

Article

So Close Yet So Far Apart: Contrasting Climate Change Perceptions in Two “Neighboring” Coastal Communities on Aotearoa New Zealand’s Coromandel Peninsula

Paul Schneider *, Bruce Glavovic and Trisia Farrelly

School of People, Environment and Planning, Massey University, Palmerston North 4442, New Zealand; b.glavovic@massey.ac.nz (B.G.); T.Farrelly@massey.ac.nz (T.F.)

* Correspondence: p.p.schneider@massey.ac.nz; Tel.: +64-21-0299-0399

Received: 11 September 2017; Accepted: 13 September 2017; Published: 18 September 2017

Abstract: Coastal hazard risk, compounded by climate change, is escalating. Efforts to address this challenge are fraught and ‘success’ is elusive. We focus on this impasse and recommend ways to improve understanding, reduce risk and enable adaptation. Two Aotearoa New Zealand coastal communities, Mercury Bay and Kennedy Bay, on the Coromandel Peninsula, serve as case studies. Ethnographic fieldwork underpins this analysis. Despite close proximity, local perceptions are ‘worlds apart’. Poor understanding of climate change, and preoccupation with everyday issues, is commonplace. Moreover, there are countervailing community narratives. In Kennedy Bay, which is undeveloped and Māori, climate change is not a manifest concern. Local narratives are rooted in Māori culture and under the shadow of colonization, which shapes contemporary perceptions, practices and prospects. In Mercury Bay, a rapidly developing resort town, seashore property owners demand protection works—ignoring sea-level rise and privileging short-term private interests. Despite laudable regulatory provisions, static responses to dynamic risks prevail and proactive adaptation is absent. Recommendations are made to improve understanding about local cultural-social-ecological characteristics, climate change and adaptation. Enabling leadership and capability-building are needed to institutionalize proactive adaptation. Strengthening Māori self-determination (rangatiratanga) and guardianship (kaitiakitanga), and local democracy, are key to mobilizing and sustaining community-based adaptation governance.

Keywords: Aotearoa New Zealand; Coromandel; Kennedy Bay; Mercury Bay; Whitianga; vulnerability; climate change; coastal hazard risk; adaptation governance

1. Introduction

The impacts of climate change on low-lying coastal communities will be predominantly negative and will compound coastal hazard risk [1–4]. Climate change is, therefore, a critical issue facing coastal communities [5–7]. Anticipatory adaptation is imperative [4,8–10]. This is even more so the case as risk escalates and mitigation continues to be hampered by insufficient political will [11,12]. Despite considerable attention over the last decade, ‘success stories’ of anticipatory adaptation are few and far between [8,13,14]. Ostensibly, more exigent matters take precedence and business as usual prevails [7,15,16]. Why is it so difficult to implement practical measures to reduce coastal hazard risk and adapt to climate change; and what might be done to break this impasse?

We address this question by focusing on two coastal communities on the Coromandel Peninsula, Aotearoa New Zealand (Aotearoa is the widely accepted Indigenous Māori name for the country) (see Figure 1). Reducing coastal hazard risk and adapting to climate change is a legislative requirement

and a local government responsibility. However, this policy rhetoric is seldom translated into local reality [17–21]. Climate-related risk might be ignored for the time being, but coastal communities, such as those on the Coromandel Peninsula, will sooner or later enter what Moser [22] refers to as ‘the period of consequences’—when shifts in mean climate conditions and rising sea levels can no longer be ignored. This study provides insight into everyday realities in two neighboring coastal communities lying ‘so close yet so far apart’. Significantly, despite their geographic proximity, these two communities have widely divergent perceptions about climate change. These differing perceptions reflect differences in historical experience, culture, values, worldviews, interests, and socio-economic and political standing. We explore how to reconcile these viewpoints and realities, and enable proactive risk reduction and adaptation.

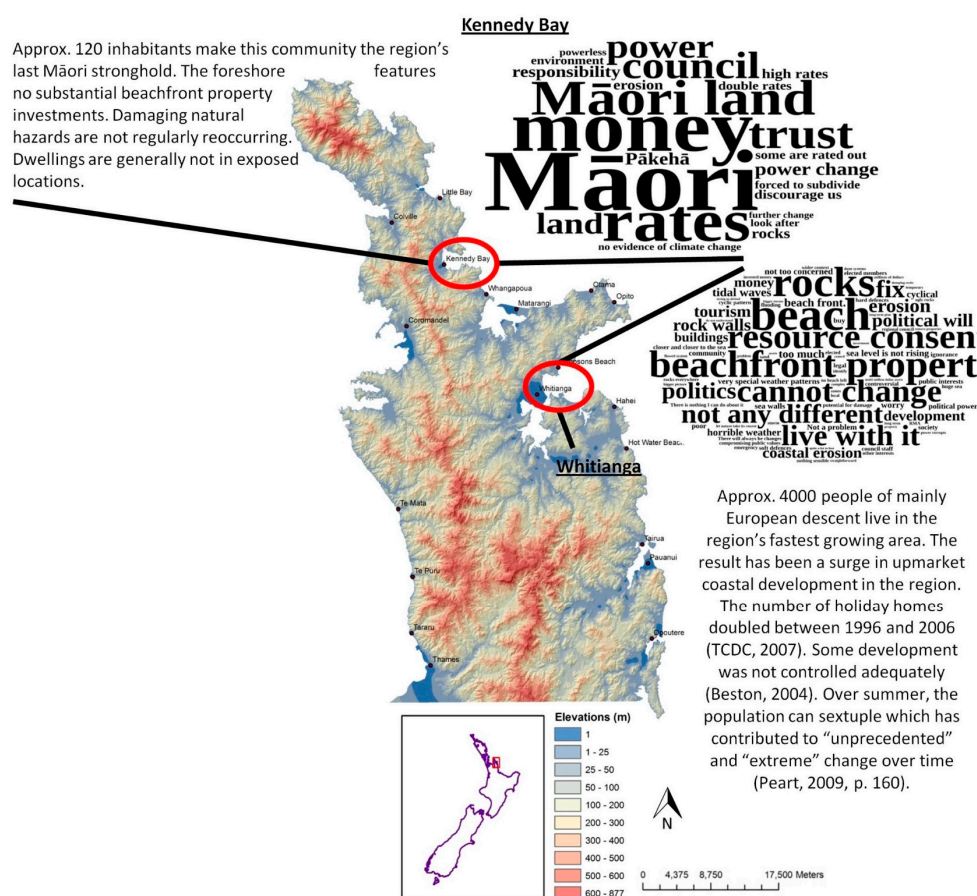


Figure 1. Overview of Kennedy Bay and Mercury Bay and the words most frequently used by research participants in interviews, in word cloud format.

Barnett et al. [23] underscore the difficulty experienced in building a common understanding about climate change, and reaching agreement on adaptation plans, in the face of an uncertain future and ongoing societal and environmental changes. Climate change denial, ignorance and contestation are barriers to adaptation [14,15]. Adaptation barriers, including natural, social, human and informational barriers, have received much scholarly attention in recent years [8,13,15,24,25]. Clearly, barriers need to be overcome for adaptation to be understood, planned for, and managed [24,26]. Failing to address barriers (beginning with understanding the ‘problem’) is a barrier in itself [26]. Drawing upon Moser & Ekstrom’s [26] ‘barriers to adaptation’ framework, which is explained in more detail below, we explore how climate change and adaptation are understood, and the implications for adaptation planning and management. We do so through the stories or narratives of those at the coalface of coastal hazard risk and adaptation reality, and, among other

things, shed light on ‘how risks are defined, who is authorised as actors in the change debate, and the range of policy options considered’ [27].

There are many different ways to analyse and disclose divergent climate change views, experiences and adaptation options. Some social science approaches have been judged as ‘lacking scientific rigour’ but such criticism has ‘declined sharply’ in recent years [28,29]. In a field of research traditionally dominated by the physical sciences, the social sciences are increasingly valued for revealing the human dimensions of climate change and making ‘visible’ the reality of those directly affected. Qualitative research methods can ‘significantly inform public engagement, deliberation and learning strategies—features of systemic adaptive governance’ [27]. ‘Experiencing, interpreting and representing culture’ [30], and gaining insight into individuals’ values shaping their ‘understanding of specific climate risk factors and management strategies’ [31], are now recognized as key aspects of adaptation research. Nonetheless, climate change narratives remain underrepresented in the climate change literature, including that relating to Aotearoa New Zealand. This article addresses this shortcoming and has a two-fold aim: First, we share stories from two neighboring coastal communities on the Coromandel Peninsula. These present strikingly different views about coastal hazard risk and climate change. Second, we consider ways to facilitate social learning about how climate change is understood within and between these communities and beyond, and how to reconcile differences and mobilize proactive risk reduction and adaptation at the local level.

2. Case Study Context and Research Methods

This section describes the case study context before outlining the ‘barriers to adaptation’ framework, and the rationale for, and nature of, the fieldwork and research methods deployed in this study.

2.1. Context: Key Features of the Aotearoa New Zealand Setting

Several geographical, historical and contemporary cultural, socio-economic and institutional features of Aotearoa New Zealand need to be highlighted to contextualize this research and the selection of the case study communities. From a geographical standpoint, Aotearoa New Zealand is a small developed nation comprising two large islands, about 600 smaller ones and a vast ocean realm in the southwest Pacific Ocean. The country has a maritime climate that is moderated by the Southern Ocean. Climate change is leading to, among other things, higher than average temperatures, more hot extremes, fewer cold extremes, and shifting rainfall patterns in some regions, with heavier and more extreme rainfall and more frequent droughts [32,33]. The country’s market-based economy is driven mainly by agriculture, forestry, fisheries and tourism, and it has a robust manufacturing and services sector. Many activities within these sectors are vulnerable to climate change impacts. Climate change has particularly significant implications for coastal hazard risk because over 65% of the population live within 5 km of the coast (based on 2006 census data), and there has been a dramatic boom in coastal development since 2000 [34,35]. Coastal development is likely to continue to intensify into the future in the face of rising sea levels and escalating coastal hazard risk. Over 9000 homes (and extensive related infrastructure) are less than 50 cm above spring high tide levels [36]. In a yet-to-be-released study recently leaked to media, the National Institute for Weather and Atmosphere (NIWA), estimates that the replacement cost of over 68,000 buildings exposed to climate change compounded coastal hazard risk is about NZD19.4 billion; the resident population at risk in low elevation zones is over 133,000 people; and over 2100 km of roads and five airports are at risk [37]. Adaptation is therefore a compelling albeit challenging imperative for coastal communities [21,32,33,36,38,39].

From a historical perspective, Aotearoa New Zealand was settled by Māori in the late 13th Century. European settlement began in the 1700s and impacted the Māori way of life in very significant ways, including newly introduced infectious diseases that caused epidemics, decades of conflict, and the pernicious impact of Western civilisation [40–42]. According to Hooper & Kaerins [43] confiscation of Māori land by the Crown, mainly in the second half of the 19th century, was a massive ‘land-grab’ that was a ‘major source of Crown revenue’ and has ‘much in common with more recent land appropriations

in Zimbabwe and Palestine'. By the early 20th Century, the ecological and cultural characteristics of the country had been transformed by colonization and associated sale and dispossession of Māori land, forest clearance, resource extraction, introduction of new species, wetland drainage, extensive pastoralism, and the emergence of industrial agriculture [44]. Woodlands had been converted to farmlands and Indigenous Māori society was supplanted by European social mores, governance institutions, and patterns of production and consumption. Like Indigenous people in many other colonized countries, Māori were dispossessed of their land, their and access to traditional resources was curtailed, and they suffered persistent injustices that continue to shape their lived realities and key aspects of Aotearoa New Zealand's environment, culture, society, economy and politics. Colonization and dispossession thus cast a shadow over current debates about social-ecological change, including climate change.

From a contemporary cultural, socio-economic and institutional perspective, despite a revival of Māori culture from the 1960s and decades of concerted political effort to redress historical injustices and grievances, Māori continue to face significant obstacles. Relative to other ethnic groups, Māori have lower socio-economic and educational status, worse housing and higher levels of incarceration, and ill-health [45–47]. Radical restructuring of the political economy in the 1980s and 1990s, driven by a neoliberal agenda, increased vulnerability to environmental and economic shocks, particularly impacting Māori. About 74% of the population is of European descent, 12% is Asian, over 7% are non-Māori Pacific Islanders. Māori make up about 15% of the population [48]. The distinctive Māori culture, with their own language, Te Reo Māori, rich mythology, and traditional practices, nonetheless has a major influence on Aotearoa New Zealand culture and society. The 'founding document' of the country is the Treaty of Waitangi. The Treaty was signed in 1840 by about 500 Māori chiefs and representatives of the British Crown. English and Māori versions (at least five) of the Treaty vary significantly and there is no consensus on what was actually agreed to [40,49]. The English version of the Treaty gave Britain sovereignty, an exclusive right to buy Māori land, and the right to govern whilst Māori retained ownership rights over their land, forests, fisheries, and other possessions. Māori were also accorded rights and privileges as British subjects. By contrast, Māori versions of the Treaty did not require Māori to give up their sovereignty, despite transferring governorship (kāwanatanga) to the British; and the Treaty guarantees full chiefly authority (tino rangatiratanga) over land, forests, waters and 'treasures' (taonga) which include intangible considerations beyond the European notion of 'property'.

