] Estimates range from 15,000 to 18,000 km; Carl Walrond, 'Natural environment - Coasts', *Te Ara - the Encyclopedia of New Zealand*, http://www.TeAra.govt.nz/en/natural-environment/page-2.
[59] 75% of New Zealanders live within 10 kilometres of the coast; *Statistics New Zealand, Internal migration*, 2009 http://www.stats.govt.nz/browse_for_stats/population/Migration/internal-migration/are-nzs-living-closer-to-coast.aspx.
[60] "Light Detection and Ranging": uses light in the form of a pulsed laser to measure variable distances to the Earth and generate three-dimensional information about the shape of the Earth and its surface characteristics. This can be used to make digital elevation models and more accurate shoreline maps.
[61] National Institute of Water and Atmospheric Research, *National and regional risk exposure in low-lying coastal areas* (NIWA, October 2015).
[62] Ibid.
[63] For example, Christchurch and Wellington; see Parliamentary Commissioner for the Environment, above n 10.

The land in South Dunedin was originally salt marsh and is bound by sand dunes along its ocean margins and sea walls along its harbour margins. After European settlement, the area was progressively reclaimed from 1850 to 1960 using any available fill to create a land surface level "a couple of feet" above the water table.[64] Since its reclamation, South Dunedin has experienced extensive development and now contains 10,000 residents and significant infrastructure such as wastewater, stormwater, roading and community assets, worth an estimated $4.3 billion.[65]

While coastal inundation will be a significant hazard in some areas, the main threat to the area arises from rising ground water and the existing coastal aquifer. The water table is typically 0.3m to 0.7m under the urban area and has a 'tidal signal', whereby it rises and falls with the tides.[66] Given future sea level rise predictions of a 0.3m sea level rise above 1990 mean sea level by 2040 and 0.8m to 1.6m sea level rise by 2100, significant flooding is likely to occur even in the absence of a rainfall event.[67] In June 2015 residents had a preview of South Dunedin's future under sea level rise when floods inundated the area overwhelming the storm-water system, damaging more than 2000 homes and businesses costing $138 million.[68] As a result, pressure has been placed on the Council to take protective action and better maintain existing stormwater systems.[69] Despite this ongoing risk, South Dunedin is currently only subject to a Hazard 3 (coastal) Overlay Zone that reflects a 'low risk' hazard scenario.[70] The main planning restriction contained in the District Plan requires new buildings for sensitive activities (including residential building) to be relocatable and have a minimum floor level of 2.5-2.8 metres above mean sea level. This is accompanied by general advice that "development in hazard prone areas…are at an owner's risk and the DCC does not accept any liability in regards to development and risk from natural hazards."[71]

A 2014 consultant engineering report identified a number of potential options to protect residents from the effects of rising sea levels. The report finds that for sea level rise up to 0.3m underground drains and pumps could be used to move the collected groundwater into existing stormwater systems. Longer term responses considered included building an underground seawall designed to prevent seawater raising groundwater from below and a preferred option of constructing dewatering wells along 5.3km of coast and harbour. However, both protection options have serious deficiencies; the seawall would be costly and not guaranteed to work and the dewatering scheme is dependent on retaining beach dune support and could lead to ground slumping.[72]

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[64] Jens Rekker, 'The South Dunedin Coastal Aquifer', Otago Regional Council, 2012.
& Effect of Sea Level Fluctuations at 5.
[65] Dunedin City Council Climate Change Adaptation- Harbourside and South City,
http://www.dunedin.govt.nz/your-council/district-plan/2gp/natural-hazards-phase/climate-change/climate-change-adaptation-harbourside-and-south-city.
[66] Rekker, above n 64.
[67] Beca, 'Assessment of Options for Protecting Harbourside and South City from Direct Impacts of Sea Level Rise', 2014.
[68] Radio New Zealand, Sinking suburb: Thousands of Dunedin homes at risk, 19 July 2016.
http://www.radionz.co.nz/news/national/308984/sinking-suburb-thousands-of-dunedin-homes-at-risk
[69] Ibid.
[70] Moderately likely or unlikely hazard; Dunedin District Plan, 11.1.4.
[71] Dunedin City Council District Plan, Policy 11.2.1.10.
[72] Parliamentary Commissioner for the Environment, above n 10; Beca, above n 67.

