Climate Adaptation Act: Building a Durable Future
Case study: Ōmana ki Umupuia

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List of abbreviations

AEP	Annual Exceedance Probability
CAA	Climate Adaptation Act
CCRA	Climate Change Risk Assessment
DAPP	Dynamic Adaptive Pathway Planning
EDS	Environmental Defence Society
IPCC	Intergovernmental Panel on Climate Change
MHWS	Mean High Water Springs
NCCRA	National Climate Change Risk Assessment
NBEA	Natural and Built Environment Act
Ngāi Tai	Ngāi Tai ki Tamaki
RPMP	Regional Parks Management Plan
RCP	Representative Concentration Pathways
RMS	Risk Management Solutions
SAP	Shoreline Adaptation Plan
SPA	Spatial Planning Act

Acknowledgements

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Key findings

The case study demonstrated that local community members hold contrasting viewpoints on climate impacts and adaptation solutions. The predominant view was that private property should be protected and the existing, but damaged, sea wall along Maraetai beach fortified. Managed retreat, as a solution, was opposed because it was perceived as unnecessary and extreme. A few community members did recommend that the broader area from Ōmana ki Umupuia be managed to 'make room for nature' where possible. But this approach is generally unpopular at present and would require considerable discussion within the community before pursuing.

The case study also indicates that it will be important to achieve agreement on the science and data before further risk assessments and community conversations are undertaken. There is a disconnect between government, expertise and locals that needs to be addressed. The success of the proposed Climate Adaptation Act and other climate policy will rest on developing shared understandings of climate change and recognising past and current injustices with land acquisition.

1. Introduction

Climate change is expected to escalate, and intensify hazards, with every incremental increase in temperature. These hazards will inevitably cause harm to people and impact other species and ecosystems. It is important that we start to adapt before more losses and damages are experienced. The earlier we take adaptation action the more harm we can avoid. Managed retreat is an adaptation option that avoids and/or reduces risk by moving people and nature out of harm's way. It is one of many adaptation options including avoiding risk in the first place, transferring risk to a third party (such as through insurance) or accepting the risk and mitigating it. These options can overlap and run concurrently. For example, while managed retreat is in process a home owner may install a pump and insure against flood damage.

In Aotearoa New Zealand managed retreat will become increasingly necessary because we have built many of our settlements, cities and towns in flood prone areas. This includes on the coast which is the focus of this case study. Being an island nation with extensive coastlines, the country is very exposed to coastal hazards, which means that flooding and erosion will inevitably increase over time.

In 2020, the government proposed a new piece of legislation, the Climate Adaptation Act (CAA). This is intended to address the distinctive issues associated with managed retreat such as funding, compensation, land acquisition, liability and insurance. It is needed because the proposed new Natural and Built Environment Act (NBEA) and Spatial Planning Act (SPA), and the existing Public Works Act 1981, do not have the required tools to effectively relocate people out of harm's way. In 2021, the Environmental Defence Society (EDS) initiated a project to consider the design elements of the proposed CAA. The project's aim is to ensure the CAA takes a holistic approach and considers all the complex issues associated with moving people and nature out of harms' way. Relocation is more than moving away from risk, it is also about moving people to new places. The process can span decades.

1.1 Purpose and scope

As part of the project, EDS is drawing on case studies to provide in-depth analysis and insight into how climate adaptation and managed retreat is likely to play out in different communities around the country. The aim is to better understand how the CAA should be designed to ensure the best outcomes for communities on the ground and te taiao the environment.

This case study is focused on the coastal area from Ōmana to Umupuia (Ōmana ki Umupuia).[1] This area has been selected for study because it:

- shares some characteristics[2] with other low-lying coastal sites
- includes areas of cultural significance including marae, cultural sites and wāhi tapu
- includes regionally utilised park and beach areas
- is home to diverse coastal ecosystems and landscapes
- has a diversity of uses including residential housing and small businesses
- is served by local water and road infrastructure.

The scope of this study is focused on the landward, coastal area starting from Ōmana Regional Park and extending around the coast to the small settlement of Umupuia. This area is a part of the Franklin Ward of Auckland Council. There are three focal points in the study: Ōmana Regional Park, Maraetai Beach and Umupuia. Infrastructure including roading connections and water services is included in the study. Excluded from the case study area is the settlement of Beachlands (due to its different physical setting) and the Whakakaiwhara Peninsula Duder Regional Park (because it has similar risks to Ōmana Regional Park particularly in terms of the threat to cultural values and heritage sites). A further description of the case study area is contained in Appendix A.

1.2 Methodology

The case study presents the findings from a mix of desktop and empirical analysis. Desktop material included local and central government documents, independent reports, historical and archival articles and academic literature.

The empirical component included interviews with 56 residents and non-residents in the case study area and engagement with Ngāi Tai ki Tāmaki (Ngāi Tai). Interviews were conducted with homeowners, renters, business employees and owners, infrastructure providers, experts, media, local government employees and consultants. The questions that were asked focused on perspectives on climate change, climate risk, hazards and options (particularly managed retreat). Interviews were undertaken on a confidential basis to encourage frankness and quotes are not attributed. Further detail on the interview methodology is contained in Appendix B.

1.3 Structure

The case study is structured into four parts:

Part One: Context	This Part describes the basic demographics of Ōmana ki Umupuia. The section on history recounts how land ownership abruptly changed, first by the sale of Ngāi Tai land to the Church Mission Society in the 1840s, followed by confiscation of land by the Crown and the subdivision of Maraetai Beach in the 1920s. This sale transformed the beach into a bach destination for middle-class Europeans.
Part Two: Risk	This Part identifies climate risks and explores the works undertaken to date to prepare for climate change impacts.
Part Three: Responses	This Part discusses the findings from the semi-structured interviews.
Part Four: Findings	This Part identifies some key themes from the case study which may serve as a guide for further discussion on risk management, adaptation and retreat.

PART ONE: CONTEXT

2. Regional and local context

Auckland Tāmaki Makaurau is Aotearoa New Zealand's largest city with about 1,695,200 people (June 2022 estimate)[3]. It was settled first by Māori in 1350 and then Europeans from 1840. Over half the residents are European Pākeha (53.5%), followed by recent migrants from Asia (28.2%), and those from the Pacific (15.5%). Māori comprise only 11.5% of the total.[4] The city's geographical boundaries are expansive, extending to the Manukau Harbour in the southwest, to the Waitākere Ranges and smaller ranges to the west and northwest, to the Hauraki Gulf in the east, and to the Hunua Ranges in the southeast.

Development has tended to concentrate along the roughly 3,200km of coastline. Residential housing, business and communities have intensified close to the edge of sedimentary cliffs and on dynamic beach systems. As a result, there are significant parts of the coastline and associatd communities that are exposed and vulnerable to coastal hazards.[5] Much of the case study area, which is situated on the south-east coast of the region, is subject to coastal hazards (see Figures 1 and 2 below).