Thus, there are fundamentally different understandings of the Treaty. It is now commonplace to refer to the principles or 'spirit' of the Treaty. A Commission of Inquiry, the Waitangi Tribunal, was established in 1975 and was granted exclusive rights to discern the meaning of the Treaty and investigate breaches of the Treaty by the Crown. An Office of Treaty Settlements settles historical claims to make up for past breaches and restore Crown relationships with iwi (Māori extended kinship group or tribe). Principles of the Treaty are incorporated into many Acts of Parliament, including laws shaping local government planning and decision-making relevant to climate change. For example, the Resource Management Act (RMA), the principal planning legislation in Aotearoa New Zealand, and the Local Government Act (LGA), which defines the purpose, roles and responsibilities of local government, both require local government and other parties to take into account the principles of the Treaty, including among other things, a requirement to consult local Māori as 'people of the land' (tangata whenua) and to protect their customary rights. The LGA requires councils to establish and maintain processes that enable tangata whenua to participate meaningfully in local government decision-making.

A variety of regulatory and non-regulatory provisions are in place to address climate change. Responsibilities for, among other things, land use planning, emergency management, and the provision of basic services, are devolved to local government. The management of significant natural hazard risk is identified as a matter of national significance in the RMA. The New Zealand Coastal Policy Statement (NZCPS) specifically requires local government to avoid increasing coastal risk due to

natural hazards and climate change (Objective 5). NZCPS policies require local government to identify coastal areas exposed to coastal hazards, prioritizing areas exposed to high risk over at least 100 years (Policy 24). In areas exposed to high risk, efforts must be made to avoid increasing risk. For example, the relocation of exposed infrastructure where practicable; discouraging ‘hard’ protection structures; and encouraging alternative ‘soft’ engineering (Policy 25).

Steps need to be taken to protect, restore or enhance natural coastal defences that shield coastal assets from hazard impacts and climate change (Policy 26). In areas of significant existing development that is at risk, among other things, the reasonably foreseeable needs of future generations need to be taken into account and, where protective works are deemed necessary, the environmental and social costs of such works need to be identified and considered; and transition options that enable sustainable long-term risk reduction in the face of uncertain and changing coastal hazard risk need to be investigated (Policy 27). Other NZCPS policies reinforce these provisions and require a strategic approach to the protection, use and development of the coastal environment (see Policies 6 and 7) and a precautionary approach (Policy 3) concerning activities that have uncertain, unknown, or poorly understood (yet potentially significant) impacts on the coastal environment. The NZCPS is the principle regulatory mechanism to address coastal hazard risk and climate change in a conjoined manner. It is supported by a range of other legislative provisions in the RMA, LGA, and other laws. Furthermore, a wide range of non-regulatory initiatives are underway to address climate change and facilitate adaptation. These include government guidance on adapting to climate change at the local level, and a host of public education and awareness raising schemes. A range of climate change and adaptation-focused research projects have also been underway, a number of which actively involve local stakeholders in applied research that aims to institutionalize proactive adaptation. Notwithstanding these laudable regulatory provisions, and concerted efforts by many, adaptation ‘success’ at the local level is elusive [17–21]. Why, and what might be done to address this impasse?

The Coromandel Peninsula is a good location to explore this question because of its geographical features, including demographic and coastal development patterns; exposure to climate change impacts and escalating coastal hazard risk; its history and contemporary cultural, socio-economic and institutional features, including Māori and non-Māori communities, diverse livelihood practices and socio-economic activities, including its popularity as a tourist and holiday destination, and local government practices that reflect the character of much of Aotearoa New Zealand outside the main city centres.

2.2. Context: Whitianga/Mercury Bay and Kennedy Bay

Two coastal communities were selected for this study, Mercury Bay (Te-Whanganui-o-Hei) and Kennedy Bay (Harataunga) (see Figure 2) because of their close proximity, shared administrative jurisdiction and contrasting features that together reflect the character of the Coromandel. Whitianga (in the centre of Mercury Bay) is a rapidly growing resort town, with affluent beachfront development and associated infrastructure, attracting people seeking to experience a beach lifestyle or ‘Kiwi’ summer holiday. Residents are predominantly of European descent, and the town’s population increases dramatically every summer with an influx of holiday visitors. Kennedy Bay by contrast is a small, predominantly Māori community without significant development. Despite these contrasts, these communities lie in close proximity in scenically attractive bays on the Peninsula’s East Coast. How might these distinctive features shape perceptions of, and understanding about, climate change and adaptation practices and prospects?

In less than half a century, Whitianga, in the centre of Mercury Bay has transitioned from being a traditional coastal community (in many ways similar to what Kennedy Bay is today), with few holiday homes (called ‘baches’ in Aotearoa New Zealand), to a resort town with developed shoreline and residential canal development catering mainly for affluent Auckland city dwellers. According to the latest available 2013 census data, 4368 people live in Whitianga, 89.1% of whom are of European descent. The population increased by 15.9% between 2006 and 2013. In 2013, there were

1986 dwellings in Whitianga, 1248 (62.8%) of which were holiday homes and are unoccupied for most of the year. Whitianga experienced the largest increase in the number of new dwellings built on the Coromandel Peninsula in recent years: an increase of 1059 new dwellings between 1991 and 2006. The number of holiday homes, mainly unoccupied dwellings, increased by 38.5% in the 10-year period between 1996 and 2006 [50]. This figure almost doubled again between the 2006 and 2013 censuses. Whitianga's transformation has occurred at such a fast pace that, according to some community members, local authorities are not able to manage the development adequately [51]. According to the Coromandel Peninsula Blueprint [52], Whitianga's summer population can increase by up to 600% over summer. The town's permanent population is projected to reach 6000 by 2040. These statistics reflect the 'unprecedented' and 'extreme' changes that have already been experienced and that are likely to continue into the foreseeable future [35] given that the Mercury Bay area, especially Whitianga, is described as 'the Hauraki–Coromandel's fastest-growing area... [with] extensive flats for expansion' [53].



Figure 2. Comparison between (a) Kennedy Bay and (b) Whitianga/Mercury Bay (Google maps, 2017).

Kennedy Bay, on the other hand, could hardly be any more different. No census data is collected from this community. According to a survey conducted in 2008 by local historian John Hovell, approximately 120 people live in Kennedy Bay: the majority of whom identify as Māori or 'part-Māori'. There are only a few people of European descent living in Kennedy Bay, and few holiday homes. There is little evidence of material wealth in the community. There is no village shop or any other form of retail outlet in the community. The sandy beach is neither visible nor easily accessible from the road. Even the houses along the road are set back with long driveways and fences to either side. The beach is fenced off and there is only one (unmarked) road access. The owner of the land through which the beach access goes, George Potae, has the locally-ascribed role of gatekeeper to the beach. He claims to 'have no intention of preventing *Kennedy Bay people* [italics added] from exercising their customary usage of free access to and from the beach' [54].

Thus, although these two communities are only about 20 km apart ('as the crow flies'), there are stark differences between them. How might these distinctive local characteristics shape understanding and perceptions about climate change, and adaptation praxis and prospects? Given the prevailing adaptation impasse, our starting point was to focus on adaptation barriers.

2.3. Adaptation Barriers Framework

The ‘barriers to adaptation’ framework developed by Moser & Ekstrom [26] informed how we conceptualized this research and structured our data analysis. The framework was selected because of the breadth, detail, and processual nature of its approach. It is beyond the scope of this article to discuss Moser & Ekstrom’s framework in detail. However, it is important to note the three key components that make up this framework: *understanding*, *planning* and *managing* (see top left panel in Figure 3). These components represent a staged depiction of a rational planning approach to adaptation while recognizing that this is an idealized depiction of reality. Our research focused mainly on the first of these three components, *understanding* (or the lack thereof), which can be a persistent barrier to detecting and addressing climate change risk. *Understanding* comprises: (i) detection of the problem; (ii) gathering and use of information; and (iii) a (re)definition of the problem possibly requiring a decision. Adaptation barriers are situated within these three subdivisions, and are situation-specific. Figure 3 illustrates when and how an adaptation phase is completed, shows individual barriers within the *understanding* phase, and associated stages.

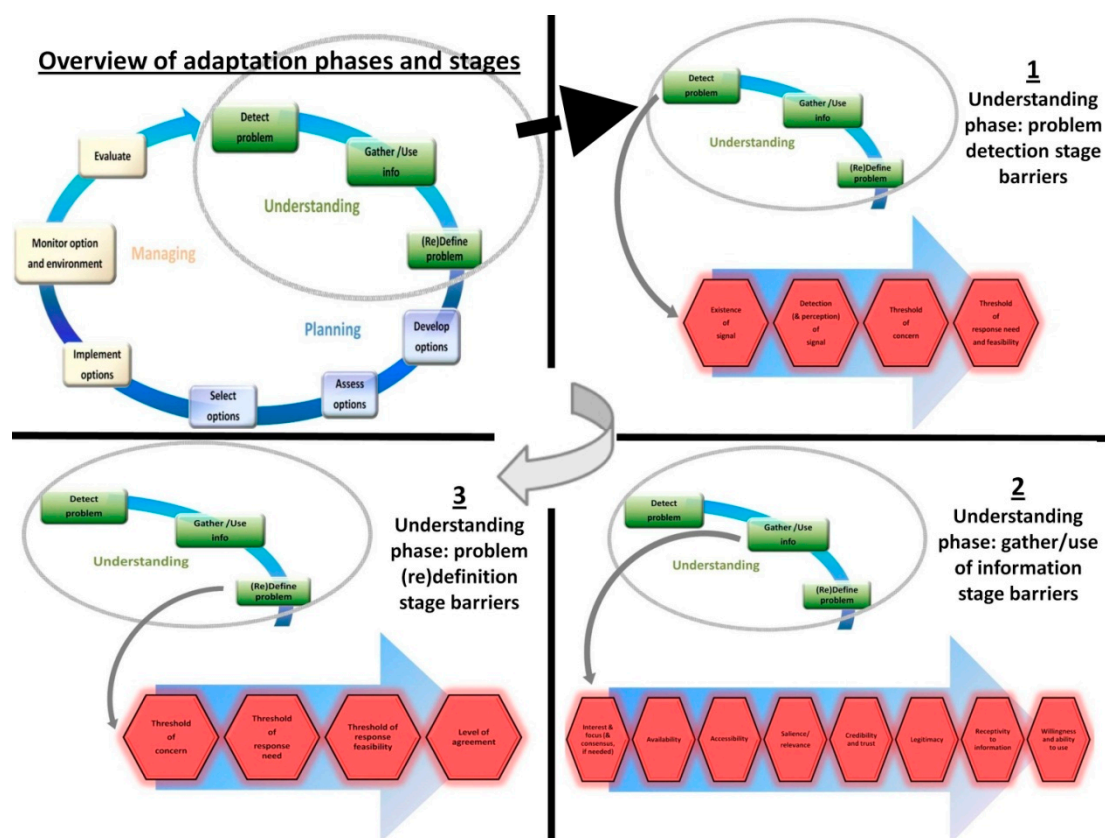


Figure 3. Adaptation phases and stages, with a focus on barriers to understanding (after [26]).

Overcoming barriers in the *understanding* phase is paramount to progressing to the *planning* phase and eventually the *management* phase [26]. If barriers in earlier stages are ignored, they can hamper subsequent efforts to move from one stage to the next. We used ethnographic methods to study how climate change is understood in the two case study communities, and how these understandings shapes coastal hazard risk reduction and adaptation practices and prospects.

2.4. Understanding Climate Change on the Coromandel Peninsula: Ethnography

Ethnography describes the in-depth study of people, social interactions and cultural phenomenon. It refers to how research is conducted and how it is reported. Ethnography as a research method involves in-depth, long-term fieldwork with the researcher embedded in a community to systematically document their lived realities. Ethnography as a written report refers to the detailed or ‘thick description’ of the lives and social interactions of people studied (after Clifford Geertz). Initially developed by anthropologists, ethnographic research is now widely used in the social sciences and deploys a variety of methods to interpret and appreciate other people’s ways of life. Importantly, ethnographers go beyond merely reporting viewpoints, events and activities. They seek to understand how people think, behave, interact, etc. from the perspective of those being studied; what things mean to research participants; and how this relates to societal structures and processes.