While the report did not directly consider options for managed retreat it acknowledges that "[t]here may well come a time when the cost of defence outweighs the benefit delivered. This will require major economic and policy decisions by [Dunedin City Council], possibly the largest and most far reaching decisions it has made to date."[73] The potential for managed retreat to form part of an overarching coastal adaptation policy for South Dunedin has been acknowledged by the Mayor who signalled that he would support managed retreat or "non-protection" if it was "clearly the most efficient and cost-effective" option.[74] Despite this acknowledgement managed retreat is currently not part of South Dunedin's adaptation plans. To the contrary, there is significant public pressure to build community infrastructure in the area, with the Council committing over $5 million to the construction of a South Dunedin community hub.[75]

While South Dunedin will be one of the worst impacted urban areas, it in many ways is an exemplar of the political, policy and planning stalemate that has arisen regarding coastal adaptation in New Zealand. In light of these tensions, the following discussion will assess how the existing legal and planning framework will either advance or constrain the implementation of managed retreat.

IV NEW ZEALAND'S LEGAL AND PLANNING FRAMEWORK FOR MANAGED RETREAT

Planned adaptation has the potential to address fundamental failures in the underlying economic and social factors that lead to continued development in hazardous locations. Such failures include the current inability of markets to fully incorporate environmental risk in property values and the propensity of individuals to discount the impact of future events.[76] The planning system can in many instances respond to these failures by: publicly identifying properties affected by hazards, limiting future development in hazardous areas and encouraging public and private investment in less vulnerable locations.[77] Where it faces greater challenges, is its ability to implement managed retreat policy when this conflicts with existing private development and public infrastructure.

This part will assess the ability of New Zealand's legal and planning framework to advance coastal adaptation measures such as managed retreat. It will be argued that local government has limited capacity to implement managed retreat because of a lack of higher level controls mandating coastal adaptation measures, particularly long term managed retreat.

A *National Adaptation Legislation and Policy*

New Zealand's core planning legislation, the *Resource Management Act 1991* ("RMA") contains tools for managing coastal hazards and adaptation. Part 2 provides that all persons exercising a function or power under the RMA must have particular regard to the 'effects of climate change'[78] The Courts have confined this provision to consideration of climate change adaptation as opposed to mitigation.[79]

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[73] Beca, above n 67, at 18.
[74] Chris Morris, 'City to face 'end game' in the lowlands', *Otago Daily Times*, 15 June 2015.
[75] Vaughan Elder, 'Former BNZ seen as ideal for hub', *Otago Daily Times*, 12 August 2016.
[76] Manning, above n 40.
[77] N. H. Stern, 'The Economics of Climate Change: The Stern Review' (Cambridge University Press, 2007).
[78] *Resource Management Act 1991* (NZ), s 7(j). The *Resource Legislation Amendment Bill 2015* (NZ) also proposes to include natural hazards as a matter of national importance under RMA, s 6.
[79] *Greenpeace New Zealand Inc v Genesis Power Ltd* [2009] 1 NZLR 730 (SC); *West Coast ENT v Buller Coal* Ltd [2013] NZSC 87.

Planning under the RMA is implemented through a "cascade of planning documents"[80] that reflect the sustainable management purpose of the RMA:[81] The New Zealand Coastal Policy Statement 2010 ("NZCPS") which sets national policy for the coastal environment; regional coastal plans which regulate activities within the coastal marine area of a region; and district plans which control land use activities within the broader landward coastal environment. Climate change and the challenges it presents for the coastal environment permeates the NZCPS.[82] It identifies the management of coastal hazard risks resulting from climate change as a key priority and provides that coastal hazard risks should be managed by: locating new development away from areas prone to such risks; considering responses, including managed retreat, for existing development in this situation; and protecting or restoring natural defences to coastal hazards.[83]

Policy 25 specifically provides that in areas affected by coastal hazards over at least the next 100 years decision-makers should:

a. avoid increasing the risk of social, environmental and economic harm from coastal hazards;
b. avoid redevelopment, or change in land use, that would increase the risk of adverse effects from coastal hazards;
c. encourage redevelopment, or change in land use, where that would reduce the risk of adverse effects from coastal hazards, including managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances, and designing for relocatability or recoverability from hazard events;
d. encourage the location of infrastructure away from areas of hazard risk where practicable;
e. discourage hard protection structures and promote the use of alternatives to them, including natural defences; and
f. consider the potential effects of tsunami and how to avoid or mitigate them.