Figure 1: Map of inundation hazards from Ōmana Regional Park to Maraetai (yellow is flooding at 0.25m sea level rise; pink at 1m with 100 AEP storm event) (Source: Auckland Council)

Figure 2: Map showing inundation hazards at Umupuia (as above)

3. **Socio-cultural and economic context**

3.1 Demographics

The population of Ōmana ki Umupuia is mostly located in Maraetai, which in 2018 was estimated as having 2,346 residents, a density of 320 people per km^2. Since the 2006 census, the population has increased by 25%. The median age is 43 years (compared with a 37 year national average), with over half of the population aged 30 to 64, and 14.1% aged 65 or older. Residents are predominantly European Pākeha (94%), with 9.5% Māori, 2.9% Pacific peoples, 2.9% Asian and 2.0% other ethnicities. The median income is $48,700 ($37,000 national average). These statistics are comparable to those for the Auckland Region, except for ethnic groups, with Maraetai having a higher percentage of European Pākeha and lower percentage of Asian and Pacifica (see Figure 3 below). In addition, Maraetai residents born in the United Kingdom and Ireland were at 14.8% compared to only 5.7% for the Auckland region as a whole.[6]

Category	Maraetai (%)	Auckland Region (%)
European Pākeha	93.9	53.5
Māori	9.5	11.5
Pacific peoples	2.9	15.5
Asian	2.9	28.2
Middle East/Latin American/African	0.5	2.3
Other ethnicity	1.5	1.1

Figure 3: Table of Ethnic Groups in Maraetai, Auckland Region, 2018 Census (Source: NZ Stats)

Umupuia does not have a specific population count, but in the 2018 census, 2,649 people identified as Ngāi Tai. This figure includes those who reside at Umupuia in the few residential buildings that are

located there, and those who do not. It also includes those who may not identify as Māori but have Ngāi Tai ancestry. Umupuia is the site of the Umupuia marae, wāhi tapu and urupa and is not the main location for most of the population of Ngāi Tai.

Visitor counts at Ōmana Regional Park show visitor numbers increasing from around 211,000 in the 2016/17 year to about 297,000 in 2021/22.[7] This is around half of total visitors to the wider Howick area which was about 560,000 in 2020 according to Auckland Tourism, Events and Economic Development. This figure includes both domestic and international visitors. Overall, Auckland Regional Parks have 4 million visitors per year.[8]

3.2 Economic factors

Commercial activity in the case study area is primarily driven by tourism, residential development and small business. While small in scale, the local economy is closely tied to the natural environment and supports the local community.

Tourism plays a significant role, particularly during the summer months, when visitors are attracted to the area's beaches and water-based activities such as boating, fishing and kayaking. In the weekends, Maraetai Beach becomes a popular spot for non-residents. There are also local restaurants and cafes on the beach that cater to tourists and residents alike. They benefit from the flow-on effects of park visitors and members of the nearby Maraetai Boating Club.

There several small-scale commercial activities, such as retail shops, service businesses and marine-related industries. Many of these businesses cater to the local community, providing essential goods and services. They are located on the ridge overlooking Maraetai Beach. While relatively small in scale, these businesses provide employment opportunities and support the community's ongoing development and growth. As such, connectivity to the Auckland Region is critical to the local economy.

3.3 Property

The property market provides residents with investment income and opportunities. In the 2018 census, 954 private dwellings were identified in Maraetai.[9] Nineteen are located on the beachfront. The latest Real Estate Institute of New Zealand report on Maraetai shows that 31 properties were sold with a median price $NZD 1.325 million (May 2022 to April 2023).[10] Average prices in the Auckland Region during the same time period were $NZD 1.02 million. According to local real estate assessments, few properties on the beachfront have sold in recent years (the last sale was 2021), so it is difficult to estimate the extent to which Maraetai beachfront properties are sold for higher prices than properties without sea views (in percentage terms). Anecdotal evidence suggests it could be as high as 50% in some instances.

There are no new property developments expected in Ōmana ki Umupuia. However Beachlands, which lies adjacent to Maraetai, is the site of a proposed 250 hectares, 3,000 dwelling project.[11] The development includes the construction of homes as well as commercial, retail, education and open-

space amenities. Beachlands South Limited Partnership has applied to Auckland Council for a plan change necessary to facilitate the development. The partnership is jointly owned by the Russell Property Group, the NZ Super Fund, Ngāi Tai and Hapai Development Property LP. Submissions on the plan change highlight how the project would address the lack of housing but others were concerned that the infrastructure, especially roading would not have the capacity to withstand the added population.

4. Historical context

4.1 Māori

Ngāi Tai is the tangata whenua and the original inhabitants of Ōmana ki Umupuia.[12] Ngāi Tai's traditional rohe extends south from Tirikōhua near Pukekohe, to Te Kawau Tū Maro Kawau Island in the north, across to Aotea Great Barrier Island, the north-western shores of the Coromandel Peninsula to the east, and the upper Manukau Harbour to the west (see Figure 4). Ngāi Tai's interests on the fringes of this area are shared with many other hapū and iwi, and have at times been contested. The undisputed centre of Ngāi Tai territory lies between the Wairoa and Tāmaki Estuaries. Ngāi Tai have inhabited Umupuia since their arrival on the Tainui waka at Whakakaiwhara Peninsula Duder Regional Park c.1350. Also acknowledged are the connections to the land by Ngāti Pāoa and Ngāti Whanaunga.

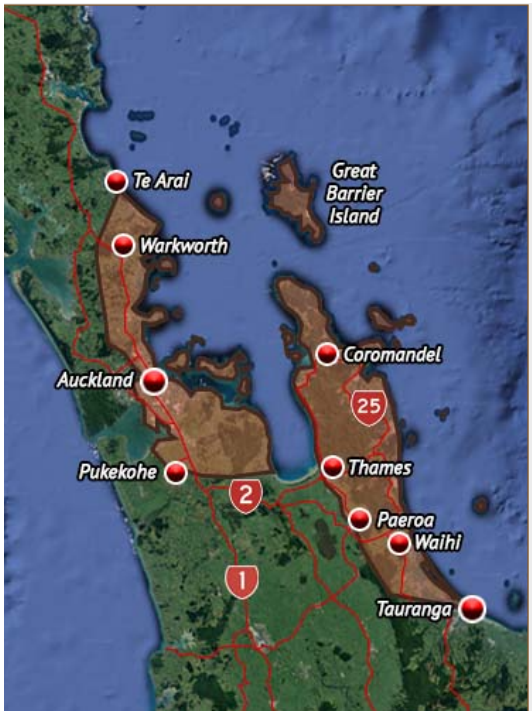

Figure 4: Map of Ngāi Tai rohe (Source: Te Puni Kōkiri)

4.2 Colonialisation

Europeans first arrived in the area c. 1830s, soon after Captain William Hobson landed in the Hauraki Gulf in September 1833, aboard the *HMS Herald*. Historical accounts of contact in the area focus on

the sale of Ngāi Tai lands and alienation. The narrative recounts how Ngāti Pāoa and Ngāti Tamaterā were attempting to occupy Ngāi Tai lands that had been uninhabited during the musket wars. To settle these issues several hui were held at Tāmaki, Ōrere and Ōkāhu, and on 18 January 1836, Te Wherowhero of Ngāti Te Rau and Henry Williams arranged a conference at Ōtāhuhu between Ngāti Pāoa, Ngāti Tamaterā, Ngāi Tai, Waikato and Ngāti Te Ata. Williams suggested to Te Wherowhero that Ngāi Tai's land should be sold to the Church Missionary Society to resolve the dispute.

The outcome was that on 22 January 1836, thirty-two Rangatira led by Te Hira Te Tuiri of Ngāti Tāwhaki (Ngāti Tamaterā), Herua (a.k.a. Kahukōti) and Hauāuru of Te Urikaraka & Matekiwaho (Ngāti Pāoa) signed a deed of sale for a block referred to as 'Tāmaki', comprising an estimated 40,000 acres of land to William Thomas Fairburn.

The land was later revealed to be between 78,000 and 83,000 acres when surveyed. The boundaries of the sale known as the 'Fairburn Purchase' included Ōtāhuhu, extended southward along the Manukau Harbour to Papakura, turned east to take in land between Papakura and Te Wairoa, extended along the Wairoa's west bank to the river's exit at Maraetai, along the Maraetai coastline to the mouth of the Tāmaki, and then along the Tāmaki back to Ōtāhuhu (see Figure 5). In 1837 Fairburn then signed a deed returning one-third of the land to Ngāi Tai but this was not put into effect. Following the transaction, Ngāi Tai continued undisturbed in their customary use of the remaining land.