This article draws upon the findings of ethnographic doctoral research carried out by Paul Schneider [55]. Paul has lived on the Coromandel Peninsula for over 10 years, has developed trusting relationships with many people in the region, and has been able to engage with, and observe, climate change related issues in the two case study communities over many years. In this article, we focus attention on the findings of a series of interviews carried out as part of Paul’s doctoral fieldwork. The semi-structured interview process was framed by six themes. These themes were identified through the doctoral research as being most relevant for understanding climate change and adaptation barriers, enablers, and prospects on the Coromandel Peninsula:

- i. Knowledge of the Peninsula’s coast and ongoing development
- ii. Perception of climate change salience
- iii. ‘In situ’ knowledge, problems and concerns
- iv. Anticipated environmental changes
- v. Adaptation already underway
- vi. Governance roles and responsibilities and future development prospects

While these themes guided the interviews, the specific questions posed depended on unfolding conversations given the interests, roles, and experience of participants. For example, when interviewing a Māori elder (kaumatua) in Kennedy Bay, greater emphasis was placed on questions related to traditional knowledge; whereas the local mayor was invited to questions which focused on formal government roles and responsibilities).

2.5. Participant Selection

Participants were selected to canvas diverse perspectives and experiences in both communities and from the wider Peninsula to reveal (i) local views on climate change, risk, and adaptation; and (ii) the extent to which regulatory and non-regulatory provisions translate into local adaptation reality and enable effective action. Research participants were selected based on the location of their property or the property they manage (for example, beachfront property owners, campground managers, and those living in high-risk areas); snowball selection via identification by the local iwi (the largest social Māori unit, extended kinship group or tribe) manager; the sector they work in; their instrumental relationships to the Coromandel Peninsula (for example, insurance representative assigned to assess flood damage events, road network provider assigned to the area, or researchers); the role within government (such as emergency management, climate change guidance, or planning); and governance role (such as the Ministry for the Environment spokesperson, local political party candidates, and local and regional council officials). In total, 10 participants were selected from Mercury Bay and seven from Kennedy Bay. A further 14 participants were selected based on their climate change-relevant professional responsibilities on the Coromandel Peninsula (i.e., council representatives, Crown Research representatives, a New Zealand Transport Authority representative, a coastal scientist, a property developer, an Insurance Council Executive, and politicians).

2.6. The Interview Process

Prior to interviewing, the research aim, scope, and ethical considerations were discussed with participants. Some participants relinquished their entitlement to anonymity and wanted to be identified, while others expressed concern about the prospect of identification. The main concern of some participants was that their identification could have negative implications for future local government decisions. In order to represent all participants' insights accurately and fairly, and respect participants' viewpoints, all interview findings, except those articulated by political party leaders, have been reported anonymously.

In some cases, photo-elicitation was used to initiate discussion and to encourage descriptive detail in participants' narratives [30,56]. Aerial photographs, kindly supplied by the Thames-Coromandel District Council, were used to show what the two bays looked like in the 1950s and 2010s. The stories told by some locals, in particular those who have lived in the area most of their lives, were often supplemented with photographs of their own. The memories of the past evoked by the photographs proved to be of particular importance to locals elders. To them, photos generated memories which in turn stimulated elaborate stories. Novelist John Berger writes, 'The thrill found in a photograph comes from the onrush of memory. This is obvious when it's a picture of something we once knew' ([57], cited in Harper, 2002, p. 13). The interviews, the use of photos in interviews, and the narratives they evoked produced nuanced accounts of participants' lived realities that went 'beyond presentational rhetoric and behavioural shows' [58]. Participants' accounts of their understandings, interpretations, and practices were honoured while also giving consideration to possible alternative explanations/interpretations through triangulation with other data obtained throughout a year of fieldwork that included interviews with other participants, personal observations, and analyses of GIS maps and secondary data sources.

2.7. Interview Analysis

Once all interview data from the 31 interviews (with an average length of one hour each) was transcribed, the data was categorized according to their relationship to the six themes noted above. A total of 14 sub-themes emerged from the narratives and were subsequently iteratively coded:

1. Adaptation underway
2. Climate change salience
3. Coastal defence
4. Wider challenges
5. Hazards and environmental challenges
6. Insurance
7. Local knowledge
8. Option development
9. Politics
10. Power
11. Problem detection
12. Roles and responsibilities
13. Coastal development
14. Coastal erosion

These sub-themes reflect participants' key climate change-related concerns, and enabled the application of the adaptation framework to diagnose adaptation barriers [26] on the Coromandel Peninsula. Visual coding was used to highlight key features of the stories shared in the interviews. Word clouds, also known as tag clouds (see Figure 1), were generated to illustrate the distinct nature of climate change concerns in each community. Word clouds portray the frequency of words in a given text and have been described as 'scholarly toy[s] of worth to the academic community' [59].

World clouds provide readily-accessible summaries of key topics generated from the raw data in an ‘aesthetically pleasing presentation where different font sizes are coordinated to create an attractive visualization compared to blocks of text or lists of words’ [60]. However, we found that this ‘scholarly toy’ [59] has limitations even when treated as a supplementary research tool: ‘[e]ach word is treated as the unit of analysis [and] the semantics of the words and also the phrases and even sentences the words are composed of [are neglected]’ [59]. We found that one way to address this limitation is to manually connect words, e.g., *central + government*, *beachfront + property*, or *climate + change*.

3. Results

“I believe that we are in some sort of a cyclic pattern.”

—Mercury Bay beachfront property owner

Our findings suggest that climate change is not ‘detected as a problem’, and that available information is not gathered and used in ways to foster shared understanding, in either Mercury Bay or Kennedy Bay. Moreover, fundamentally different views on climate change are expressed by research participants in the two communities. Compare, for example, the ‘word clouds’ in Figure 1 to see the distinctive issues raised in each community. It is notable that, at first glance, none of the words or terms used most frequently (See Figures 1 and 4) appear to have a direct relationship with coastal hazard risk, climate change or adaptation. However, these seemingly unrelated notions are the main concerns locals conveyed in the interviews and thus reflect their lived experience and how they understand and frame climate change, risk reduction, and adaptation praxis and prospects.

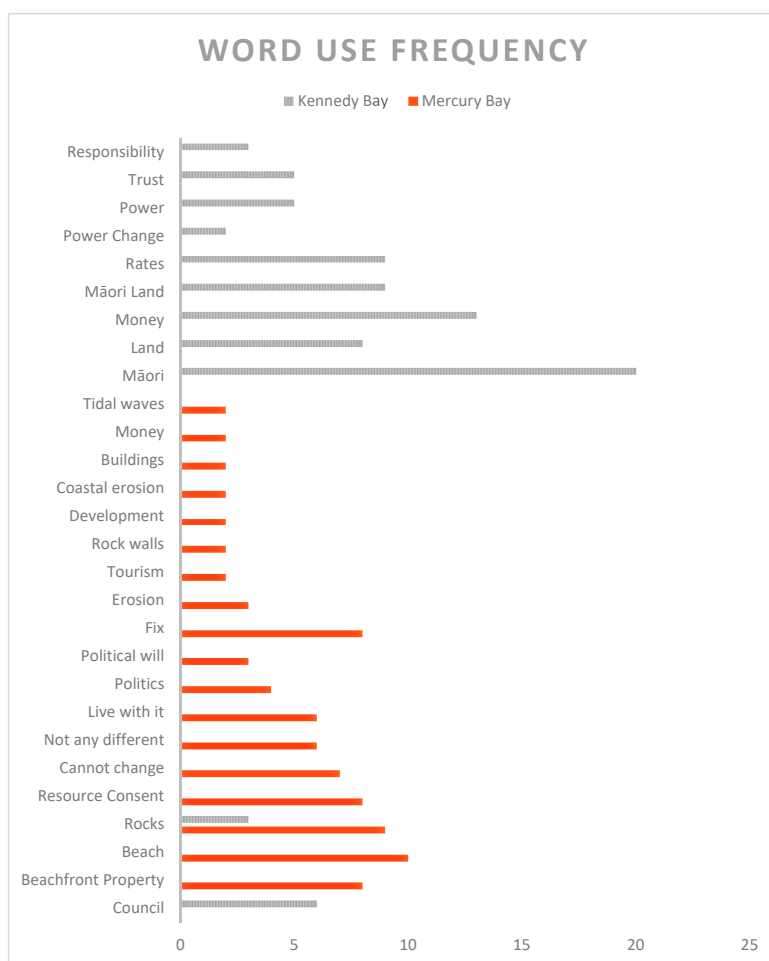


Figure 4. Word use frequency in Kennedy Bay and Mercury Bay interviews.

Table 1 presents examples of participants' observations about the relevance of climate change, concerns about coastal development patterns, and how power and politics shape development and future prospects.

Table 1. Representative examples of research participants' understanding of coastal risk and development prospects.

Interview Category Example	Examples from Participants Associated with Mercury Bay	Examples from Participants Associated with Kennedy Bay
Climate change salience	"It's something we can't change. [I am] not unhappy to live with it. I don't like to get too concerned about it; we can worry about it once it takes shape" (Mercury Bay coastal property owner).	"If climate change were to impact on our environment...that would be absolutely devastating. I see no evidence of climate change and I don't believe that scientists always get it right" (Kennedy Bay long-time resident).
Coastal development	"I can't think of a sensible idea why council would let people build so close to the sea. The people who just started building next door were allowed to build closer to the sea than anyone else. How can this happen? They don't tell us anything so we don't know what's going on. These people are property developers from Auckland, so I guess they just know how to work their way through council. They did go to the Environment Court, and they also chopped down a beautiful old Pohutukawa tree that was in their way" (Mercury Bay coastal property owner).	"The problem with the rise in coastal property value is that some people are being rated out because rates are assessed on the capital value of the property. So as the value of the property increases, rates inevitably increase. Coastal camping grounds, for example, couldn't afford rates, so they had to subdivide" (Kennedy Bay long-time resident).
Power and Politics	"Often you have powerful councillors who have doubts about the science and then hold on to uncertainties so they don't have to consider it" (MFE spokesperson). "Any one of those [beachfront property owners] has more access to political power than half the rest of the community" (local coastal scientist).	"We don't trust any of the government departments. We don't need them here to tell us how to sustain our land... Council is just a pack of arseholes there to gather revenue for the government . . . You can fight them and they'll go away but not for long. They come back from a different angle" (Kennedy Bay long-time resident).

What do these findings suggest about how climate change is understood, and how coastal hazard risk might be reduced? What proactive steps then might be taken to adapt to climate change on the Coromandel Peninsula?

4. Discussion

According to Moser & Ekstrom [26], 'detecting a problem' is the point of departure for understanding and addressing climate change. Relevant information then needs to be gathered and used, and the problem (re)defined before moving onto planning for, and managing, climate change (See Figure 1). Four barriers influence problem detection: existence of a climate change signal; detection of signals; threshold of concern; and threshold of response, need, and feasibility. Despite readily available scientific evidence about the reality of climate change, and the need for proactive adaptation in Aotearoa New Zealand, many research participants are unaware that climate change signals exist; do not detect such signals, are not sufficiently concerned about them, and/or do not see a need for response. Climate change is simply not detected as a problem in the daily lives of most research participants. Many interviewees expressed fundamental doubt about the reality of climate change, filter out climate change signals and/or are not sufficiently concerned about climate change. For example, a long-time Mercury Bay resident claimed to 'see no evidence of climate change' and asserted 'that scientists [do not] always get it right'. Another argued that climate change is 'something we can't change', that we should not 'get too concerned about it' and that '[w]e can worry about it once it takes shape'. Yet another research participant compared climate change to a 'crystal ball gaze' while the New Zealand Transport representative mused that, "if climate change is really upon us, it's going to be so gradual and any change in the way we do things is also going to be gradual. Don't panic yet!"

Even if a problem is detected, Moser & Ekstrom [26] identify a series of barriers to gathering and using information about climate change: interest and focus; availability; accessibility; salience; credibility and trust; legitimacy; and receptivity to information. Each of these barriers became evident

in the interviews. Progressing to problem (re)definition must transcend thresholds of concern, response need and feasibility, before sufficient agreement can be reached. Only then can one progress towards adaptation planning and management. The interviews, corroborated by participant observation and other fieldwork carried out as part of the doctoral research, demonstrated clearly that most people are 'stuck' in the understanding phase—unable to overcome barriers to 'detecting a problem' and 'gathering and using information'. Moreover, climate change, and what if anything should be done about coastal risk reduction and adaptation, is understood in widely divergent ways in the two case study communities. How might these findings be explained?