Further national guidance is provided by the Ministry for the Environment non-statutory guidance manual *Coastal Hazards and Climate Change: A Guidance Manual for Local Government 2008* ("Manual").*[84]* The Manual aims to provide best practice information and guidance to strengthen the integration of coastal hazard management and land-use planning and consenting processes. Based on the now outdated Fourth IPCC Assessment Report, the Manual recommends that an allowance of 0.5-0.8 metre sea level rise be incorporated in local authority planning and decision-making out to the 2090s.[85] The Manual notably stresses that managed retreat will "need to become a fundamental and commonly applied risk-reduction measure within the next few decades"[86] due to the level of existing coastal development in New Zealand. It also states that hard protection works will only be a long-term solution in exceptional cases.[87] However, the manual acknowledges that local authorities have yet to develop a district or region-wide strategic approach to managed retreat. While the Manual

[80] *Environmental Defence Society v New Zealand King Salmon Company Ltd* [2014] 1 NZLR 593 (NZSC), 620.
[81] *Resource Management Act*, s 5, *Environmental Defence Society v New Zealand King Salmon Company Ltd*.
[82] New Zealand Coastal Policy Statement 2010, Objectives 4 and 5; Policies 3, 4, 10, 18, 24.
[83] Ibid, Objective 5.
[84] New Zealand Ministry for the Environment *Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand* (2008). This document is currently being updated for release in 2017.
[85] Ibid, at viii.[86] Ibid at 70.
[86] Ibid at 70.
[87] Ibid.

provides constructive advice for local government, inconsistent weighting is given to such non-statutory policy documents in consenting and plan-making decisions. Decision-makers may have regard to non-statutory documents as an "other matter"[88] when considering a resource consent application, but it is unclear whether such documents may be a matter for consideration under the broader plan-making exercise where there is no such drafting catch-all.[89] However, in practice, the sea level rise allowances and planning horizon endorsed in the Manual have been considered in decisions affecting coastal land, particularly where supported by expert scientific evidence.[90]

B *Regional and District Adaptation*

Planning for climate change adaptation has been delegated to regional councils and territorial authorities as part of local government's general function to avoid or mitigate natural hazards.[91]

At the regional level, regional policy statements may direct how responsibility for natural hazards, including coastal hazards, are allocated between regional councils and territorial authorities, and identify regionally significant natural hazard issues.[92] More specifically, regional coastal plans may regulate the construction of sea walls and other protection activities carried out within the coastal marine area.[93] In the absence of a rule providing for the construction of coastal protection works, resource consent will need to be obtained from the relevant regional council.[94] This restriction on the private construction of sea walls was challenged in the early RMA decision of *Falkner v Gisborne District Council*[95]. In that case the High Court considered whether the construction of sea walls required an application for resource consent under the RMA where the local authority had discontinued coastal protection works. The land owners argued that at common law the Crown had a duty to protect land from the encroachment of the sea and that as owners they had the right to protect land from the inroads of the sea. The Court found that such common law rights, if established, were impliedly subject to the RMA and that the right of an owner to protect land from the inroads of the sea through the construction of sea walls was inconsistent with the Act's resource consent procedure.[96] This provides an important method by which regional councils may control the potentially ad hoc construction of sea walls in favour of more long term adaptation solutions.

It is territorial authorities, through district plan restrictions on land use activities, that arguably have the greater potential to limit inappropriate development in areas subject to coastal hazards. District Plans may include specific coastal hazard zones or overlays, accompanied by rules that limit development and redevelopment of affected land. This is

[88] *Resource Management Act 1991*, s 104(1)(c).
[89] Judicial scepticism of non-statutory documents is evident in the Environment Court decision of *Living Earth Ltd v Auckland Regional Council* NZEnvC A126/2006, 4 October 2006.
[90] *Waterfront Watch Incorporated v Wellington Regional Council* NZEnvC W43/2009, 9 June 2009; Hemi v Waikato District Council [2010] NZEnvC 216.
[91] *Resource Management Act 1991*, both regional councils (s 30(1)(c)(iv)) and territorial authorities (s 31(1)((b)(i)) have this as a function.
[92] Ibid, s 62(1)(i)(i).
[93] Ibid, s 2.
[94] Ibid, s 12.

evident in many planning instruments, including the Dunedin City District Plan and Western Bay of Plenty District Plan referenced above.

There are limits to the efficacy of such measures. Techniques such as fixed hazard lines should be used cautiously given its ability to entrench the public perception of safety outside hazard lines.[97] Attempts to regulate development along coastal margins may be delayed by the political process. This is evident in the attempt by Christchurch City Council to include coastal hazard zone notations on 24,000 properties[98] and limit new development in such areas through the fast-tracked Replacement Christchurch District Plan. In response to challenges by residents, the Council requested that Government remove coastal hazards from the district plan review process and instead propose the changes as part of a future plan change process.[99]

Even where coastal hazards are identified in planning instruments, in the absence of prescriptive rules, courts to date have not adopted a consistent benchmark against which development should be declined or approved with engineered solutions. Some decision makers have emphasised the ability of individuals to voluntarily assume the risk of developing in a hazardous coastal environment: for example, the redevelopment of a passenger terminal for residential use in a tsunami warning area[100] and the construction of relocatable residential dwellings in an area subject to storm surge and coastal erosion hazards.[101]

A more precautionary approach has been adopted by some courts to decline the development of residential housing where existing storm surge and tsunami risk would be exacerbated by climate change. For example, in *Southern Environmental Association (Wellington) Inc v Wellington City Council*[102], the Court refused an application by the Wellington City Council to rezone land on its southern coast for residential development where access could be limited for heavy seas. This finding seems to be strengthened by the fact that in rezoning the development for residential purposes, the Council would have been effectively endorsing the site as a suitable and safe location, contrary to its role as a local authority.