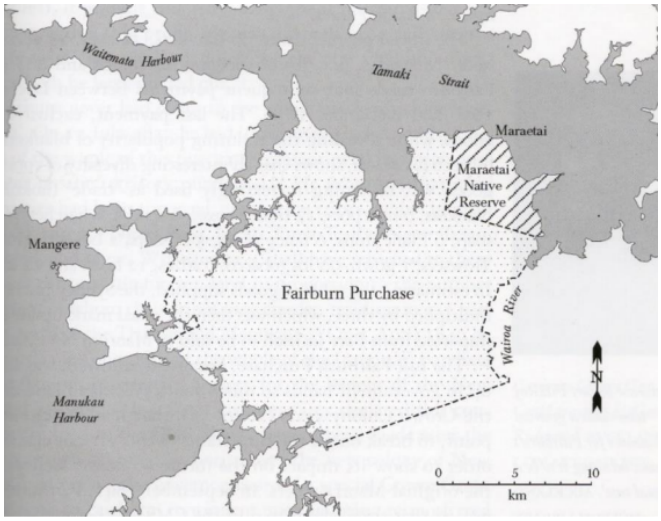

Figure 5: Map of the Fairburn Purchase (source: Stone 2001)

On 6 February 1840, the Treaty of Waitangi/Te Tiriti o Waitangi was signed, and established Aotearoa New Zealand as a colony of the British Empire. This was by way of partnership between the Queen of England and Māori chiefs. With the foundation of the new government came the Land Claims Commission which set out to investigate pre-Treaty purchases. Those that were found to be excessive, inequitable or unfair were to be 'disallowed' and no formal grant of legal title would be awarded. 'Disallowed' lands were not returned to iwi but were sold as 'surplus lands' to colonists for profit.

There were several issues with the Fairburn Purchase. For example, not only were the Ngāi Tai signatories illiterate but they had no previous experience with land transactions; the concepts of private ownership and extinguishable title were unknown to them. As a result of the Land Claims Commission's enquiry the Fairburn claim was 'disallowed' and the Crown granted 5,494 acres at Maraetai and Ōtāhuhu.

In 1851 the protests of Te Moananui Katikati (Ngāi Tai, Ngāti Tāwhaki) against logging at Te Puru near Maraetai prompted the Crown to reopen the investigation into the Fairburn Purchase. In 1854 Ngāi Tai received £500 and Ngāti Tamaterā (Ngāti Tāwhaki) received £200 compensation for the land taken from within Fairburn's returned third. The majority of the lands were retained by the Crown. In 1854, the Crown created the 'Umupuia Native Reserve' (6,063 acres) which extended from present-day Maraetai Beach to Umupuia, including land from Te Whakakaiwhara Peninsula to the Wairoa River's mouth. This constituted less than one thirteenth of the 83,000 acres in question.

In 1864, despite the efforts of the Rangatira of Ngāi Tai to remain neutral during the Land Wars, over 58,000 acres, known to Ngāi Tai as Ōtau–Hikurangi and to the Crown as the East Wairoa Block, was confiscated from Ngāi Tai, Ngāti Kōhua and Te Koheriki. Honetana Te Irirangi was later paid £1,000 compensation on behalf of the iwi. Then in 1865 the Native Land Court removed Papa tupu title or collective ownership from the Umupuia Native Reserve and cut the land into private, alienable titles in the name of individual chiefs. Umupuia was divided into 11 blocks, 10 of which had been alienated by 1869, leaving a little over 1,300 acres in collective Ngāi Tai ownership.

The Duder family purchased the Whakakaiwhara Block from Ngāi Tai, and members of Ngāi Tai and Ngāti Kōhua took employment on the renamed Duder Farm. Other members of Ngāi Tai worked for European farmers at Clevedon, or on Kauri logging and gum-digging settlements such as Kahawairahi and Kauriwhakiwhaki Beachlands, where whanau maintained traditional kāinga, fishing grounds, cultivations and urupā on land now in European ownership. A flax mill was run from Umupuia during the latter stages of the 1800s, and pigs, fruit and vegetables continued to be traded at the Auckland markets. The flax mill later burnt down.

4.3 Treaty Settlement

In 2010, Ngāi Tai gave the Ngāi Tai ki Tāmaki Tribal Trust a mandate to negotiate a deed of settlement with the Crown to redress land confiscation and alienation. Five years later, in November 2015, settlement was finalised which included financial and cultural compensation for the iwi. The deed acknowledged the significant historic grievances suffered and was signed at Umupuia Marae.

The former Minister of Treaty Negotiations, Chris Finlayson, said that the settlement acknowledges and apologises for the acts, omissions and historical breaches of the Treaty of Waitangi suffered by Ngāi Tai from the taking of their land:

> We can never fully compensate the people of Ngāi Tai ki Tāmaki for the wrongs they have endured. This settlement, however, provides a basis for Ngāi Tai ki Tāmaki to develop a much stronger future and an opportunity for a genuine partnership with

> the Crown… Signing this deed of settlement is an important step towards settling historical grievances in the Tāmaki Makaurau region and New Zealand as a whole.

Financial redress for Ngāi Tai included $12.7 million, two commercial redress properties and one joint commercial property with the Marutūāhu Collective as well as the opportunity to purchase four deferred selection properties. Cultural redress was focused on sites of immense cultural and historical significance to Ngāi Tai and includes the vesting of 16 properties. Ngāi Tai also received a $50,000 cultural redress payment.

4.4 Early to late European Pākehā

Maraetai Beach was an early European settlement, dating from the establishment of the Maraetai Church Missionary Society at Ōmana, by Anglican lay catechist W.T. Fairburn in 1837.[13] Soon after, Maraetai became a focus for the surrounding farming district established by European settlers, with a wharf providing a sea transport link to Auckland City and other areas.[14]

From the 1850s, Europeans were mostly farmers who cleared the land which was heavily forested with kauri trees. The timber from the felled trees was used to construct houses and schools in the area and for boat building. Early families to set up a farm in the hills around Ōmana were the Keanes who arrived in the 1880s and the Kellys. By 1901, there were 21 families, mostly farmers, in the Maraetai area. Well-known families included the Couldreys and Duders.[15] The Craig family, suppliers of sand and metal, also had a house in the district. The period of greatest population growth occurred in the 1960s, when it grew from 190 in 1956 to 395 by 1966, and it continued to grow steadily thereafter. This increase reflected the shift from bach dwelling to more permanent residency.

Figure 6: Photo of Maraetai circa 1911 (Source: Auckland Council)

During the 1920s, Maraetai became an outlying beach settlement of the Auckland region. The Pollards owned the land that was then subdivided in 1923 for bach and bungalow development. The

subdivisional map of the Maraetai Beach Estate was prepared by Harrison & Grierson, Licensed Surveyors. That map shows that the original beach section subdivision of 156 lots on the land rising back from the beach at Maraetai encompassed the foreshore part of Maraetai Drive, Carlton Crescent and Rewa Road. The lots are around one fifth of an acre in size with the largest lots being twice that size. The plantation reserve strips running along the rear of some sections later became Colson, Coney and Cunnolds Lanes. Prices ranged from 50 to 200 pounds.