The climate change and coastal hazard risk 'problem' is subsumed in everyday, 'in situ' local problems and concerns. Indeed, seemingly unrelated issues constitute the 'real world context of multiple stressors, on-the-ground vulnerabilities, and the actual capacity of communities... to respond to rapidly unfolding changes in the physical and social environment' [61]. In Mercury Bay, expensive houses are being built as close as possible to the ocean and coastal canals continue to be constructed. Such development is taking place despite severe coastal erosion, and frequent storm and flood events which will get worse with relentless sea-level rise. Despite visible climate change signals, and first-hand experience of impacts, the majority of the research participants perceive little cause for concern. A Ministry for the Environment spokesperson observed: 'While the science is accepted by scientists, it is not necessarily accepted by everyone. Often you have powerful councillors who have doubts about the science and then hold onto uncertainties so they don't have to consider it'. In Mercury Bay, as in many other coastal communities around the world, climate change tends to be seen as 'no more than background noise' [62]. Furthermore, there is widespread belief that protective techno-fixes can prevent future damage. 'That only leaves one response and that's to put rocks in place', a Waikato Regional Council representative explained. The reliance on rocks, seawalls and other techno-fixes gives rise to a 'safe development paradox' whereby communities are lulled into a false sense of security until an extreme event, or a shift in mean conditions, such as a rise in sea level, exceeds design standards and devastating impacts result [63].

As shown in Figure 4, Mercury Bay participants used words such as 'beach', 'rocks', and 'beachfront property' to describe the coastal setting and at-risk properties, while the terms 'resource consent', 'political will' and 'politics' relate to the political arena and adaptation actions/inactions. The term 'beachfront property' refers to the private interests at stake. Other frequently used terms including 'not any different', 'cannot change', 'live with it', and 'fix' refer to the participant's perspective on whether or not there is a climate change signal, and if so, what can be done about it. The Mercury Bay narratives also indicate that there is little to no agreement when it comes to whether or not climate change and associated risk is real, and whether or not anticipatory adaptation is necessary. Nonetheless, climate change denial and reliance on protection works and techno-fixes are commonplace. Perhaps ironically, the appeal of 'unspoilt' Mercury Bay, which originally attracted people to this area, and why it is still held so dearly, is reflected in frequent use of the word 'beach'.

For some, Mercury Bay is being 'loved to death' because its unspoilt character has been eroded by recent development patterns. There is also a sense that 'community character and interests' are being eroded. This could stem from the prioritization of private interests over community concerns and interests, in part explaining divergent perceptions of, and responses to, climate change risk and consequently, adaptation prospects. The interviews, together with documented changes and personal observations about the nature of development that has taken place in this part of the Peninsula in recent decades, provide clear evidence that private property rights predominate over public interests. Rapid coastal development and the high number of vacant holiday dwellings have eroded the 'community feel' in this beautiful bay with its colourful but contested history founded upon traditional Māori cultural and livelihood practices, subsequent colonization and dispossession, and more recent activities ranging from boat building to kauri tree and flax milling, gold mining, gum digging, conservation, and tourism.

Reflecting on recent rapid development in Mercury Bay, and the prioritization of private over community interests, a Kennedy Bay resident commented: 'Whitianga sold its soul'. A Mercury Bay resident indicated that 'the [Whitianga] Waterways have caused a lot of problems' and that '[this] development should not have happened' since it has led to both social ("it's not about us anymore") and ecological ("the whole bay has changed since... I've lived here all my life and I can just see the change") problems in the bay. Another long-time resident remembered that "[i]t was so wonderful and lovely and wild when we were children... Those Hopper brothers (coastal property developers) have a lot to answer for. I think they want to put up a bronze statue too. I read something about that recently. This is why my heart will stop beating one of these days. I just can't handle it: it's so horrible... just too much." If the majority of houses are vacant for most of the year, then a loss of sense of community seems inevitable. According to Glynn [64,65], the strongest predictors of a sense of community are (1) expected length of community residency, (2) satisfaction with the community, and (3) the number of neighbors identifiable by first name. In a highly transitory holiday town like Whitianga, with the majority of house owners living elsewhere, the psychological sense of community is correspondingly low, which, not surprisingly, results in varied perspectives and levels of understanding about climate change risk and the necessity to adapt.

Barriers to understanding help to explain why risk reduction and anticipatory adaptation are all but absent in Mercury Bay notwithstanding evidence of escalating risk, and the NZCPS policy obligations on local government to reduce climate-compounded risk. However, other barriers further entrench the prevailing impasse [18–21]. Local government is challenged to meet the pressing everyday needs of communities. It is difficult to give effect to the plethora of local government responsibilities, because of inevitable legislative gaps and inconsistencies, confusion over roles and responsibilities, and resourcing and capability limitations, especially in more remote jurisdictions. Furthermore, there is weak national government leadership on climate change adaptation. As a result, each District Council is compelled to 'learn on the job' and 'reinvent the wheel': a costly undertaking across the country.

Not surprisingly, coastal hazard risk varies around the country, and consequently 'risk reduction appetites' vary within and between local communities and their governing authorities. Furthermore, communities and the legal system have a misplaced expectation that local government will provide certainty about climate change despite the dynamic nature of the associated risk and deep uncertainty about locality-specific impacts and risk in the distant future. This situation is further entrenched by professional practice biases and constraints [18]. Consequently, when action is taken, it is typically limited to static responses, such as protection works or 'coastal hazard zones' based on single-best-estimate scenarios [20,33,66]. Such actions invariably impact private property interests along developed coastlines and are challenged through the legal system. The associated reputational risk, costs and demands on local government discourage anticipatory adaptation, especially more 'radical' pathways such as managed retreat [33]. Paradoxically, private risk is being transferred to the public and from current to future generations. Consequently, a complex interplay of barriers need to be overcome with respect to understanding; capability; resourcing; community, professional and legal perceptions and expectations; implementation of RMA, NZCPS and other regulatory provisions; as well as wider institutional, governance and policy constraints [21].

Overcoming these barriers is much more than a technical challenge. In short, it is an ethical, political, and governance challenge. Progressive sea-level rise and other climate change impacts will necessitate major works to protect strategic assets and critical infrastructure. However, a strategy of managed retreat will be required when such works become too costly and infeasible to maintain in the face of relentless sea-level rise. Adaptation choices will consequently generate intensive conflict. Prescriptive policy provisions alone will neither reduce coastal hazard risk nor build adaptive capacity. Democratic decision-making will, therefore, need to be re-imagined in order to reconcile public and private interests across different geographic and temporal scales, and bridge divergent values, worldviews, and interests with respect to the environment, culture, society, politics and governance in Aotearoa New Zealand [67]. The vexed nature of this challenge is brought to light when consideration

is given to how climate change and adaptation are understood and framed in nearby Kennedy Bay; and then compared to Mercury Bay perceptions, practices and prospects.

Kennedy Bay research participants expressed strikingly different viewpoints when discussing climate change risk and adaptation practices and prospects. Their views are strongly rooted in the way Māori traditionally value, view, and use the coast. Given the absence of beachfront development in Kennedy Bay, exposure to coastal hazards is considerably less than in Mercury Bay. This does not mean that climate change-related risk is not relevant to Kennedy Bay residents. Coastal erosion, for example, does not pose a threat to man-made structures but could result in the loss of land which has deep cultural and spiritual significance to Māori. Consequently, '[a]ny consideration of the sea and shore and the land contiguous to it', as Hovell and Ngapo [54] write about Kennedy Bay, 'must take account of the spiritual dimension appropriate to all these people'.

Therefore, when asking the question: Are climate change signals apparent to people in Kennedy Bay? The answer is that the signals are not as obvious as they are in Mercury Bay. Furthermore, if they are evident, they are not necessarily attributed to climate change. Consequently, climate change is not a manifest concern nor are proactive steps being taken to address it. Kennedy Bay participants made it clear that their Māori identity, culture and living in a Māori community are very important in terms of the way they understand human-environment interactions and associated changes, including climate change. Their narratives clearly conveyed the significance of their community's cultural identity and this identity was reflected in the frequent use of the word 'Māori'.

Research participants described inherently different connections to their land compared to the majority of the Mercury Bay participants. The Māori term 'tangata whenua' means 'people of the land' [68]. Kennedy Bay community members relate to their land and sea with an ethic of guardianship or stewardship (kaitiakitanga) and regard land, soil and water as treasures (taonga) to be protected. Their connection with the land is thus first and foremost cultural and spiritual; and land is not viewed primarily as 'property' nor merely as a financial asset. Much of the land that has remained in, or was returned to, Māori ownership is in joint customary ownership. This puts Māori in a difficult position in the context of the prevailing capitalist framing of land value. A long-time Kennedy Bay resident comments: 'Even going to the bank to get money for, say, when we wanted to build the house ... if you tell them you've got Māori land they look at you as if you've got some sort of bloody disease. We own a lot of land and my share of all that land is about six beaches. But what's the use if you can't borrow on it? It is very frustrating'.

Borrowing money secured over Māori land is difficult due to joint customary ownership. Consequently, cultural factors and associated property rights impact the value of Māori land and potential sale, use, and development prospects [69]. Such considerations are reflected in frequent references to the term 'money'. Climate change thus intersects with Māori lived realities in complex and distinctive ways. King et al. [70] underscore this complexity, pointing out that "there is a diversity of influences that complicate the climate change issue for Māori and make it difficult to specify the 'implications' with any certainty."

The contrast between Kennedy Bay and Mercury Bay is striking. Climate change-relevant perceptions, practices and prospects are significantly influenced by predominant cultures and associated 'land ethics' and tenure patterns: joint customary tenure in the former under an ethic of guardianship and stewardship; and private property in the latter with an emphasis on securing the financial value of property and assets. Such considerations shape vulnerability, adaptation and community development options and prospects. Māori and non-Māori communities can therefore co-exist in close physical proximity but they might as well be 'worlds apart' given their distinctive histories and cultural, social, political and economic characteristics; and consequentially their framing of climate change [70].

Other terms of importance to Kennedy Bay locals, and closely associated with the terms 'Māori', 'money', 'Māori land' and 'land', are 'rates' and 'council', and by 'trust' and 'power' (Figure 4). The frequent use of the term 'rates' indicates concern about the high cost of council rates and a

perceived mismatch between fees paid to council and the services they provide that aren't necessarily needed. A long-time Kennedy Bay resident explained as follows:

When the Waikato Regional Council was formed as a buffer between local and central government they came down here. We invited them to have a look at the hills and the forests, we pointed out the fresh water we gave them to drink and we said to them 'we don't really need you here'. We told them that we envisage a time when you will impose additional taxes on us for services we simply don't need. Have a look out there! Tell us we are doing a bad job. Of course they were stunned and shocked but still formed. Now they are not going away [but] nor are we.

The 'power' frequently referred to by locals from Mercury Bay was directly linked to the power that beachfront property owners are perceived to hold and their decision-making influence when it comes to the way in which development takes place and coastal erosion is dealt with. Community interests are seen to be secondary to the private interests of those with political and economic power. Consequently, the manner in which coastal hazard risk is framed and addressed is skewed towards those with more 'power' and influence. Inequitable power determines how information is gathered and used. For example, its perceived legitimacy can be a barrier to understanding if narrow but powerful private interests are thought to have 'captured' decision-makers. Power also influences how the 'problem' is (re)defined. For example, how those with power determine how thresholds of concern, response need and feasibility, and levels of agreement are framed.

Such barriers to understanding are likely to shape trajectories of adaptation planning and management (see Figure 3). In contrast to how 'power' was framed in Mercury Bay, Kennedy Bay respondents referred to 'power' in the context of struggles tied to land ownership and also the loss of power through colonialization. 'The thing is', a Kennedy Bay long-time resident explained, 'that thumbs are being screwed by people who are not local'. Again, legitimacy could pose a barrier to understanding if climate change information is provided by illegitimate 'authorities'—which could be any sphere or agent of government or science. Climate change information is typically gathered and used by government and scientists to frame the problem, and guide planning and management. However, its legitimacy may be questioned by Māori, and poses a significant barrier to understanding and subsequent action, because of Māori experience of colonization and dispossession by the Crown and its agents, including scientists [44].

Credibility and trust also pose a serious barrier to understanding. 'Trust' was of particular significance to the Kennedy Bay research participants. In their narratives, it is the absence of trust: distrust of government and science. Among other things, climate change is typically framed in technical scientific terms that fail to encompass and articulate knowledge from a Māori perspective. By contrast, information derived from Mātauranga Māori has credibility amongst Māori because it encompasses Māori knowledge, culture, values and worldviews [71]. It is generated using approaches consistent with the scientific method but is articulated from a Māori perspective. The essential difference between science and Mātauranga Māori is that the latter includes values and is articulated from a Māori worldview. Climate change information proffered solely from a government or scientific source is consequently unlikely to be deemed credible and trustworthy because it is solely derived from a Eurocentric scientific perspective. As a consequence, climate change and associated risk is likely to be dismissed as other more salient and pressing problems demand attention.