Putting aside the different geographical locations and local authorities involved, it is fundamentally difficult to reconcile these decisions. There are, however, positive signs of a more consistent judicial approach due to the strengthened role of the NZCPS in shaping policy and planning instruments at the regional and local levels as a result of the New Zealand Supreme Court decision *Environmental Defence Society v The New Zealand King Salmon Co Ltd*[103]. The Court found, in the context of a proposed aquaculture development, that the requirement for planning authorities to 'give effect' to the NZCPS is '… a strong directive, creating a firm obligation on the part of those subject to it'[104] particularly where a

[97] Judy Lawrence, Frances Sullivan, Alison Lash, Gavin Ide, Chris Cameron & Lisa McGlinchey, 'Adapting to changing climate risk by local government in New Zealand' (2013) Local Environment.
[98] Lois Cairns, 'Controversial coastal hazards zonings dropped', *The Press* (online), 29 September 2015, <http://www.stuff.co.nz/the-press/news/72501997/Controversial-coastal-hazards-zonings-dropped>.
[99] Ibid.
[100] *Waterfront Watch Ltd v Wellington Regional Council*, above n 90.
[101] *Otago Regional Council v Dunedin City Council* [2010] NZRMA 263 (EnvC); *Mahunga Etu Incorporated v Hawkes Bay Regional Council* [2014] NZEnvC 83.
[102] *Southern Environmental Association (Wellington) Inc v Wellington City Council* ENV-2007-WLG-190, 15 April 2010.
[103] *Environmental Defence Society v The New Zealand King Salmon Co Ltd* [2014] 1 NZLR 593 (NZSC).
[104] Ibid, 635.

policy is 'framed in a specific and unqualified way.'[105] In *Gallagher v Tasman District Council*[106], the Environment Court declined a plan appeal that would have allowed residential development to take place on land subject to coastal erosion, and stormwater and seawater inundation. The Court applied *King Salmon* in finding that the development should not be allowed as it would increase the risk of social, economic and cultural harm from coastal hazards in conflict with NZCPS Objective 5 and Policy 25.

While *King Salmon* and the NZCPS may result in more consistent decisions in respect of prospective coastal development, local authorities have little control over existing development which is protected through the operation of existing use rights.[107] As large tracts of New Zealand's coastline is already developed, the introduction of coastal development restrictions in district plans will be a necessary but insufficient condition for managed retreat.

One tool available to local government in advancing managed retreat for existing developments is through its role as a provider of special land information in Land Information Memoranda.[108] While bright line planning restrictions on development may be contestable, parties need to be well informed if coastal property markets are to be corrected and expansion and intensification of coastal development contained. Notification may form part of a 'do nothing' approach, but may also, as the result of a comprehensive assessment of coastal hazard, be an important preliminary step for managed retreat.

The New Zealand Ministry for the Environment Coastal Hazards and Climate Change: Guidance Manual 2008 identifies the importance of community information and education, but cautiously states:[109]

> It is well established, both in New Zealand and elsewhere, that the provision of information on coastal hazard risks does not always influence people's decision-making on purchasing or living in property within at-risk areas. Nor does it in general result in property owners proactively and sustainably reducing coastal hazard risk to their property.
>
> Whilst education and the provision of hazard and risk information underpin all aspects of coastal hazard risk management, these are ineffective in managing coastal hazard risk on their own.

This informing role may be performed by notification of coastal hazards on local government property information. New Zealand local authorities are under a statutory obligation to identify hazards that are known to it through a Land Information Memoranda, which is normally acquired at the time of purchase.[110] However, there is some latitude regarding at what point future hazards, such as sea level rise, should be noted. Where there is a failure to provide relevant hazard information, this may support a claim in negligence for any consequential losses.[111]

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[105] Ibid, 636.
[106] *Gallagher v Tasman District Council* [2014] NZEnvC 245.
[107] *Resource Management Act 1991*, s 10.
[108] *Local Government Official Information and Meetings Act 1987*, s 44A.
[109] New Zealand Ministry for the Environment, above n 38, 65
[110] *Local Government Official Information and Meetings Act 1987*, s 44A.
[111] *Smaill v Buller DC* [1998] 1 NZLR 190 (HC). See also *Marlborough DC v Altimarloch Joint Venture Ltd* [2012] 2 NZLR 726 (NZSC). See Julia Harker 'Local Authority Liability for Developments in Areas Subject to Hazards' [2011] 15 *New Zealand Journal of Environmental Law* 277-322.