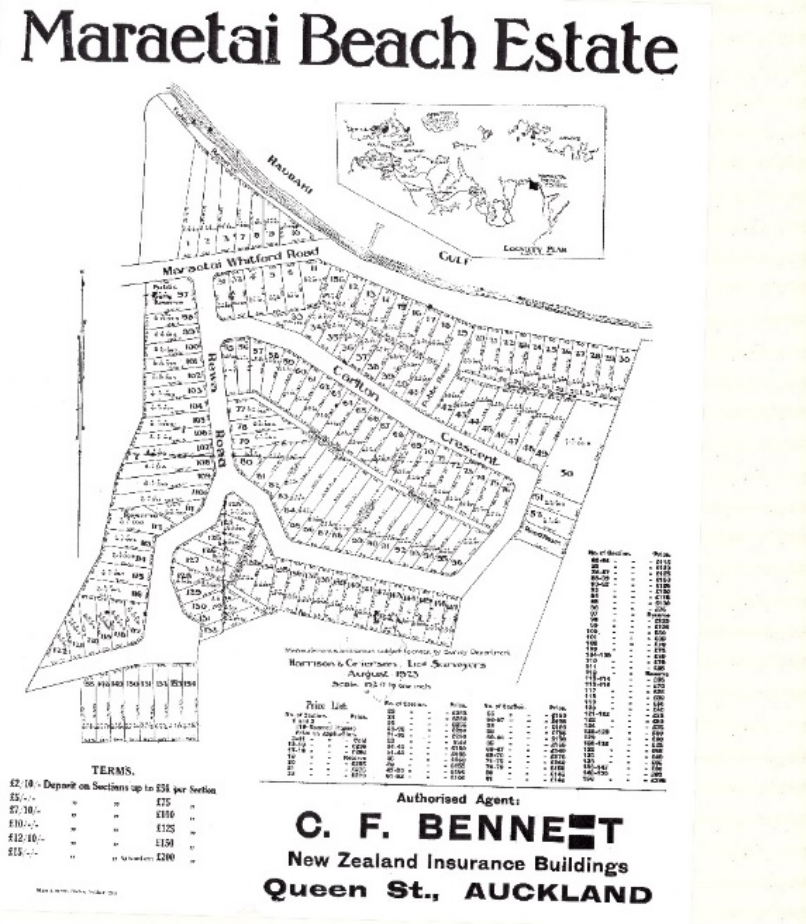

Figure 7: Map of original 1923 Maraetai Beach subdivision (Source: unknown)

The parochial magazine for the Clevedon Anglican Church advertised the lots throughout most of 1926-27:

> Ōmana Beach Estate, Maraetai: select your section before Xmas … The finest beach near Auckland … accessible by motor car, bus, launch, and steamer … no section less than quarter of an acre…[16]

Maraetai continued to expand and undergo piecemeal subdivisional development from the 1920s to the 1950s. These distinct areas are still apparent. In particular, the 1920s Maraetai Beach and hinterland development and the other 1920s development at the western end of the Ōmana Beach area are distinct in character from the more suburban 1950s development at Ōmana. By the 1960s, scattered housing was evident. The original wharf store was built in 1925 (and the present building

in 1946). The first Maraetai School opened in 1880. Maraetai Beach Boating Club was established in 1958 at the eastern end of the beach and the present building was opened in 1979.[17]

Infrastructure, and the connections to Auckland city, developed in line with Maraetai's expansion. Most early settlers reached the area by sea from Auckland. The first road was constructed in 1890 and was clay beyond Howick until the 1930s. The road to Howick was the first concrete road in Auckland. The last stretch of the clay road from Whitford to Maraetai was metalled in the late 1930s and sealed about 1960. In the early 1960s, Campbell Road was sealed, kerbed and channelled, while the main road into Maraetai was still unsealed. Consolidation of the Craig Road area took place mostly during the 1960s and 1970s.

4.5 Ōmana Regional Park

Ōmana was named after Manawatere, the Ngāi Tai ancestor Te Tuhi a Manawatere who left his mark on a large pohutukawa tree as an indicator for those following that this was a good safe place to settle. The Ō-Manawatere Pā, built by Ngāi Tai, is located on the north-western headland of the park. The Pā is a small rectangular area on the cliff edge, with a defensive ring ditch around the three inland sides. This fortified Pā and other wāhi tapu features in the park date from the early 1600s.[18]

The Ō-Manawatere Pā has cultural significance for Ngāi Tai and is a scheduled historic heritage place under the Auckland Unitary Plan. Pōhutukawa lining the coastal edge, and the area in front of the coastal cliff where remnants of caves are located, are also culturally significant. A prominent cave is Te Rua Tauiroha. Consistent with the tradition of intertidal burials, and the significance of the pōhutukawa, this cave situated between Te Puru and Ōmana opened and closed with the tides. It was associated with rituals of arrivals and departures both physical and spiritual. The area is known as Te Tahua and refers to the abundance of kaimoana which was harvested off this area by Ngāi Tai. This site is pre-dates the arrival of the Tainui waka.

A recorded shell midden site is located on the eastern raised bank of Te Puru Stream, above Kellys Beach. This is one of the significant and substantial archaeological sites located within the park and contains information relating to settlement both in this area and at the nearby O-Manawatere Pā. Ngāi Tai and members of other Hauraki tribes lived on the land when it was part of William Fairburn's Maraetai Mission Station. This included a small school for Māori from 1837-1842. The Church Missionary Society school and station no longer exist.

Ōmana was one of the region's first farms, developed from 1837 as part of the mission farm that was then bought by the Craig family. The Craigs lived in a house on the cliff top between Ōmana and Maraetai. As with the surrounding district, the forest was felled for timber, the soil was dug for kauri gum and the land prospected for gold and silver. The land continued to be farmed from 1837 until 1970 when the Auckland Regional Authority purchased it for use as a regional park. It acquired the land from the Motion family, who bought the property from the Strachans, who had in turn acquired it from the Craigs in the early 1940s.

Figure 8: Photo of Maraetai Mission Station site (Source: Auckland Council)

The Auckland Regional Authority spent the first few years rejuvenating the greatly neglected pastures by spraying the gorse and thistles, ploughing and fertilising. The cliffs were fenced off in 1971. A superintendent was appointed and his house erected later that year. In 1972, new internal fencing was begun, stockyards erected, the toilet block and changing sheds erected, and major plantings commenced. In 1973 a new water reticulation system was installed and the flat area above the toilet block was landscaped.

A large slip behind Ōmana beach had to be re-landscaped in 1974. Since then work has been concentrated on upgrading road access and the picnic, camping and parking areas, planting more shelter belts and general maintenance.

Figure 9: Map of Ōmana Regional Park's cultural sites and amenities (Source: Auckland Council)

4.6 Maraetai Beach

Maraetai was the name given to the stretch of sea offshore from Umupuia and Pohaturoa and inside Te Arai-roa Waiheke Island. It is correctly translated as 'the marae of tides' or 'enclosed tide' not as 'a meeting place by the sea' as it is more commonly referred to.[19] This name was given because the sea was viewed as similar to the courtyard enclosure of a marae, sheltered by Te Arai-roa Waiheke Island. There are at least 12 cultural sites of significance in Maraetai registered in Auckland Council's Cultural Heritage Inventory.[20] These reflect the settler and Māori occupation of the area.

Many Māori cultural sites date pre-1600 but some are more recent. At the eastern headland is Papawhitu, the place of gathered forces, where there is a small headland pā called Papawhitu Pā. This is commonly referred to as Maraetai Pā and Waiomanu Pā. This Pā supported about 200 people from the 1600s onwards. Near to Papawhitu Pā is the large stone Ohinerangi – named for the Turehu Ngāi Tai ancestress of Ngāi Tai known as Hinerangi or Hinemairangi. The stone is Hinerangi herself turned to stone as the result of Te Pakurangarahihi battle of the sun's rays, and she acts as mauri and kaitiaki of the Maraetai foreshores, protecting Ngāi Tai from seismic and volcanic activity.