Given the views articulated by Kennedy Bay research participants, and how they relate to Moser and Ekstrom's [26] barriers to understanding, one might presume that Māori in general are paying little attention to climate change and related concerns. This is not the case. According to Bargh et al. [72]:

[T]ribal organisations are paying close attention to the ways that they can respond to climate change. The way their responses are articulated however is often inextricable from more longstanding environmental, economic and political concerns that tribal organisations face. . . . [We need] to be cautious to peel back all the layers of long-standing arguments

around topics that might appear on the face of it somewhat removed from climate change *per se*, such as unity on the marae or language revitalisation. These issues however are part of a bundle of interconnected arguments aiming to foster worldviews and ways of living in the world that might be better suited for ensuring tribal organisations can produce significant proportions of their food and energy needs. . . . Tribal organisations are being proactive to both engage in asserting their rights as well as attempting to secure the well-being of their areas in a time of climate change.

The Kennedy Bay and Mercury Bay interviews clearly show that perceptions, values and worldviews, and barriers to understanding and action, vary *between* these communities. They also vary *within* these communities and, undoubtedly, they have and will change over time. It would be simplistic and misleading to portray either Māori or non-Māori values and viewpoints as homogenous, or as a one-dimensional binary. For example, Māori are culturally and spiritually driven; non-Māori are financially driven. The reality is that Māori and non-Māori hold diverse values, worldviews and perceptions, including diverse views about the relative importance of spiritual, cultural, environmental, financial and other considerations. It is, therefore, important to avoid romanticizing or denigrating those who make up either Kennedy Bay or Mercury Bay communities. In a three-part study of Indigenous geographies, Coombes et al. [73] discern a tendency to view Indigenous aspirations and social projects in wholly negative or positive terms. Indigenous peoples are framed as either heroes and champions of avant-garde politics or vulnerable casualties of colonial pasts and environmentally destructive futures. Neither caricature provides an adequate representation of the complex material, political and cultural characteristics of emergent Indigenous geographies.

As these interviews have shown, two local communities in close proximity to each other can have strikingly different viewpoints, understanding, experiences and prospects in the face of a changing climate, and wider global change. No wonder it so difficult to implement practical measures to reduce coastal hazard risk and adapt to climate change. The question remains: What might be done to break this impasse?

5. Recommendations

Our research demonstrates the importance of understanding and proactively addressing the climate change 'problem' in a locally appropriate manner. Laudable regulatory provisions have little practical value if climate change and the imperative to reduce coastal hazard risk and adapt are not well understood by communities and if there is insufficient political will and institutional capability to mobilize sustained local action. The point of departure is to raise awareness about the reality of climate change and escalating coastal hazard risk. Then shared understanding needs to be built about what a changing climate portends for particular coastal communities. Attention can then be focused on crafting locally attuned institutional structures, processes and practices that enable community deliberation, visioning, and anticipatory adaptation planning. Translating such intentions into practical reality is, however, difficult and contested. Climate change is woven into everyday local realities and the complex interplay of many context-specific considerations, including seemingly unrelated issues and concerns.

This study has shown that despite their close proximity, distinctive adaptation pathways need to be charted for the communities in Mercury Bay and Kennedy Bay, and by implication other communities on the Coromandel Peninsula and elsewhere in Aotearoa New Zealand. How adaptation is understood, planned, and managed thus needs to be framed by and tailored according to, distinctive local environmental, historical, cultural, political, social, economic and governance characteristics. Based on the insights gained from this study, we make five recommendations to raise climate change awareness, improve understanding and break the prevailing adaptation impasse.

5.1. Raise Awareness and Build Shared Understanding

There is a plethora of information available about the reality of climate change, its impacts and implications, as well as adaptation options, pathways, and prospects for Aotearoa New Zealand [32,36,38,74]. Far-sighted regulatory provisions such as those in the NZCPS indicate that barriers to understanding and planning for climate change on the coast are being overcome in the policy-making arena at the national level of government. However, translating such policy provisions into practical reality at the local level (managing climate change on the coast) poses a more implacable challenge. At the local level, as this study shows, public awareness of, and understanding about climate change and the adaptation imperative are weak at best. Local government has yet to demonstrate adequate understanding of the climate change 'problem' or the political will and institutional capability to address it. Barriers to understanding need to be overcome, starting with obtaining compelling evidence that climate change has been detected. Such information needs to be readily available, accessible, and deemed by local government and communities to be credible, salient, and legitimate. Consideration can then be given to whether or not climate change poses sufficient concern to Coromandel communities, and whether or not a response is necessary and feasible.

Public awareness of the climate change 'problem' and understanding its locality-specific implications requires community-specific initiatives. Coordinated adaptation action will also be needed at the regional scale: across the Coromandel Peninsula for example. Hence both intra- and inter-community awareness and understanding are required. Indeed, adapting to climate change is arguably one of the most significant challenges facing Aotearoa New Zealand in the 21st Century and beyond. Awareness of, and understanding about, this challenge is therefore a society-wide inter-generational imperative. Barriers to understanding will, therefore, need to be overcome by all actors involved in adaptation governance, including all spheres and sectors of government; all levels of Māori governance, including iwi, hapū and marae; civil society; the private sector; scientific community and media. At the local level, community-council partnerships will be needed to initiate and sustain locally applicable anticipatory adaptation planning and management actions. Information showing unequivocal detection of climate change signals needs to be 'actively communicated with appropriate language, metaphor, and analogy; combined with narrative storytelling; made vivid through visual imagery and experiential scenarios; balanced with scientific information; and delivered by trusted messengers in group settings' [75].

Efforts to raise climate change awareness and improve understanding need to be targeted at and tailored for the various groups, stakeholders and interests that make up particular communities. For example, in Mercury Bay, particular attention needs to be focused on those who own property and live along the seashore, especially in the most at-risk locations. Those who shape local decision-making also need to become aware of and understand the implications of climate change, including elected officials, and strategically placed government officials in the District and Regional Councils, including those involved in planning, emergency management, infrastructure and asset management, and community development and service provision more generally.

Innovative ways to reconcile divergent values and interests, and inequitable distribution of power, need to be explored. Concerted attention needs to be focused on people who are vulnerable to coastal hazard risk in a changing climate, including those who are socially vulnerable. Community-specific stakeholder analysis needs to be undertaken before developing targeted initiatives to raise climate change awareness and understanding. How and when is the best time to initiate such efforts in Mercury Bay? Many properties have already been impacted by coastal erosion and storm events but climate change denial is commonplace and hard engineering solutions such as sea walls persist as the preferred solution. The sooner tailor-made efforts are started to raise awareness and understanding, the quicker necessary adaptive capacity and resilience will be developed. A future extreme event might catalyze action. In the meantime, community and local government 'thought leaders' and 'champions' need to be identified and engaged to draw attention to the problem, raise concern, and prompt action. Where appropriate, past or current public awareness and education initiatives, possibly embedded in

research projects, could provide a platform on which to build. For example, researchers from Crown Research Institutes, NIWA, AgResearch, and others have already worked with Whitianga stakeholders to investigate projected climate change impacts and adaptation prospects for Mercury Bay. Such efforts could provide a platform for future efforts [21,76].

In Kennedy Bay, consideration needs to be given to whether or not awareness and understanding about climate change and adaptation needs to be addressed; and, if so, when, how and who should participate in such efforts. A Māori-centric framing of climate change is essential: one that is rooted in and woven into local culture and lived realities. Local Kennedy Bay community leaders (e.g., kaumatua) are well-placed to provide advice and catalyze such efforts. Among other things, it may be constructive to explore how climate change relates to local concerns about self-determination (rangatiratanga), guardianship (kaitiakitanga), community development and sustainability. Given that Kennedy Bay residents live some distance from the shoreline, and exposure to coastal hazard risk is low compared to Mercury Bay, the starting point is to garner evidence of a climate change signal. If a climate change 'problem' is detected, and there is sufficient community concern and recognition of the need for, and feasibility of, a response, then barriers to gathering and using information, and progressing towards (re)defining the problem, need to be overcome. As explained in the discussion section, overcoming such barriers poses a significant challenge in the light of historic interactions between Māori and the Crown and its agents, including scientists.

Careful consideration needs to be given to engaging community members in a process that captures their interest and focus, and that relevant information is made available and accessible, in ways that are deemed to be credible, salient and legitimate. Raising community awareness and understanding about climate change is, therefore, not simply a matter of providing climate change information to community members. It requires all those working with the community, including government officials and researchers, to understand the historical context and lived reality of Kennedy Bay and wider region. It will require mutual understanding about how climate change is perceived and embedded in the communities' lived experiences. 'Out of the box' thinking will be needed to build shared understanding, and in particular to overcome barriers related to salience, credibility and trust, and legitimacy. Doing so is a deeply challenging undertaking. As pointed out by Parsons & Nalau [44]:

[C]urrent depictions of Indigenous peoples as being highly vulnerable to the impacts of climate change holds the potential to "rearticulate colonial imaginings of Indigenous peoples as being passive victims (the so-called 'doomed races') of external stimuli (in this instance global warming) who require outside (non-Indigenous) intervention to save them" Such a warning does not mean that climate change, and other environmental changes, does not pose presenting risks to Indigenous peoples nor that strategies should be deferred for the foreseeable future, but instead that problem-definition and selection of strategies need to be directed by Indigenous peoples themselves and reflect their knowledge, values, concerns, and aspirations for the future, rather than simply repeating past top-down interventions In order to be truly transformative, practices, plans, and policies need to be situated in and reflective of Indigenous knowledge, ethics, values, and histories, and harness Indigenous knowledge and skills.

Cultural sensitivity, coupled with creativity and innovation, will therefore be needed to raise climate change awareness and understanding in ways that take into account diverse local realities and experiences. For instance, what locally appealing approaches could be used to engage local artists, 'champions' and 'thought leaders' in a community project or competition to visualize a one-metre rise in sea level, show when this is likely to take place and how it might compound coastal hazard risk? What locally appropriate technologies and media (such as print media, social media, video games, apps, and television) could be used to visualize, interpret, and communicate climate change prospects and adaptation pathways as a local reality? Options range from simply painting lines on community landmarks, such as roads and/or power/telephone poles, to showing possible

future sea-level rise, to the use of street theatre, story-telling, poetry, 'climate change games' and computerized scenario-based community dialogues, charrettes, role-plays, and planning processes [39]. As a result, community members and key stakeholders could become actively engaged in a stimulating ongoing process of joint fact-finding and social learning about climate change, coastal hazard risk reduction, and adaptation governance.

Media outlets can play an informing, educating, and mobilizing role, especially if this is done in tandem with community and local government leaders, and community interest groups. Such initiatives can complement school-based programs to raise awareness and understanding amongst the youth that help to build inter-generational understanding. Careful consideration will need to be given to how to frame the 'climate change problem' given pervasive climate change denial and scepticism. A focus on local issues of community concern, such as coastal erosion in Mercury Bay, may be sufficient to garner attention initially. Focusing on coastal issues that concern locals, without necessarily framing this as a 'climate change problem' could be a constructive first step for raising awareness. Once 'intra-community' awareness and understanding is progressed, consideration could be given to interactive initiatives between communities. What kind of community exchanges could be initiated to help build Coromandel-wide inter-community awareness of, and understanding about, climate change and the adaptation imperative?

Climate change science plays a crucial role in determining the existence of a climate change signals and providing evidence to this effect, in ways that is relevant to local communities. Despite incontrovertible scientific evidence about the reality of climate change, scepticism and denial persist, hence our second recommendation.

5.2. Develop a Climate Science-Society Social Contract, and Implement It Locally

Climate science is accorded surprisingly low levels of credibility and trust by the research participants in both case study communities. The scientific community needs to reflect critically on the root causes of this mistrust and learn how to build credibility and legitimacy to enable climate change awareness, understanding, and action. It will not be possible for scientists to do so in isolation. Scientists will need to engage with other societal actors involved in climate change governance, including leaders in government, civil society, the private sector and media. Scientists will also need to engage with the general public and local communities in new ways to build credibility, trust, and legitimacy. This is a strategically important undertaking that deserves attention at the highest levels of science and governance in Aotearoa New Zealand together with authentic engagement at the local community level.