Despite statutory and common law obligations to provide coastal hazard information, local authorities have faced legal and political challenges when attempting to include coastal hazard notifications on property notices. For example, the Kapiti Coast District Council included reference to 50 and 100 year coastal hazard lines in property information. This was removed after concerned property owners brought judicial review action against the Council, partially due to concerns regarding the accuracy of the hazard lines.[112]

This highlights the importance of strong national or state level hazard benchmarks and the political difficulty for local government in providing such information independently.[113]

C *Discussion*

New Zealand central and local government face many challenges in pursuing Managed Retreat through local government planning restrictions and the provision of coastal hazard information. Such challenges arise partly because of the uncertainty regarding the timing and extent of impacts resulting from sea level rise, but equally because of poor communication of risk to the community.[114] In the absence of real experience of coastal hazards, such as inundation events, views that climate risk is a distant and lower priority threat are often perpetuated.[115]

In many developed countries, adaptation plans are lagging behind likely climate change impacts, sometimes referred to as an "adaptation deficit".[116] This is partly a consequence of institutional and governance barriers, for example at the local government level poor leadership, communication, resource constraints and limited jurisdiction have been identified as barriers to implementing adaptation measures.[117]

This is borne out in New Zealand where empirical research has concluded that the existing legislative framework has been unsuccessful in curbing expansion and intensification of coastal development.[118] Responsibility for preparing communities to adapt to climate change has been delegated to local government under the RMA. However, many local authorities do not have the financial resources to properly map areas affected by coastal hazard, let alone

[112] *Weir v Kapiti Coast District Council* (2013) 15 NZCPR 28 (HC). Kay Blundell, 'Kapiti Hazard Lines are Removed from the Reports', *Dominion Post* (online), 17 December 2013, <http://www.stuff.co.nz/dominion-post/news/kapiti/9526955/Kapiti-hazard-lines-removed-from-reports>.
[113] Bell, above n 39.
[114] Parliamentary Commissioner for the Environment, above n 10.
[115] Manning, above n 40.
[116] Lawrence, above n 97; I. Burton, 'Climate Change and the Adaptation Deficit' in E.L.F. Schipper and I. Burton (eds) *The Earthscan Reader on Adaptation to Climate Change* (Earthscan, London, 2009).
[117] Lawrence, above n 97, citing S. Burch 'Transforming barriers into enablers of action on climate change: insights from three municipal case studies in British Columbia, Canada' (2010) *Global Environmental Change*, 20 (2), 287–297; S. Juhola, S. and L. Westerhoff, 'Challenges of adaptation to climate change across multiple scales: a case study of network governance in two European countries' (2011) Environmental Science & Policy, 14 (3), 239–247; E. C.H. Keskitalo and A. A. Kulyasova, A.A., 'The role of governance in community adaptation to climate change' (2009) *Polar Research* 28 (1), 60–70; J. McDonald, 'The role of law in adapting to climate change' (2011) *Wiley Interdisciplinary Reviews: Climate Change* 2 (2), 283–295; S. C. Moser and J.A. Ekstrom, 'A framework to diagnose barriers to climate change adaptation' (2010) *PNAS*, 107 (51), 22026–22031.
[118] Lawrence, above n 97; Manning, above n 40.

fund large scale adaptive measures in the face of significant community resistance.[119] This may lead local government to favour taking action that is more cost efficient and benefits property owners in the short term, than longer term managed retreat option that could benefit future generations and the wider community.[120] Long term adaptation planning also faces significant political barriers arising from coastal landowners' objections that local government is unjustifiably curtailing their property rights, as well as the reluctance of elected members to engage in such an exercise due to political pressures arising from a short electoral cycle.[121] In the Australian context, McDonald comments that 'there is considerable anecdotal evidence… that local authorities in coastal regional have avoided or delayed the introduction of retreat policies in their planning schemes because they cannot afford compensation claims brought by property owners complaining of lost development rights and lower property values.'[122] Ultimately this may result in a failure to adapt or potentially maladaptation, such as the ad hoc construction of seawalls that may promote path dependency and a false sense of security in the affected population.[123]

The NZCPS and Guidance Manual provide a national mandate for local government to limit development along the coastal margins and advance managed retreat. This will be strengthened by the proposed inclusion of "the management of significant risks from natural hazards" to the list of matters of national importance in the RMA[124] and potentially in a general National Policy Statement on Natural Hazards. While this may give a stronger basis for introducing limitations on new development in hazardous coastal areas, the timing, extent and method of implementation within district plans remains the responsibility of the individual local authority.[125] Within the existing RMA framework, there is potential for central government to promulgate regulations known as National Environmental Standards ("NES"). NES prescribe technical standards, methods or other requirements for environmental matters to be enforced by all local authorities.[126] In the context of coastal adaptation this could include: setting sea level rise projections to be considered in plan making; and providing national benchmarks based on hazard and risk assessments, where hazard zoning will apply and sensitive activities such as residential and infrastructure development will be limited.