Settler cultural sites follow the occupation of the land starting in the 1840s. Sites include the wharf built circa 1920 and Maraetai Community Hall which was built in a single day (Labour Day 1926) by local residents and a team from the Henderson and Pollard mill. The Pollards were the owners of the land that was subdivided in 1923, and gifted the hall to the Maraetai Improvement and Social Association (later the Maraetai Ratepayers and Residents' Association) which administered the hall until 1963, when it transferred ownership to Manukau County Council. Another heritage site is at nearby Magazine Bay Waiomanu Reserve where Maraetai Bricks Limited briefly established a brick works. The venture was not a commercial success and the company wound up at the end of 1907.

After the subdivision in 1923 Maraetai became a popular beach holiday destination. Some of the houses were permanently occupied by families that had chosen to move to the beach from Auckland central. These included the Bell family, the Couldreys who opened the first store (called the Wharf Store), the Paxtons, the Craigs who like the Pollards owned land but from Te Puru to Rewa Road, the Kellys, the Keanes who also owned a large block of 424 acres, the Turners, the Strachans who owned 150 acres, and the Johnsons. These families created strong social relations centred on the beach culture of sailing, boating, fishing, cricket, community events and church-going at St Mark's Anglican church.

Figure 10: Photos of Maraetai Beach circa 1950/60s (Source: Auckland Council)

In the late 1990s and 2000s families began to sell and new occupants arrived. This weakened the sense of community and a historical society emerged to preserve the stories and memories of the community. Banks Laxon's recollection written down by residents reflects the transformation of Maraetai Beach:

> I first came here in 1935, and coming from Onehunga and being used to the muddy waters of the Manakau, the thing I most remember, was the crystal clear water and the abundance of large sprats. My family bought 239 Maraetai Drive in 1938 for 450 pounds, and having no car, we came in Doidge's bus. Later in the war years it was with friends who had a car with a gas producer as petrol was rationed. Since then we have been coming regularly until settling permanently in 1990. The history of Maraetai is not well recorded as many of the older people who lived here before the area was subdivided, have passed on and did not record their early experiences.[21]

4.7 Umupuia

Umupuia or 'steaming earth oven' is the name first used to describe the two kilometres west of Whakakaiwhara Peninsula Duder Regional Park. It later referenced Ngāi Tai's pā, kainga and the beach.[22] The marae and buildings, urupa and other wāhi tapu sites are positioned on the backshores of the beach and Maraetai Coast Road. The wharenui is Ngeungeu and the wharekai Raukohekohe. Umupuia is further defined by the maunga Kohukohunui, the awa Wairoa and the moana Maraetai.

Figure 11: Photo of Umupuia with Ngāi Tai ki Tāmaki wāhi tapu buildings (top right) (Source: Gift of the Gulf Foundation)

Ngāi Tai have owned and occupied Umupuia since pre-1600. Ngāi Tai consider that this is the only piece of land in Tāmaki Makaurau that has never been in Pākeha ownership. In 1854, the Crown formally created a 6,063 acre (2,454ha) Native Reserve for Ngāi Tai, which included the Whakakaiwhara Peninsula. As part of the agreement, Ngāi Tai agreed to vacate the other parts of the Fairburn Purchase and reside on the reserve. This meant that Ngāi Tai were cut off from their cultural duties as kaitiaki. Nor were they able to move around their wider territory in a seasonal cycle of gardening and fishing.

When the land war broke out in South Auckland, in 1863, co-operation ended between Ngāi Tai and the settlers. When Waikato and related iwi united in resistance under Te Wherowhero, the Crown viewed it as a major threat to colonial authority. Ngāi Tai sought to maintain a neutral status but many joined Te Wherowhero while others moved away. Although the Whakakaiwhara Peninsula was not confiscated, other Ngāi Tai land was taken. Many Ngāi Tai people stayed in exile and only a small community remained at Umupuia on the Native Reserve. In the 1850s the Ngāi Tai people of the Umupuia area numbered under 100 people.

The Native Reserve was subdivided into 11 blocks in accordance with the Native Land Act 1865 and Thomas Duder purchased the Whakakaiwhara Block from Hori Te Whëtuki in 1866 for 422 pounds. The unit was 600 acres (243ha), of which 148.2ha makes up Duder Regional Park today. The family

built a small cottage on the site of the current homestead. The Te Kuiti cottage is listed by the Auckland Council as a cultural history site.

The coastal area before Umupuia to Maraetai also holds cultural significance for Ngāi Tai and contains settler historical structures. West of Umupuia is Magazine Bay which refers to the magazine that was used to store ammunition by Nobel Explosives Limited (later ICI Limited) from 1910 to 1962 when it was demolished. The next beach west is Waiomanu where there is a shipwreck and old military camps.

PART TWO: RISKS AND RESPONSES

5. The nature of risk

5.1. What is risk?

In its latest guidance on the concept of risk, the Intergovernmental Panel on Climate Change (IPCC) defines risk as the 'potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems'.[23] Related to climate change, this definition covers both the impacts of climate change and the responses to climate change. Examples of adverse consequences include negative influences on lives, livelihoods, heath, wellbeing, economic, cultural, investments, infrastructure, ecosystems and species. The definition acknowledges how individuals will have different points of view on what constitutes a risk.

The IPCC definition draws on the hazard-vulnerability-exposure system that underpins most climate risk assessments. The three elements must be present to constitute a risk. Hazard is the potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury or other health impacts, as well as damage or loss to property, infrastructure, livelihoods and service provision by natural resources. Exposure is the presence, place or settings of people, livelihoods, species or ecosystems that could be adversely affected. Vulnerability is the propensity or predisposition to be adversely affected and includes sensitivity or susceptibility to harm and/or lack of capacity to cope and adapt. The interaction among these three elements is dynamic.

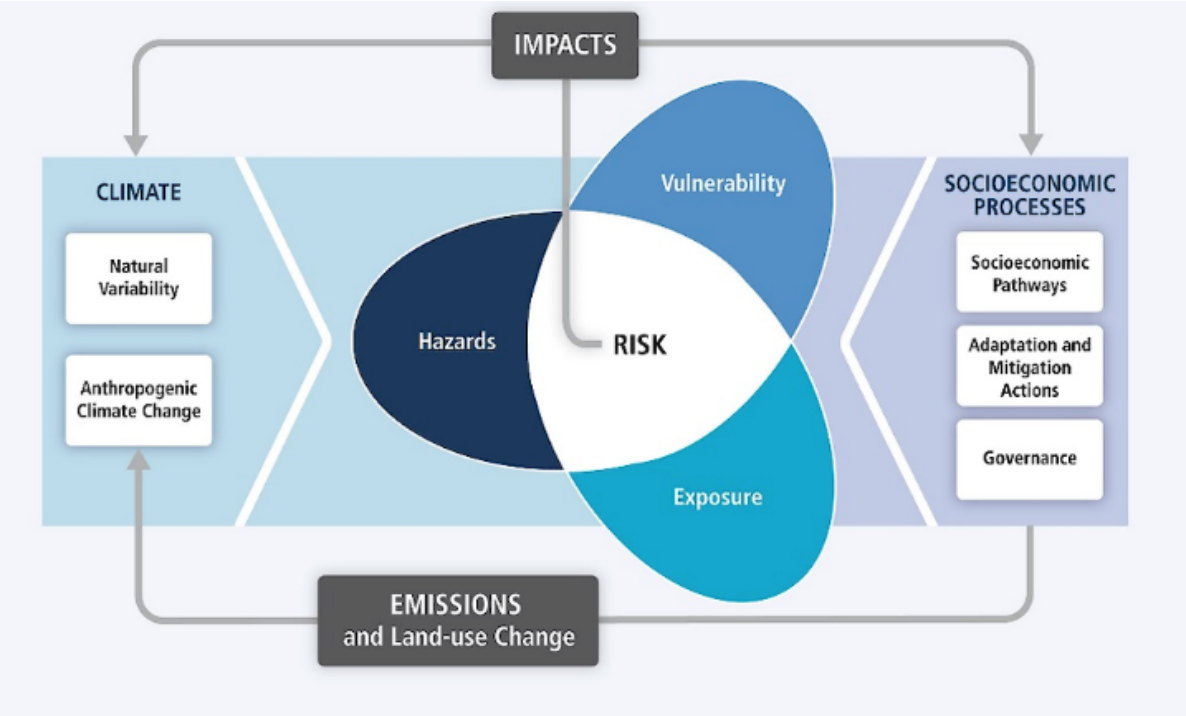

Figure 12: Core aspects underlying the IPCC concept of risk (Source: IPCC)