Rethinking the social contract between science and society assumed new import at the start of the 21st Century [77,78]. A social contract defines the roles, rights, obligations and responsibilities of the State and citizens. A science-society social contract does so between scientists, the State and citizens. Rethinking such social contracts is compelling in this era of global change as society grapples with contemporary social-ecological problems [79,80]. Building a climate science-society social contract is compelling given the prevalence of climate change denial and the persistent adaptation impasse.

A devolved approach to building a climate science-society social contract in Aotearoa New Zealand is necessary. Practical steps need to be explored to build a robust social contract that fosters credible, salient and legitimate research so that communities at the coal-face of contemporary climate change reality can develop requisite awareness and understanding, and initiate actions to reduce risk, build resilience and chart adaptation pathways. Among other things, building a climate science-society social contract necessitates reconsideration of how research agendas are set, how research is conducted, how science-policy-practice interfaces are bridged, and how climate change research is institutionalized. Among other things, consideration will need to be given to roles, rights, obligations and responsibilities with respect to institutionalizing and funding climate change research; modalities of research including disciplinary, inter-disciplinary and trans-disciplinary research, and 'blue sky' versus applied research; traditional science versus post normal science; science-led versus co-designed research with local

stakeholders; and the interfaces between science, local knowledges and Indigenous knowledges and practices.

The latter is of particular significance in Aotearoa New Zealand because of the bi-cultural partnership between Māori and the Crown established by the Treaty of Waitangi. Mention has already been made of the commonalities and distinctions between Mātauranga Māori and traditional science [71]. Indigenous research approaches, such as Kaupapa Māori, are geared towards benefitting research participants, recognizing Māori research aspirations, and developing and implementing Māori-centric theoretical and methodological approaches [72]. Compared to traditional scientific methodologies, participatory and community-based research approaches are better suited for research with Indigenous people but, according to de Leeuw et al. [72], may be enhanced by novel research praxis:

To critically and productively understand, and possibly transform, research relationships between Indigenous and non-Indigenous peoples, researchers need to establish relationships outside those of a researcher/research subject formulation . . . decolonizing the production of Indigenous peoples as wholly other, developing non-extractive relationships, fostering spaces of dissent and disruption, and confronting the persistence of colonial, racialized dynamics.

Parsons et al. [81] point out that ‘Indigenous co-design frequently involves challenging western-centric worldviews, power structures, and conceptions of time and requires acceptance and promotion of alternative knowledges, ontologies and future pathways’. They suggest that instead of attempting to fully integrate Western science and Indigenous knowledges ‘accepting different ways of viewing the world . . . can enable a richer conversation between people’. As Coombes et al. [82] point out, the challenge is nonetheless fundamental:

The challenge is contextual, engaged and performative—it requires not just methods of research, but approaches to being-in-the world. . . . debates about approaches, collaborations and ethics in Indigenous geographies unsettle our journey as researchers. They reset the compass by which we guide our endeavours and judge our achievements. They invite and challenge, but they also insist on a fundamental reconception of research partnerships and the grounds for mutually beneficial praxis and pedagogies.

Rising to this challenge has profound implications if scientists, citizens and the State are to co-design a robust climate science-society social contract that can be applied in local communities like Kennedy Bay and Mercury Bay. Crafting such a climate science-society social contract is foundational for building shared awareness of and understanding about climate change and mobilizing local adaptation action.

5.3. Mobilize Local Adaptation Action

Local leadership is essential for mobilizing local adaptation action. In July 2017, a group of 39 Local Government Mayors and Council Chairs (of 78 in total) endorsed a 2015 local government declaration calling for urgent responsive leadership and a holistic approach on climate change, with the government needing to play a vital enabling leadership role [83]. The current mayor of the Thames-Coromandel District Council, Sandra Goudie, did not sign the 2017 Local Government Leaders Position Statement on Climate Change. However, Mayor Philippa Barriball (2004–2010) signed an earlier climate change position statement while also chairing the sub-committee for local government on climate change, thus demonstrating how local leadership on climate change can shift from one election to the next.

Local political leadership on climate change is necessary but not sufficient. Translating position statements (or policy provisions) into practical reality remains an unyielding challenge. Local action will be enabled by concerted efforts to implement the preceding recommendations. Local government will be key to mobilizing local action. Non-governmental community and private sector leaders will

also need to ‘champion’ and help to mobilize local action. Boundary organizations that can bridge and link policy, practice, and science could play a vital enabling role by helping to facilitate information flow, knowledge sharing and collaboration between communities, their governing authorities, the private sector and other key stakeholders such as the insurance industry. Direct action and even civil disobedience may be necessary to overcome the prevailing adaptation impasse at the local level. As pointed out by New Zealand political scientist Bronwyn Hayward [67], the ethical and political implications of adaptation options like managed retreat reach far beyond the local level:

Difficult decisions about climate adaptation cannot be made fairly, justly or effectively within small, time and group-bound forums alone. Local voices must be heard in decision-making, but local councils cannot be left to wrestle with difficult temporal spatial and procedural justice questions unaided. Identifying the solution of managed retreat is only a small step toward implementing climate adaptation strategies. In some cases, the rush to implement local policy solutions may simply exacerbate deep community divisions and undermine long-term community resilience. In a country where ‘nowhere [is] far from the sea’ [67], some social, cultural and economic values will inevitably be surrendered to the sea. Democratic decision-making requires that these difficult choices about whose assets and values are protected, and why, are made inclusively, fairly and transparently.

Making wise climate change choices thus requires fit-for-purpose ‘institutional architecture’ and nationally consistent approaches to build resilient and sustainable communities.

5.4. Institutionalize Coastal Hazard Risk Reduction and Anticipatory Adaptation Governance

Successive New Zealand governments have exercised dubious climate change leadership at best [74,84,85]. The current government, which is seeking an unprecedented fourth term in the September 2017 elections, has been accused of stalling national action on adaptation [37,86,87] notwithstanding recently establishing a Climate Change Adaptation Technical Working Group [88]. The Parliamentary Commissioner for the Environment [36] has called on the government and all parliamentarians to recognize the inter-generational nature of the climate change ‘problem’ and develop a comprehensive statutory basis for tackling its manifold dimensions in a manner that is binding on current and future governments, possibly modelled on the UK Climate Change Act and with the establishment of an independent Climate Change Commission.

There is a compelling and urgent need for the Government to exercise far-sighted national leadership on climate change. A statutory mandate is required to mobilize and sustain climate change action in a nationally consistent but locally appropriate manner, including commensurate investment in capability building to overcome barriers to adaptation understanding, planning and management [17–21]. Formulating such a mandate, and effectively institutionalizing it, will need to take into account the manifold ways in which climate change weaves into the lived realities of local communities. Consequently, simply adding yet another statutory provision to the existing plethora of laws and policy provisions shaping local government planning and management will not resolve the adaptation impasse. A more integrated approach, and if necessary systemic reform, of, among other things, planning, emergency management and local government legislation, and associated institutional structures and processes, will be required to reduce coastal hazard risk and enable anticipatory adaptation governance.

Local government, ideally with new-found government leadership on climate change after the 2017 elections, will need to mainstream climate change and the adaptation imperative into local planning and management—whether or not a statutory climate change mandate is created and more fundamental institutional reforms take place. Opportunities exist to do so under existing institutional structures and provisions, such as the NZCPS, Regional Policy Statements, Regional and District Plans, and Asset Management and Long Term Plans. Experiences in Mercury Bay reveal the fraught nature of efforts to address climate change under prevailing institutional architecture and regulatory provisions.

Opportunities also exist for Māori communities to integrate climate change considerations into their planning and decision-making processes, including iwi environmental/resource management plans that are prepared by iwi governing authorities to assist in fulfilling cultural and spiritual roles and responsibilities. Iwi management plans are one useful mechanism to integrate Māori planning processes into the regulatory regime of local government because such plans must be ‘taken into account’ in Regional and District Plans and Regional Policy Statements under the RMA (Sections 61, 66, 74).

Many such plans have been developed by Māori and have taken account of climate change and adaptation possibilities and prospects [20,21]. Developing iwi management plans for communities such as Kennedy Bay is one constructive way to institutionalize coastal hazard risk reduction and anticipatory adaptation in the context of community realities and aspirations. Such a plan-making process can reveal barriers to or constraints on, a community’s ability to understand, plan for and manage climate change and coastal hazard risk more generally, and how these might be overcome. Past research has shown that rural and semi-rural Māori communities can face a complex set of interacting constraints in coping with, and adapting to, climate change, including: substandard infrastructure; limited access to finances; limited capacity/expertise to represent and lead community-related affairs; intensifying competition for resources; habitat and environmental degradation; loss of traditional knowledge, practices and skills; inequitable engagement in local and regional planning; and disrupted people-environment relationships [21,70,89]. Addressing such constraints, and charting appropriate adaptation pathways, is inextricably tied to resolving Māori aspirations for self-determination and can be informed by long-standing critiques of the impact of colonization on environmental management and self-determination over Māori resources [73].

Bargh et al. [72] point out that many Māori organizations have prepared plans and are already responding to the challenges of climate change as an integral part of efforts to become self-sufficient with respect to food and energy needs:

These plans indicate that Māori are not waiting for governments to recognise and acknowledge tribal competencies with environmental management. These documents show clear strategies by tribal organisations to respond locally to climate change and take their own steps towards self-sufficiency, including through activities as diverse as rubbish reduction at family and tribal levels to riparian planting to stop erosion.

There is evidence that Indigenous natural resources management practices by Māori, founded on guardianship (*kaitiakitanga*), and a system of integrated common property management, can achieve the outcomes sought by Western science through adaptive governance and ecosystem based management [90]. Hence the potential for communities like Mercury Bay to learn from Māori communities like Kennedy Bay about inter-generational stewardship, and alternative framings of and institutional approaches to planning and managing ‘common concerns’ like climate change [20]. Lessons learned from Mercury Bay’s coastal hazard risk experience, among other things, could help to inform future adaptation planning and management efforts in Kennedy Bay. Such trans-local bi-cultural social learning and anticipatory adaptation action requires bolstered *rangatiratanga* (the right of Māori to govern themselves), *kaitiakitanga*, and local democracy.

5.5. Strengthen Rangatiratanga, Kaitiakitanga and Local Democracy

Translating the foregoing recommendations into practical reality depends to a large extent on how local communities reflect upon and address issues of common concern. The Kennedy Bay and Mercury Bay communities are only about 20 km apart but they might as well be ‘worlds apart’ because of their distinctive historical, cultural, economic, social-ecological, and governance characteristics. The Kennedy Bay narratives clearly show that reducing coastal hazard risk and enabling local action requires that Māori cultural and spiritual values, and governance praxis, are respected and bolstered. Much has and is being learned from efforts around the country to do so through iwi management

plans [69] and resource management [90], community based natural resource management [91], native forest governance [92] and collaborative water governance [93].

Research by Memon & Kirk [93] on collaborative water governance, for example, shows that Māori are only able to exercise limited authority (*tino rangatiratanga*) over their resources; and that the ‘forces of institutional inertia stem from property rights, globalization and regulation’—restricting Māori agency to that of a stakeholder group. Bolstering *rangatiratanga* and *kaitiakitanga* is thus essential but transcends the local level. The Mercury Bay narratives underscored the importance of strengthening local democracy so that divergent viewpoints and the ‘voices’ of current and future generations can be taken into account and reconciled in local adaptation planning and management. Strengthening *rangatiratanga* and *kaitiakitanga* in Kennedy Bay, and local democracy in Mercury Bay, require locality-specific efforts but they need to be part of an ongoing nation-wide effort to embed the principles of the Treaty of Waitangi in local community visioning, planning and decision-making. Innovative locally crafted, culturally-sensitive deliberation and conflict resolution processes are an integral part of such endeavors—even if such efforts require direct action and civil disobedience that challenges and disrupts prevailing local government planning and decision-making processes.

Translating these recommendations into practical reality is profoundly challenging but urgent and compelling. However, it is a challenge that needs to be confronted because climate change impinges in fundamental ways on the identity, security, well-being and livelihoods of current and future generations in Aotearoa New Zealand.

6. Conclusions

This article had a two-fold aim. Firstly, to share narratives from and explore why two ‘neighboring’ coastal communities, Mercury Bay and Kennedy Bay, are ‘so close, yet so far apart’ with respect to their perceptions of coastal hazard risk and climate change; and why they face an adaptation impasse. Secondly, to recommend ways to facilitate social learning about climate change and break the impasse. Ethnographic fieldwork, including in-depth interviews with community key informants, enabled us to identify barriers to adaptation understanding, informed by Moser & Ekstrom’s [26] ‘barriers to adaptation’ framework. Research participants from both communities have a poor understanding of climate change: they do not detect the ‘problem’ and available information is not gathered and used in ways that enable shared understanding. Residents are mainly preoccupied with everyday issues. Their lived realities, and framing of climate change and the adaptation imperative are, however, fundamentally different. Despite their close proximity, these communities have starkly different histories, and cultural, social, economic, political, and governance characteristics which together shape adaptation possibilities and prospects.