Given the limited tools available for the removal of existing development, the next section will consider how government may acquire land for the purpose of managed retreat.

V ACQUISITION OF LAND FOR MANAGED RETREAT

While planning controls have real potential to restrain future coastal development and facilitate managed retreat, existing development is largely protected by existing use rights under the RMA[127]. This poses significant problems where the coastal environment is already

[119] Jan McDonald, 'The ebb and flow of coastal adaptation in Australia' in Randall S. Abate (ed) *Climate change impacts on ocean and coastal law: US and international perspectives* (Oxford University Press, 2015).
[120] Lawrence, above n 97.
[121] Manning, above n 40.
[122] Jan McDonald, 'Mapping the legal landscape of climate change adaptation' in Tim Bonyhady, Andrew Mcintosh and Jan McDonald (eds) *Adaptation to climate change: law and policy* (Federation Press, 2010) 1, 19.
[123] Lawrence, above n 97; C. Freeman and C Cheyne, above n 3.
[124] *Resource Legislation Amendment Bill 2015*, cl 5.
[125] *Resource Management Act*, s 79; Lawrence, above n 97.
[126] Ibid, s 43
[127] Ibid, s 10.

highly developed, such as in many New Zealand urban areas.[128] This problem is identified in the PCE Report:

> little thinking has been done on how to implement a managed retreat strategy. The critical factor is scale – with scale will come the uprooting of entire communities and the associated financial cost. But the alternative to managing an inevitable retreat will be leaving people living in homes that become uninsurable and then uninhabitable.

The following will consider whether existing land acquisition mechanisms by central and local government in New Zealand may be used in their present state to advance managed retreat policies. Property faced with the greatest risk from sea level rise and other coastal hazards could be acquired for a coastal protection reserve. The benefits of such a reserve would be threefold: this process could overcome limitations of the planning process with respect to existing development; dune and wetland restoration could occur, providing essential ecosystem services such as fisheries, coastal protection and carbon sequestration[129]; and the public would retain access to the coastline. Precedent for such reserve space can be found in the United States, where the Federal Emergency Management Agency has promoted the acquisition of high hazard land for open space because of its potential to benefit natural resources and to reduce risk to structures from potential sea level rise.[130]

In New Zealand the RMA[131] and *Public Works Act 1981* ("PWA") empower both the Crown and territorial authorities to designate and acquire land for public work. The Minister of Lands has the power to acquire any land required for any government work carried out for 'any public purpose.[132] Normally attempts should be made to acquire land by agreement before commencing the compulsory acquisition process.[133] The ability of local authorities to acquire land is limited to 'local works' for which they have financial responsibility.[134] This includes the ability to take land compulsorily for public recreation purposes.[135] There is some disagreement as to whether land may be compulsorily acquired for reserve purposes under the PWA or whether it may only be purchased by agreement.[136] While there is no specific mechanism for acquiring land for coastal protection or managed retreat, central government

[128] Jan McDonald, above n 121, 15.
[129] E. B. Barbier, S.D. Hacker,C. Kennedy, E. W. Koch, A.C. Stier, and B. R. Silliman, 'The value of estuarine and coastal ecosystem services' (2011) *Ecological Monographs* 81, 169-193.
[130] Federal Emergency Management Agence, 'Mitigation Ideas A Resource for Reducing Risk to Natural Hazards', January 2013.
[131] *Resource Management Act 1991*, Part 8.
[132] *Public Works Act 1981*, ss 4A and 16. Section 2 defines 'government work' as '…a work or an intended work that is to be constructed, undertaken, established, managed, operated, or maintained by or under the control of the Crown or any Minister of the Crown for any public purpose… even where the purpose of holding or acquiring the land is to ensure that it remains in an undeveloped state.'
[133] Kenneth Palmer, 'Compulsory Acquisition and Compensation' in Tom Bennion, David Brown, Rod Thomas, Elizabeth Toomey (Thomson Reuters, 2009), 15.2.
[134] *Public Works Act*, s 16. Section 2 defines 'local work' as 'a work constructed or intended to be constructed by or under the control of a local authority, or for the time being under the control of a local authority.' Limited to any public work that the local authority was empowered to undertake, construct, or provide prior to being given a power of general competence in 2003: *Local Government Act 2002* (NZ), s 189. Section 12, *Local Government Act* gives local authorities a power of general competence to 'carry on or undertake any activity or business, do any act, or enter into any transaction'.
[135] *Local Government Act*, s 189. *Local Government Act 1974* (NZ), ss 247F.
[136] Auckland Council Parks and Open Space Acquisition Policy (June 2013) states that reserve and open space land may be acquired under the *Public Works Act*, while Kenneth Palmer *Local Authorities Law in New Zealand* (Brookers, 2012) considers that it may only be purchased.

could acquire land for such a purpose as it is undeniably 'public'. Land could potentially be acquired by local government for reserve purposes.