Uncertainty is inherent in the concept of risk and all its three elements. Not only is magnitude and frequency of hazards uncertain, because of the uncertainty around climate change, but also vulnerability and exposure to hazards. This variability affects the overall risk. For example, social or economic policies could either increase or decrease a community's vulnerability to inundation by undermining or helping to create resilience. Likewise a species may migrate away from an area exposed to drought and reduce its vulnerability to climate induced hazards. The risk is lowered in this case. The IPCC definition emphasises the importance of being explicit about the uncertainty levels in defining risks.

5.2 Elements and value(s) at risk

The IPCC's risk guidance[24] states explicitly that how risks are understood is based on values and objectives. Some individuals will view the risk to an object, idea or activity as urgent and significant, whereas others may not even perceive that there is a risk. Risks are underpinned by values and what is seen as valuable by an individual and group is not static. Perceptions can change over time, not only between individuals but also communities, cultures and regions. Some will share the same values and others will not, or to a lesser degree. As such, risk tolerance and acceptability will vary within a community and over time. What is valued can be material, aesthetic or spiritual. Values can also be ascribed to non-human systems and nature without direct connections to human value systems.

From Ōmana ki Umupuia there are multiple risks that could harm an object or idea of value to humans. There are also risks to nature and ecosystems that are innately valuable irrespective of human perceptions.

5.3 National and regional risk assessments

In 2020, Aotearoa New Zealand's first National Climate Change Risk Assessment (NCCRA) was published.[25] The NCCRA used the IPCC concept of risk and scenarios or 'Representative Concentration Pathways' (RCP)[26] to sort and rank the risks that were identified. RCPs project future greenhouse gas concentrations and associated climate change impacts. The higher emissions scenario or worst case pathway (RCP8.5) was used to screen risks in the first high level phase, and a medium-low emissions pathway (RCP4.5) was used to rate and rank the top 10 risks.

In the first NCCRA, 43 risks were identified across five domains: human, natural environment, economy, built environment and governance. The NCCRA listed the 10 most significant risks against consequence and urgency ratings. The ratings reflected the degree to which assets and values in each domain are exposed and vulnerable to climate change. Coastal hazards feature across all of these significant risks. For example, risks to the 'natural environment' include:

> Risks to coastal ecosystems, including the intertidal zone, estuaries, dunes, coastal lakes and wetlands, due to ongoing sea-level rise and extreme weather events

Under the 'built environment' domain coastal hazards are referenced in relation to:

> Risk to potable water supplies (availability and quality) due to changes in rainfall, temperature, drought, extreme weather events and ongoing sea-level rise
>
> Risks to buildings due to extreme weather events, drought, increased fire weather and ongoing sea-level rise.

In the domain of the 'economy', coastal inundation is noted as follows:

> Risks to governments from economic costs associated with lost productivity, disaster relief expenditure and unfunded contingent liabilities due to extreme events and ongoing, gradual changes

Also the under the 'human' domain coastal hazards are implicit in the following statement on dislocation:

> Risks to social cohesion and community wellbeing from displacement of individuals, families and communities due to climate change impacts.

And in 'governance', poor responses or 'maladaptation' to coastal hazards appear as a risk:

> Risk of maladaptation across all domains due to practices, processes and tools that do not account for uncertainty and change over long timeframes.

Along with the first NCCRA, regional risk assessments have been developed in the Auckland region. In 2019, Auckland Council produced a Climate Change Risk Assessment (CCRA)[27] report. The report used the same methodology, based on NIWA projections, as the NCCRA. In the report, coastal inundation and inundation in general was noted as an urgent risk:

> Flooding is the most common natural hazard in Auckland. With its many harbours, inland watercourses and tributaries, there is no part of the region that is not close to and intimately related with water. Auckland's sub-tropical climate means that high humidity and heavy rainfall events are not uncommon year-round. Further, there is a risk of tropical storms from the Pacific. Climate change will increase the

> severity and frequency of flooding across the city, particularly in winter and autumn. Auckland's urban area has large amounts of impervious surfaces. These surfaces can alter the volume, speed and path of rainfall runoff. Almost one quarter (23%) of Auckland's buildings are exposed to flood hazards. It is estimated that that 16,000 buildings are at risk of floor flooding in a 100 year flood event.[28]

The CCRA report also informed Auckland's Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan 2020.[29] This sits within the broader Auckland Plan 2050[30] and aligns with its goals and objectives, particularly around reducing emissions, adapting for resilience and climate justice.

Since Te Tāruke-ā-Tāwhiri was published, the Auckland Council has still been carrying out work to further understand the risks to the region. This risk work includes updated CCRAs, technical reports, a proposed amendment the Auckland Unitary Plan (Plan Change 78) which aims to ensure land use decisions take into account coastal hazards, Dynamic Adaptive Pathway Planning (DAPP), and strategic planning documents such as the Regional Parks Management Plan (RPMP) 2022[31] and Shoreline Adaptation Plan (SAP) 2023.[32] Further detail on the SAP is included in Appendix C. Risk and Assurance teams in the Auckland Council are leading work to define the levels of acceptable risks to inform policy. Auckland Council is developing adaptation policy under the working title Mahi Tahi Tatou: Resilient Auckland.

The Council's efforts to identify, quantity and manage risks is similar to efforts from the private sector; risk management companies, insurers, reinsurers, property investors and banks also seek to understand risks in Auckland's low-lying coastal areas. Interest from the banks and insurers is driven by cost minimisation, financial and liability risk aversion, and climate risk disclosure laws which came into effect in 2021.[33] The law requires certain financial institutions (including banks, insurers and investment managers) to disclose how climate change-related risks may affect their business, financial position and prospects. Auckland Council is also captured under this legislation. The disclosures must include information on the organisation's governance, strategy, risk management, and metrics and targets related to climate change.

As the demand for risk aversion from inundation increases, risk modelling companies are meeting this need with improved data. For example, in 2021, Risk Management Solutions (RMS) launched the first probabilistic flood model for Aotearoa New Zealand using data from NIWA, Land Information New Zealand, Insurance Council of New Zealand and local and regional councils.[34] Although this model is for inland flooding, RMS is developing a coastal equivalent which will also give the private sector more information on investment decisions. This could lead to some areas being partially insured with high excesses, or uninsured where insurance is unavailable, or voluntarily withdrawn because premiums are unaffordable.

6. Local coastal hazards and climate risks

Ōmana ki Umupuia's exposure to coastal and seismic hazards is well documented. Residents and businesses are aware of these risks as will be discussed in the last section. However, the effects from climate change exacerbates coastal hazards and has the potential to compound the adverse effect

from earthquakes. Recent risk assessments and analyses from Auckland Council have identified three critical risks in the Auckland region: coastal inundation, erosion and land instability.