Kennedy Bay is a small minimally developed Māori community. Residents seem unconcerned about climate change, which is hardly surprising given that there is little exposure to coastal hazard risk and climate change impacts. Rather, residents are much more focused on everyday concerns. Their views about social-ecological change, including climate change, are rooted in Māori cultural and spiritual values, and issues pertaining to Māori identity, self-determination (*rangatiratanga*), guardianship (*kaitiakitanga*) and community development. A legacy of the dismal history of colonization and dispossession is that government and scientists, who typically provide information on climate change and frame the adaptation agenda, are not trusted and lack the credibility and legitimacy required to enable adaptation understanding, planning and management. How might such barriers be overcome?

Mercury Bay is a well-developed and rapidly growing resort region that faces severe coastal erosion and escalating coastal hazard risk that will get progressively worse with rising sea levels. Residents, especially those on the shoreline, find themselves in a quandary: they would like to retain the character of the town but are compelled to protect their assets using hard engineering options. Despite NZCPS provisions to reduce coastal hazard risk, short-term private interests are given priority over long-term community interests as shoreline development intensifies and protection

works proliferate. Beachfront property owners are thought to have undue ‘power’ and influence over council decisions about coastal development; preventing anticipatory adaptation action. How might such barriers be overcome? Furthermore, how might the divergent lived realities of Kennedy Bay and Mercury Bay be respected and, where appropriate, reconciled to enable shared understandings and prudent adaptation governance on the Coromandel Peninsula, and beyond?

We offer five key recommendations: (1) Raise awareness and build shared understandings in a culturally sensitive and creative manner to enable community-wide understanding about the reality of climate change, its long-term locality-specific implications, and adaptation prospects and pathways; (2) Develop a climate science-society social contract, and implement it locally to build credibility, trust, and legitimacy between researchers, community members, and their governing bodies; (3) Mobilize local adaptation action—with enabling local political leadership supported by local government, the bridging role that boundary organizations can play, and direct action and even civil disobedience if necessary; (4) Institutionalize coastal hazard risk reduction and anticipatory adaptation governance—through new-found government leadership on climate change, and systemic reforms to build robust institutional architecture with requisite capability building investment that enables nationally consistent but locally nuanced risk reduction and adaptation; (5) Strengthen rangatiratanga (Māori self-determination), kaitiakitanga (guardianship) and local democracy—so that the principles of the Treaty of Waitangi can inform and shape local adaptation visioning, deliberation, conflict resolution and anticipatory adaptation governance. Climate change poses an intractable challenge. Implementing these recommendations will help to build the adaptive capacity and resilience of diverse coastal communities in Aotearoa New Zealand.

Acknowledgments: We gratefully acknowledge funding for this research from the Massey University Doctoral Scholarship as well as additional funding for research expenses from the Massey University Graduate Research Fund Grant in 2011 and 2012. Particular thanks to our research participants for their generous contribution to this research. We appreciate the constructive suggestions that reviewers made to improve the paper.

Author Contributions: This manuscript draws from Ph.D. research carried out by Paul Schneider. Bruce Glavovic was the chief supervisor and Trisia Farrelly was the co-supervisor of this research. Paul, Bruce and Trisia conceptualized this research. Paul conducted all interviews and analysed all data. Paul and Bruce drafted the manuscript and Trisia made substantive revisions.

Conflicts of Interest: The authors declare no conflict of interest. The founding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

References

1. Glavovic, B.C. Sustainable Coastal Communities in the Age of Coastal Storms: Reconceptualising Coastal Planning as ‘New’ Naval Architecture. *J. Coast. Conserv.* **2008**, *12*, 125–134. [[CrossRef](#)]
2. Klein, R.J.T.; Midgley, G.F.; Preston, B.L.; Alam, M.; Berkhout, F.G.H.; Dow, K.; Shaw, M.R. Climate Change 2014: Impacts, Adaptation, and Vulnerability. In *Intergovernmental Panel on Climate Change. Part A: Global and Sectoral Aspects*; Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., et al., Eds.; Cambridge University Press: Cambridge, UK, 2014.
3. Spalding, M.D.; Ruffo, S.; Lacambra, C.; Meliane, I.; Hale, L.Z.; Shepard, C.C.; Beck, M.W. The Role of Ecosystems in Coastal Protection: Adapting to Climate Change and Coastal Hazards. *Ocean Coast. Manag.* **2014**, *90*, 50–57. [[CrossRef](#)]
4. Glavovic, B.; Kelly, M.; Kay, R.; Travers, A. *Climate Change and the Coast: Building Resilient Communities*; CRC Press: Boca Raton, FL, USA, 2014.
5. Steffen, W.; Crutzen, P.J.; McNeill, J.R. The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature? *AMBIO: J. Hum. Environ.* **2007**, *36*, 614–621. [[CrossRef](#)]
6. Brown, S.; Nicholls, R.J.; Hanson, S.; Brundrit, G.; Dearing, J.A.; Dickson, M.E.; Gallop, S.L.; Gao, S.; Haigh, I.D.; Hinkel, J.; et al. Shifting Perspectives on Coastal Impacts and Adaptation. *Nat. Clim. Chang.* **2014**, *4*, 752–755. [[CrossRef](#)]
7. Moser, S. Communicating Adaptation to Climate Change: The Art and Science of Public Engagement When Climate Change Comes Home. *Wiley Interdiscip. Rev. Clim. Chang.* **2014**. [[CrossRef](#)]

8. Barnett, J.; Evans, L.S.; Gross, C.; Kiem, A.S.; Kingsford, R.T.; Palutikof, J.P.; Pickering, C.M.; Smithers, S.G. From Barriers to Limits to Climate Change Adaptation: Path Dependency and the Speed of Change. *Ecol. Soc.* **2015**, *20*. [[CrossRef](#)]
9. Moser, S.C. Navigating the Political and Emotional Terrain of Adaptation: Community Engagement When Climate Change Comes Home. In *Successful Adaptation to Climate Change*; Moser, S.C., Boykoff, M.T., Eds.; Routledge: Abingdon, UK, 2013; pp. 289–305.
10. Pelling, M.; O'Brien, K.; Matyas, D. Adaptation and Transformation. *Clim. Chang.* **2015**, *133*, 113–127. [[CrossRef](#)]
11. Latin, H.A. *Climate Change Policy Failures: Why Conventional Mitigation Approaches Cannot Succeed*; World Scientific: Singapore, 2012.
12. Pielke, R. *The Climate Fix: What Scientists and Politicians Won't Tell You about Global Warming*; Basic Books: New York, NY, USA, 2010.
13. Biesbroek, G.R.; Klostermann, J.; Termeer, C.J.A.M.; Kabat, P. On the Nature of Barriers to Climate Change Adaptation. *Reg. Environ. Chang.* **2013**, *13*, 1119–1129. [[CrossRef](#)]
14. Adger, W.N.; Barnett, J.; Brown, K.; Marshall, N.; O'Brien, K. Cultural Dimensions of Climate Change Impacts and Adaptation. *Nat. Clim. Chang.* **2013**, *3*, 112–117. [[CrossRef](#)]
15. Eisenack, K.; Moser, S.C.; Hoffmann, E.; Klein, R.J.T.; Oberlack, C.; Pechan, A.; Rotter, M.; Termeer, C.J.A.M. Explaining and Overcoming Barriers to Climate Change Adaptation. *Nat. Clim. Chang.* **2014**, *4*, 867–872. [[CrossRef](#)]
16. Moser, S.C.; Jeffress Williams, S.; Boesch, D.F. Wicked Challenges at Land's End: Managing Coastal Vulnerability under Climate Change. *Annu. Rev. Environ. Resour.* **2012**, *37*, 51–78. [[CrossRef](#)]
17. Reisinger, A.; Wratt, D.; Allan, S.; Larsen, H. The Role of Local Government in Adapting to Climate Change: Lessons from New Zealand. In *Climate Change Adaptation in Developed Nations*; Ford, J.D., Berrang-Ford, L., Eds.; Springer: Dordrecht, The Netherlands, 2011; Volume 42, pp. 303–319.
18. Lawrence, J.; Sullivan, F.; Lash, A.; Ide, G.; Cameron, C.; McGlinchey, L. Adapting to Changing Climate Risk by Local Government in New Zealand: Institutional Practice Barriers and Enablers. *Local Environ.* **2013**, *20*, 298–320. [[CrossRef](#)]
19. Lawrence, J.; Reisinger, A.; Mullan, B.; Jackson, B. Exploring Climate Change Uncertainties to Support Adaptive Management of Changing Flood-Risk. *Environ. Sci. Policy* **2013**, *33*, 133–142. [[CrossRef](#)]
20. Manning, M.; Lawrence, J.; King, D.N.; Chapman, R. Dealing with Changing Risks: A New Zealand Perspective on Climate Change Adaptation. *Reg. Environ. Chang.* **2015**, *15*, 581–594. [[CrossRef](#)]
21. Rouse, H.L.; Bell, R.G.; Lundquist, C.J.; Blackett, P.E.; Hicks, D.M.; King, D.N. Coastal Adaptation to Climate Change in Aotearoa-New Zealand. *N. Z. J. Mar. Freshw. Res.* **2017**, *51*, 183–222. [[CrossRef](#)]
22. Moser, S.C. Entering the Period of Consequences: The Explosive Us Awakening to the Need for Adaptation. In *Climate Change Adaptation in Developed Nations*; Ford, J.D., Berrang-Ford, L., Eds.; Springer: New York, NY, USA, 2011.
23. Barnett, J.; Graham, S.; Mortreux, C.; Fincher, R.; Waters, E.; Hurlimann, A. A Local Coastal Adaptation Pathway. *Nat. Clim. Chang.* **2014**, *4*, 1103–1108. [[CrossRef](#)]
24. Biesbroek, G.R.; Termeer, C.J.A.M.; Klostermann, J.E.M.; Kabat, P. Analytical Lenses on Barriers in the Governance of Climate Change Adaptation. *Mitig. Adaptat. Strateg. Glob. Chang.* **2014**, *19*, 1011–1032. [[CrossRef](#)]
25. Jones, L.; Boyd, E. Exploring Social Barriers to Adaptation: Insights from Western Nepal. *Glob. Environ. Chang.* **2011**, *21*, 1262–1274. [[CrossRef](#)]
26. Moser, S.C.; Ekstrom, J.A. A Framework to Diagnose Barriers to Climate Change Adaptation. *Proc. Natl. Acad. Sci. USA* **2010**, *107*, 22026–22031. [[CrossRef](#)] [[PubMed](#)]
27. Paschen, J.-A.; Ison, R. Narrative Research in Climate Change Adaptation—Exploring a Complementary Paradigm for Research and Governance. *Res. Policy* **2014**, *43*, 1083–1092. [[CrossRef](#)]
28. Hammersley, M. *What's Wrong with Ethnography?* Routledge: London, UK, 2002.
29. Denzin, N.K.; Lincoln, Y.S. *The Sage Handbook of Qualitative Research*; Sage: London, UK, 2011.
30. Pink, S. *Doing Visual Ethnography*; Sage: London, UK, 2007.
31. Bessette, D.L.; Mayer, L.A.; Cwik, B.; Vezér, M.; Keller, K.; Lempert, R.J.; Tuana, N. Building a Values-Informed Mental Model for New Orleans Climate Risk Management. *Risk Anal.* **2017**. [[CrossRef](#)] [[PubMed](#)]