Despite the advantages of acquiring land for managed retreat as part of an adaptation pathway, statutory compensation provisions make such measures prohibitively expensive.[137] In New Zealand, where land is acquired by the Crown or territorial authority, the owner is entitled to 'full compensation' for the property acquired[138] and in future may also receive an increased solatium.[139] The amount of compensation is based on what would be paid in an open market where there is a willing buyer and seller[140] and any increase or decrease in land value due to the prospect of work will not be taken into account.[141]

The market value assessment will take into account the site potential, including special attributes of the property and its development potential under the relevant planning framework.[142] This prospective view of compensation finds support in statements of the Privy Council in the context of the acquisition of land for water supply:[143]

> …it has been established by numerous authorities that the land is not to be valued merely by reference to the use to which it is being put at the time at which its value has been determined … but also by reference to the uses to which it is reasonably capable of being put in the future.

Arguably the market value of land could be reduced based on knowledge of future sea level rise impacts and coastal hazard zoning.[144] However, valuing land subject to planning restrictions 'bristles with difficulties' particularly if no sales data for similarly restricted land is available.[145] Such difficulties will no doubt be encountered with land subject to coastal hazard zoning based on increased risks from sea level rise.

The need to consider such risks has arisen in Canterbury, where as a result of a series of earthquakes in 2010 and 2011, the height of parcels of residential land has subsided resulting in increased flooding vulnerability ("IFV").[146] The New Zealand Earthquake Commission, a Crown entity which provides natural disaster insurance for residential properties, [147] is also engaged in determining the diminution of value ("DoV") of land resulting from IFV. This calculation has proved difficult as knowledge about the IFV effects on land and its impact on the market is still evolving. [148] Research carried out by EQC consultants to establish a DoV methodology found that even where local government clearly identifies existing flood hazard

[137] Turbott, above n 50.
[138] *Public Works Act*, s 60.
[139] *Resource Legislation Amendment Bill 2015* (NZ), cl 171-172.
[140] *Public Works Act*, Section 62(1)(b).
[141] *Public Works Act*, Section 62(1)(c).
[142] Kenneth Palmer, above n 132.
[143] *Vyricherla Narayana Gajapatiraju v Revenue Divisional Officer, Vizagapatam* [1939] AC 302, 313.
[144] Provided that this must not have been introduced immediately before acquisition of the land: *Lands Acquisition Act 1989* (Cth), s 59.
[145] *Port Macquarie West Bowling club Ltd v Minister* (1972) 28 LGRA 23 at 24.
[146] Earthquake Commission, *Increased Flooding Vulnerability Policy Statement* (September 2004) http://www.eqc.govt.nz/.
[147] *Earthquake Commission Act 1993* (NZ).
[148] Earthquake Commission, 'Diminution of Value Methodology for Increased Flooding Vulnerability' (April 2014) http://www.eqc.govt.nz/, 6-7. See also Turbott, above n 50.

areas and notes site specific risks on property information this had 'limited direct impact' on property values[149] and more significantly:[150]

> Overriding positive features such as unique views reduce, and in some cases offset, any diminution of value caused by the risk of flood. Additionally, there is evidence that in some cases unique properties may even exhibit a premium post flood, despite on-going flood risk.

In light of their research, EQC valuers found that the DoV should be assessed as:[151]

> …the discount from the price that would have been paid for a property (the residential land and residential buildings combined) on the day prior to the earthquake that would be agreed between a willing buyer and a willing seller because of the specified physical change to the land, with full knowledge about that change and its impact on the vulnerability of the land to flooding, the cost of repair options, and advice from competent and reasonable advisors.

Such an approach could be applied to valuing land subject to future sea level rise risk: the current market value could be moderated by the willing buyer having full knowledge of the vulnerability of land to sea level rise and the likelihood of the property being eroded within a certain time horizon, based on the advice of competent and reasonable advisors. At the macro-economic level a progressive revaluation of coastal land through hazard notations and acquisition of land may also be needed to ensure that a dramatic price correction does not result when the full implications of sea level rise for coastal property is finally realised by the market.[152]

However, in the absence of any present ability to moderate market value, the compulsorily acquisition process is not likely to be utilised in the short or medium term unless there is a significant rebalancing of coastal property prices in response to potential hazards.