Coastal inundation is the flooding of normally dry land by the sea, particularly during storms. It is further defined as a combination of tide, inverse barometric effect, wind stress and wave set up which result from storm surges. Storm surges are exacerbated by climate change and can last for 1.5-15 days. Rising sea levels from climate change will increase the frequency of flood events and cause some permanent innundation.

Coastal erosion is the removal of the material forming the land due to natural processes, resulting in the coastline moving inland over time. It is a complex process caused by factors including wave energy, changes to sediment availability and land use, and sea-level rise. Although some types of shorelines may undergo short term periods of erosion, but then recover, other types of shorelines continuously erode with no cycle of recovery.

Coastal instability is the movement of land typically as a landslide resulting from the loss of support caused by coastal erosion. [1]

6.1 Shoreline Adaptation Plan

The SAP notes that council owned land-based assets in Ōmana Regional Park and Maraetai Beach have a medium to high risk of coastal inundation in the medium to long term while the risk at Umupuia is moderate. Coastal erosion and rainfall inundation are rated as being of lower risk than coastal inundation, and are given a moderate rating in the short, medium and long term. However, network infrastructure, water and roads are at high risk of coastal inundation across all areas.

Within the case study area, cultural assets are considered to be the most at risk from coastal inundation in the short term. This is because there are around 41 cultural heritage sites and 19,856m^2 of areas identified to be of high value to tangata whenua. In contrast, Beachlands has only 11 cultural heritage sites and no land of value to tangata whenua. It also has significantly less area of ecological value (at 158,369m^2 compared to Maraetai at 486,836m^2, Ōmana Regional Park at 361,208m^2 and Umupuia at 429,956m^2). It is important to note that this analysis was preliminary and quantitative. A fuller understanding would require more in-depth research.

Although Ōmana ki Umupuia has less roads than the suburb of Beachlands, it is more reliant on one arterial route that is highly exposed to the impacts of climate change: Maraetai Drive which turns into Maraetai Coast-Road or the Pōhutukawa Coast road as it heads towards Umupuia. This strip of road is highly exposed to erosion and inundation. In 2018, to protect Maraetai Drive, the Council erected a sea wall. Auckland Transport has also used tipped rocks to defend the coastal road from erosion. There is a sloping grouted wall with reinforced concrete footing ,to protect the road from Maraetai to Umupuia, which is consented until 2023. The SAP notes that tipped rocks have resulted in damages to trees. Landslips that are both landward of the road and on the coastal edge are frequent in this stretch from Maraetai and Umupuia.

Water infrastructure in this area is highly susceptible to coastal inundation. Particularly at risk is the wastewater and stormwater system. Along the Ōmana Esplanade Reserve there are several assets which continue through to Maraetai Beach where there are storm water pipes west of the wharf. The wastewater network is located only 20-30m landwards of the coastal edge and is exposed to coastal inundation at a 5% Annual Exceedance Probability (AEP). There is a pump at the western end of Maraetai Beach that services the residences in the vicinity and those that are directly behind the beach. Beach residences have their own water tanks but rely on waste and storm water networks. Umupuia residences are reliant on only stormwater and have septic tanks.

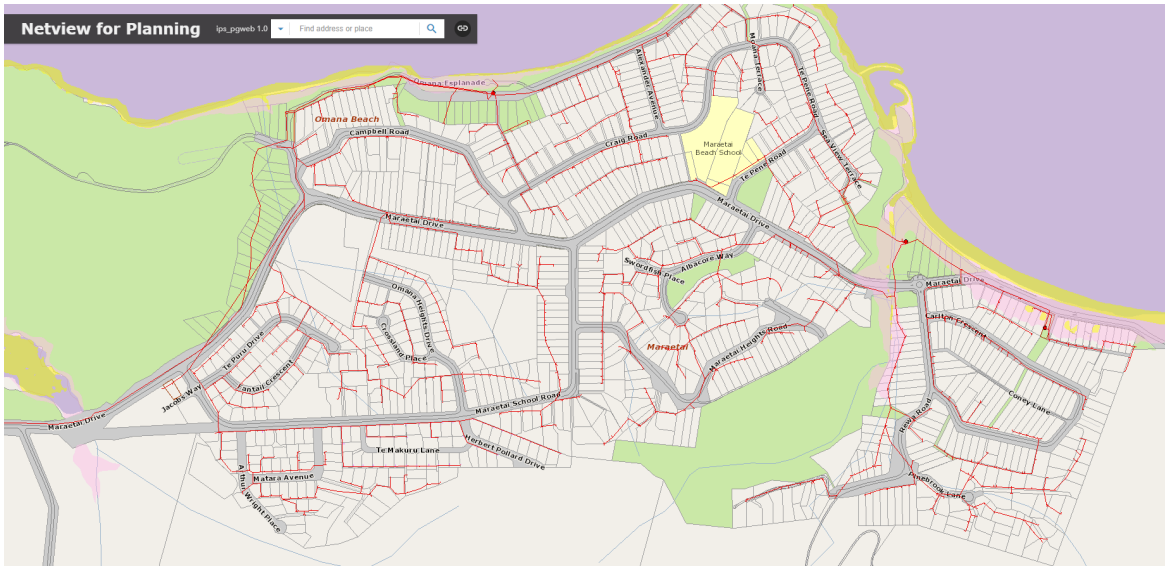

Figure 13: Map of Ōmana to Maraetai showing potential inundation of water and road infrastructure (red lines are waste water infrastructure; yellow is flooding at 0.25 meter sea level rise; pink at 1 m with 100 AEP storm event) (Source: Auckland Council)

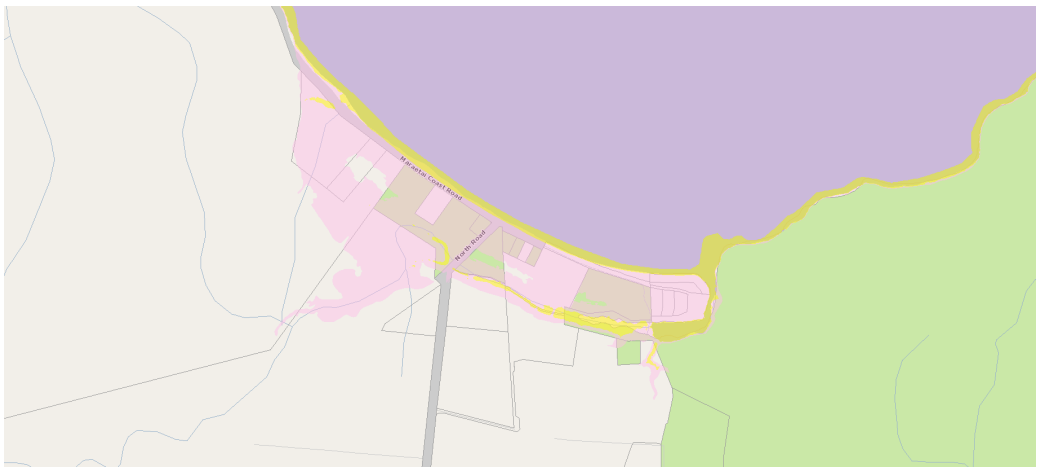

Figure 14: Map of Umupuia showing potential inundation of road infrastructure (Source: Auckland Council)

Damage to infrastructure has downstream implications as well as direct impacts on the services it provides. Damage to transport links can affect the flow of residents and tourists and cause business disruption. It can also affect emergency services. Wastewater pipes that are inundated may lead to sewage overflow. Salt-water intrusion adversely affects conveyance capacities and may contribute

to corrosion.[35] Exposure to unsafe water due to contamination can lead to public health issues and reduced mental health. For Māori, places or activities related to human waste are seen as tapu. Therefore, the intermingling of urupa sites and wastewater is not only culturally offensive but creates significant anxiety and grief for the past injustices against te taiao the environment and Māori.