32. Gluckmann, P. *New Zealand's Changing Climate and Oceans: The Impact of Human Activity and Implications for the Future*; Office of the Prime Minister's Science Advisory Committee: Auckland, New Zealand, 2013; p. 22.
33. Reisinger, A.; Kitching, R.L.; Chiew, F.; Hughes, L.; Newton, P.C.D.; Schuster, S.S.; Tait, A.; Whetton, P. Australasia. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; Barros, V.R., Field, C.B., Dokken, D.J., Mastrandrea, M.D., Mach, K.J., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., et al., Eds.; Cambridge University Press: Cambridge, UK, 2014; pp. 1371–1438.
34. Freeman, C.; Cheyne, C. Coasts for Sale: Gentrification in New Zealand. *Plan. Theory Pract.* **2008**, *9*, 33–56. [[CrossRef](#)]
35. Peart, R. *Castles in the Sand—What's Happening to the New Zealand Coast*; Craig Potton: Nelson, New Zealand, 2009.
36. Parliamentary Commissioner for the Environment. *Preparing New Zealand for Rising Seas*; New Zealand Government: Wellington, New Zealand, 2015; p. 93.
37. Mitchell, C. Counting the Cost of Sea Level Rise. Available online: <https://www.stuff.co.nz/environment/96503854/counting-the-cost-of-sea-level-rise> (accessed on 7 September 2017).
38. Renwick, J.A.; Anderson, B.; Greenaway, A.; Ngaru King, D.; Mikaloff-Fletcher, S.; Reisinger, A.; Rouse, H. *Climate Change Implications for New Zealand*; Royal Society of New Zealand: Wellington, New Zealand, 2016.
39. Susskind, L.; Rumore, D. Helping Coastal Communities Prepare for and Respond to Climate Change-Related Risks. In *Managing Climate Risks in Coastal Communities*; Susskind, L., Rumore, D., Hulet, C., Field, P.A., Eds.; Anthem Press: New York, NY, USA, 2015.
40. Belich, J. *The New Zealand Wars and the Victorian Interpretation of Racial Conflict*; Auckland University Press: Auckland, New Zealand, 2013.
41. King, M. *The Penguin History of New Zealand*; Penguin: Auckland, New Zealand, 2003.
42. Orange, C. *Te Tiriti o Waitangi: The Treaty of Waitangi, 1840*; Bridget Williams Books: Wellington, New Zealand, 2017.
43. Hooper, K.; Kearins, K. Financing New Zealand 1860–1880: Maori Land and the Wealth Tax Effect. *Account. Hist.* **2004**, *9*, 87–105. [[CrossRef](#)]
44. Parsons, M.; Nalau, J. Historical Analogies as Tools in Understanding Transformation. *Glob. Environ. Chang.* **2016**, *38*, 82–96. [[CrossRef](#)]
45. Jones, R.; Bennett, H.; Keating, G.; Blaiklock, A. Climate Change and the Right to Health for Maori in Aotearoa/New Zealand. *Health Hum. Rights* **2014**, *16*, 54–68. [[PubMed](#)]
46. Harris, R.; Tobias, M.; Jeffreys, M.; Waldegrave, K.; Karlsen, S.; Nazroo, J. Effects of Self-Reported Racial Discrimination and Deprivation on Māori Health and Inequalities in New Zealand: Cross-Sectional Study. *Lancet* **2006**, *367*, 2005–2009. [[CrossRef](#)]
47. Bécares, L.; Cormack, D.; Harris, R. Ethnic Density and Area Deprivation: Neighbourhood Effects on Māori Health and Racial Discrimination in Aotearoa/New Zealand. *Soc. Sci. Med.* **2013**, *88*, 76–82. [[CrossRef](#)] [[PubMed](#)]
48. Statistics New Zealand. Profile and Summary Reports. Available online: <http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports.aspx> (accessed on 27 June 2017).
49. Edmonds, P. 'We Did Not Sign a Treaty . . . We Did Not Surrender!' Contesting the Consensus Politics of the Treaty of Waitangi in Aotearoa New Zealand. In *Settler Colonialism and (Re) Conciliation*; Springer: New York, NY, USA, 2016; pp. 159–182.
50. TCDC. *Coromandel Peninsula Blueprint—Framework for Our Future*; Thames-Coromandel District Council, Environment Waikato, Hauraki Whaanui and Department of Conservation: Thames, New Zealand, 2007.
51. Beston, A. Unrelenting Boom Threat to Whitianga Township. Available online: http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=3576916&pnum=0 (accessed on 7 July 2004).
52. BECA. *Profile Statement: Demographic*; BECA Carter Hollings & Ferner Ltd.: Hamilton, New Zealand, 2007.
53. Monin, P. Hauraki-Coromandel Places—Mercury Bay. Available online: <http://www.teara.govt.nz/en/hauraki-coromandel-places/page-6> (accessed on 26 March 2013).
54. Hovell, J.; Ngapo, M. *A History Report*; Ngati Porou ki Hauraki Trust: Kennedy Bay, New Zealand, 2008; p. 383.
55. Schneider, P.P. Local Reality and the Climate Change Adaptation Dilemma: Beyond Technical Fixes and 'Business as Usual'. Ph.D. Thesis, Massey University, Manawatu, New Zealand, 15 October 2014.
56. Collier, J.; Collier, M. *Visual Anthropology: Photography as a Research Method*; University of New Mexico Press: Albuquerque, NM, USA, 1986.

57. Berger, J. *Keeping a Rendezvous*; Vintage: New York, NY, USA, 1992.
58. Barley, S. Images of Imaging: Notes on Doing Longitudinal Fieldwork. *Organ. Sci.* **1990**, *1*, 220–247. [[CrossRef](#)]
59. McNaught, C.; Lam, P. Using Wordle as a Supplementary Research Tool. *Qual. Rep.* **2010**, *15*, 630–643.
60. Wang, J.; Dent, K.D.; North, C.L. Fisheye Word Cloud for Temporal Sentiment Exploration. In *CHI '13 Extended Abstracts on Human Factors in Computing Systems*; ACM: Paris, France, 2013.
61. Moser, S.C. Now More Than Ever: The Need for More Societally Relevant Research on Vulnerability and Adaptation to Climate Change. *Appl. Geogr.* **2010**, *30*, 464–474. [[CrossRef](#)]
62. Brechin, S.R. Ostriches and Change: A Response to 'Global Warming and Sociology'. *Curr. Sociol.* **2008**, *56*, 467–474. [[CrossRef](#)]
63. Burby, R.J. Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing About Wise Governmental Decisions for Hazardous Areas. *Ann. Am. Acad. Pol. Soc. Sci.* **2006**, *604*, 171–191. [[CrossRef](#)]
64. Glynn, T.J. Psychological Sense of Community: Measurement and Application. *Hum. Relat.* **1981**, *34*, 789–818. [[CrossRef](#)]
65. Glynn, T.J. Neighborhood and Sense of Community. *J. Community Psychol.* **1986**, *14*, 341–352. [[CrossRef](#)]
66. Lawrence, J.; Quade, D.; Becker, J. Integrating the Effects of Flood Experience on Risk Perception with Responses to Changing Climate Risk. *Nat. Hazards* **2014**, *72*, 1773–1794. [[CrossRef](#)]
67. Hayward, B. 'Nowhere Far from the Sea': Political Challenges of Coastal Adaptation to Climate Change in New Zealand. *Polit. Sci.* **2008**, *60*, 47–59. [[CrossRef](#)]
68. Te Ahukaramū, C.R. Papatūānuku—the Land-Whenua—the Placenta. Available online: <http://www.teara.govt.nz/en/papatuanuku-the-land/page-4> (accessed on 11 September 2017).
69. McLean, D. *Development of Māori Land*; Lincoln University: Christchurch, New Zealand, 2002.
70. King, D.; Penny, G.; Severne, C. The Climate Change Matrix Facing Māori Society. In *Climate Change Adaptation in New Zealand: Future Scenarios and Some Sectoral Perspectives*; Nottage, R.A.C., Wratt, D., Bornman, J.F., Jones, K., Eds.; New Zealand Climate Change Centre: Wellington, New Zealand, 2010; pp. 100–111.
71. Hikuroa, D. Mātauranga Māori—The Ūkaipō of Knowledge in New Zealand. *J. R. Soc. N. Z.* **2017**, *47*, 5–10. [[CrossRef](#)]
72. Bargh, M.; Douglas, S.L.; Te One, A. Fostering Sustainable Tribal Economies in a Time of Climate Change. *N. Z. Geogr.* **2014**, *70*, 103–115. [[CrossRef](#)]
73. Coombes, B.; Johnson, J.T.; Howitt, R. Indigenous Geographies I: Mere Resource Conflicts? The Complexities in Indigenous Land and Environmental Claims. *Prog. Hum. Geogr.* **2012**, *36*, 810–821. [[CrossRef](#)]
74. Hopkins, D.; Campbell-Hunt, C.; Carter, L.; Higham, J.E.S.; Rosin, C. Climate Change and Aotearoa New Zealand. *Wiley Interdiscip. Rev. Clim. Chang.* **2015**, *6*, 559–583. [[CrossRef](#)]
75. Center for Research on Environmental Decisions. *The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public*; CRED: New York, NY, USA, 2009.
76. Rouse, H.; Blackett, P.; Hume, T.; Bell, R.; Britton, R.; Dahm, J. Coastal Adaptation to Climate Change: A New Zealand Story. *J. Coast. Res.* **2013**, *2*, 1957–1962. [[CrossRef](#)]
77. Lubchenco, J. Entering the Century of the Environment: A New Social Contract for Science. *Science* **1998**, *279*, 491–497. [[CrossRef](#)]
78. Crutzen, P.J. Geology of Mankind. *Nature* **2002**, *415*, 23. [[CrossRef](#)] [[PubMed](#)]
79. O'Brien, K.; Eriksen, S.; Nygaard, L.; Schjolden, A. Why Different Interpretations of Vulnerability Matter in Climate Change Discourses. *Clim. Policy* **2007**, *7*, 73–88. [[CrossRef](#)]
80. O'Brien, K.; Hayward, B.; Berkes, F. Rethinking Social Contracts: Building Resilience in a Changing Climate. *Ecol. Soc.* **2009**, *14*, 22. [[CrossRef](#)]
81. Parsons, M.; Fisher, K.; Nalau, J. Alternative Approaches to Co-Design: Insights from Indigenous/Academic Research Collaborations. *Curr. Opin. Environ. Sustain.* **2016**, *20*, 99–105. [[CrossRef](#)]
82. Coombes, B.; Johnson, J.T.; Howitt, R. Indigenous Geographies III: Methodological Innovation and the Unsettling of Participatory Research. *Prog. Hum. Geogr.* **2014**, *38*, 845–854. [[CrossRef](#)]
83. LGNZ. Local Government Leaders' Climate Change Declaration 2017. Available online: <http://www.lgnz.co.nz/our-work/publications/local-government-leaders-climate-change-declaration-2017> (accessed on 10 September 2017).

84. Hadley, C. The Sustainability of New Zealand Climate Change Policy: An Ethical Overview. *Environ. Dev. Sustain.* **2015**, *17*, 477–495. [[CrossRef](#)]
85. Rimmer, D. Breakdown of Governance: A Critical Analysis of New Zealand’s Climate Change Response. Ph.D. Thesis, Massey University, Manawatu, New Zealand, 7 June 2016.
86. Bracewell-Worrall, A. Government Accused of Hiding Climate Report That Could Affect Homes of 130,000 People. Available online: <http://www.newshub.co.nz/home/election/2017/09/government-accused-of-hiding-climate-report-that-could-affect-homes-of-130–000-people.html> (accessed on 10 September 2017).
87. 1News. A Leaked Report on Climate Change Warns \$19 Billion Worth of Property Is Now at a Greater Risk of Flooding and Coastal Erosion. Available online: <https://www.tvnz.co.nz/one-news/new-zealand/leaked-report-climate-change-warns-19b-worth-property-greater-risk-flooding> (accessed on 10 September 2017).
88. MFE. Climate Change Adaptation Technical Working Group. Available online: <http://www.mfe.govt.nz/climate-change/adapting-climate-change/climate-change-adaptation-technical-working-group> (accessed on 10 September 2017).
89. King, D.; Dalton, W.; Home, M.; Duncan, M.; Srinivasan, M.; Bind, J.; Zammit, C.; McKerchar, A.; Ashford-Hosking, D.; Skipper, A. Maori Community Adaptation to Climate Variability and Change: Examining Risk, Vulnerability and Adaptive Strategies with Ngati Huirapa at Arowhenua Pa, Te Umu Kaha (Temuka), New Zealand. 2012. Available online: https://www.niwa.co.nz/sites/niwa.co.nz/files/niwa_report_akl2011-015_0.pdf (accessed on 11 September 2017).
90. Kahui, V.; Richards, A.C. Lessons from Resource Management by Indigenous Maori in New Zealand: Governing the Ecosystems as a Commons. *Ecol. Econ.* **2014**, *102*, 1–7. [[CrossRef](#)]
91. Coombes, B. Defending Community? Indigeneity, Self-Determination and Institutional Ambivalence in the Restoration of Lake Whakaki. *Geoforum* **2007**, *38*, 60–72. [[CrossRef](#)]
92. Wilson, G.A.; Memon, P.A. The Contested Environmental Governance of Maori-Owned Native Forests in South Island, Aotearoa/New Zealand. *Land Use Policy* **2010**, *27*, 1197–1209. [[CrossRef](#)]
93. Memon, P.; Kirk, N. Role of Indigenous Māori People in Collaborative Water Governance in Aotearoa/New Zealand. *J. Environ. Plan. Manag.* **2012**, *55*, 941–959. [[CrossRef](#)]



© 2017 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).