A *Discussion*

As with planning restrictions on coastal land, the acquisition of land for the purpose of managed retreat presents thorny issues for all levels of government due to the significant implications for property rights and the potential cost of compensation.

In the Australian context, Graham has stressed that property law and rights are fundamental to managing coastal hazards as the 'majority of human habitation on Australia's mainland is on its coastlines in the form of private property interests and thus there is a strong cultural and economic investment in protecting those interests in their current form.'[153] Although property is constitutionally protected in Australia[154], this analysis is equally applicable to

[149] Earthquake Commission, ibid.
[150] Ibid, at 57.
[151] Earthquake Commission, *Increased Flooding Vulnerability Policy Statement*, above n 145, 5.
[152] John R. Nolon, 'Land use and climate change bubbles: resilience, retreat, and due diligence' (2015) 39(2) *William & Mary Environmental Law and Policy Review* 321.
[153] Nicole Graham, 'Property and adaptation: the question of coastal erosion' in Penny Carruthers, Sharon Mascher and Natalie Skead (eds) *Property and sustainability: selected essays* (Thomson Reuters, 2011), 43.
[154] Australian Constitution, s 51(xxxi).

New Zealand where consideration of private property rights and property values often drive planning decisions, particularly where the extent of risk is uncertain.[155]

Many arguments are levelled against acquiring and compensating coastal property owners for coastal property as it is inherently subject to the risks of a dynamic coastal environment. The NSW State Government has argued that 'the risk to a property from sea level rise lies with the property owner, public or private, so whoever owns the land takes the risk. Whether it is the state or a private landowner, they gain the benefit of proximity to the ocean and they bear the risk of proximity to the ocean.' [156]

However, there is an argument that land acquisition would socialise the loss of sea level rise damage by spreading the cost amongst all members of society. In addition to the financial benefits of long term managed retreat as opposed to 'ad hoc disaster relief schemes'[157] discussed previously, acquisition could be justified on the grounds that all parties have contributed to greenhouse gas emissions and therefore all should take responsibility for its ill effects.

However, this must be tempered by a requirement to pay fair compensation that does not unduly benefit private property owners as a result of the market's failure to respond to risk, particularly where landowners had knowledge of coastal hazard risks at the time of purchase. As Tarlock identifies:

> The problem is not with the basic idea of helping victims of natural disasters, but with our inability to distinguish between deserving victims and subsidized risk takers. The basic idea of compensation law is the promotion of fairness. The law is designed to compensate victims of regulation who have suffered substantial and *unanticipated* losses in the value of their property, which are disproportionate in comparison to those suffered by similarly situated landowners. [158]

A competing model has been suggested by Local Government New Zealand ("LGNZ"). This would involve the establishment of a nationally funded financial assistance mechanism similar to that administered by the Earthquake Commission ("EQC"), whereby compensation is paid for property affected by earthquake damage. However, LGNZ admits that "such a mechanism does not currently exist and its design and implementation would raise many vexed public policy issues".[159] One problem is that the current EQC scheme is designed to provide compensation after an unpredictable earthquake event has occurred, not to prospectively compensate for a predicted event. However, such a scheme could potentially assist with funding the acquisition of land on a modified compensation basis. Further research of alternative compensation and insurance models is required.

VI CONCLUSION

[155] Manning, above n 40.
[156] House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009), 144.
[157] Bell, above n 39, 83.
[158] A. Dan Tarlock 'Global climate change and the stability of property rights' in Thomas Hartmann and Barrie Needham (eds) *Planning by Law and Property Rights Reconsidered* (Ashgate, 2012), 135.
[159] Local Government New Zealand, 'Managing natural hazard risk in New Zealand – towards more resilient communities', 2014, 43.

Managed retreat has many long term advantages over coastal protection measures in terms of coastal ecosystems, public access and the prevention of maladaptation. Despite such benefits and New Zealand's significant exposure to coastal hazards, managed retreat policies have not been adequately promoted by current legal and planning frameworks. While this is in part the result of the devolution of climate adaptation to local government in the absence of sufficiently directive national planning requirements, it also reflects the more fundamental conflict between planning controls and the acquisition of land with the interests of property owners.

Options that should be the subject of further inquiry include: setting statutory sea level rise benchmarks that trigger enforceable planning controls for proposed development; mapping land that will be protected by hard and soft engineering options and land that should be acquired; and adopting a new statutory regime for acquisition of coastal land.

Effective coastal adaptation in New Zealand will require ongoing public consultation and education to ensure that the community fully appreciates the risks of failing to properly plan for sea level rise adaptation, and that there is acceptance of adaptive measures, such as managed retreat, despite their implications for property owners.