The SAP states that for Ōmana Regional Park the Council will carry out limited intervention. The aim is to maintain access and the integrity of the natural environment. The adaptation strategies presented in the SAP are a mixture of hold the line, limited intervention and managed retreat. For example, it is recommended that a section of Ōmana Esplanade be converted to a shared walkway and cycling path; and that Watercare assets be realigned out of the hazard zone as they come up for renewal. The area from Te Pene Point to Maraetai Boat Club is also marked as limited intervention, but it is noted that in the long-term, sea level rise may mean that the boat club is fortified and upgraded to support continued use.

At Maraetai Beach's western end a 'high-level strategy' of managed retreat is recommended in the short to long term. The eastern end is designated as 'hold the line' up until the long-term period, when managed retreat should be considered. The SAP notes that a combination of moving and protecting assets will have to take place:

> due to the high amenity value of this area we recommend that the beach area be maintained. In the short term, this can be achieved by continuing to 'hold the line' by maintaining the seawall and increasing sand levels. In the medium to long term, however, the area will require 'managed retreat' to reduce coastal flooding risk and reduce coastal squeeze to provide space for the beach environment and ongoing coastal access….in the long term the current sea wall may require work to increase resilience to wave overtopping and to reduce damage to berm[36]

For the stretch that includes Ōmana to Umupuia, in the short and medium term the Council suggests limited intervention or 'hold the line'. This includes examining the option of realignment of the beach system. However, in most cases longer term managed retreat of Council assets and infrastructure will be required. In Umupuia the septic tanks pose a contamination risk and threaten the integrity of Ngāi Tai cultural sites. Although there is only one direct road connecting Maraetai to Umupuia, there is an alternative route to Umupuia via Clevedon. Closing or moving the Maraetai coastal road would close off direct access to the Eastern Suburbs. Conversely this could also create space for nature and provide a new recreational area.

6.2 Ōmana Regional Park: what is happening

The impacts of climate change and sea level rise are a significant threat to the park and some infrastructure and recreation spaces along the coastal boundary. Instability of the headlands and eroding coastal cliff faces have already resulted in relocation of part of the perimeter track encircling the park. There are highly significant cultural sites for Ngāi Tai in this location such as the Ō-Manawatere Pā, ancestral caves and pōhutukawa. There are sites that have yet to be found that may also be of high cultural significance.

The cliff top campground has been partially moved back due to cliff instability. It is likely that further relocation or reconfiguration will be needed. Coastal erosion at the park's interface with Ōmana Beach is also affecting the land and vegetation.

6.3 Maraetai: what is happening

Maraetai has experienced frequent inundation. The shoreline is exposed to wind and waves from the north west and north east. Maraetai Beach properties are located within the 1% Annual Exceedance Probability (100-year AEP) Coastal Inundation Zone plus 1m of sea-level rise. Therefore the Auckland Unitary Plan[37] specifies that habitable floor levels must be above 1m sea level rise. Most residences have adopted defensive techniques and technologies to cope with the inundation. This ranges from stockpiles of sandbags, to pulling up carpets, through to building small sea walls in the front of properties and raising floor levels. Local government has also engineered and built solutions such as the revetment and timber seawalls.

Prior to the 1990s, resident photos and anecdotal evidence suggests inundation occurred. There is a lack of information on these early floods. However 1936 was the highest recorded tide at 2.27m (mean sea level) at the Port of Auckland. The water level, which does not include the wind stress and wave set-up effects, would be in excess of the existing roadway and would have resulted in inundation of the residential properties in the lee of Maraetai Beach.

In late 1997, the storm surge associated with Tropical Cyclone Drena inundated the beach front. Photographs taken during the peak of Cyclone Drena indicate that the storm surge overtopped the roadway and resulted in inundation of the low-lying properties. The maximum inundation level was 2.40m.

In 2010, Manukau City Council built a buried timber seawall to protect the road and replace an existing failed concrete filled sloping revetment (See Figures 15 and 16 below) that was constructed in response to storm erosion. The revetment was exposed and damaged when beach levels were lowered during cyclone Drena and storm events in 2007 and 2008.

Figure 15: Failed revetment wall at Maraetai Beach (Source: Auckland Regional Council)

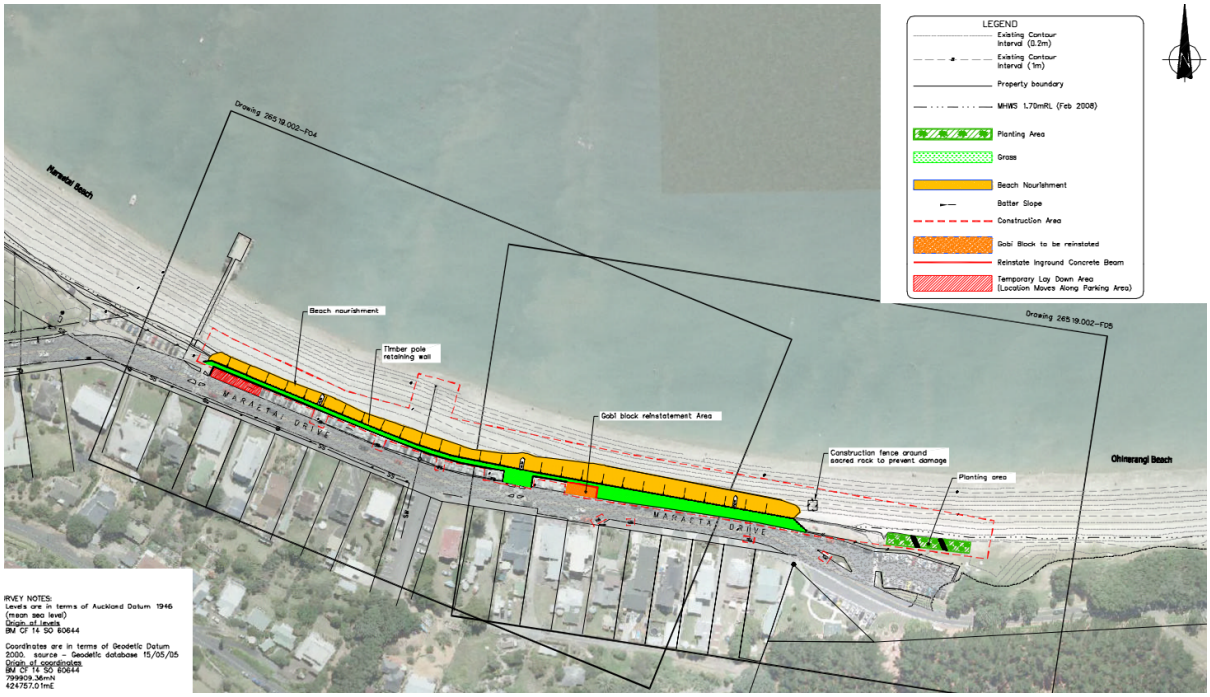

Figure 16: Map of backstop timber wall at Maraetai Beach (Source: Auckland Regional Council)

The 2010 seawall (see Figure 16 above) was constructed along the line of Mean High Water Springs (MHWS) with some parts of the structure located above the coastal marine area. The seawall was buried *in situ* by beach sand and, when beach levels were lowered, by sand imported from Pakiri. An existing consent authorises beach nourishment of up to 1,000m^3 of sand on Maraetai Beach annually. The seawall was set about 2m seaward of the existing edge of the carpark, and is about 304m in length with angled returns into the reserve at each end.[38] The area immediately landward of the seawall was back filled to create a narrow, slightly raised, grassed area to provide a buffer in response to any overtopping during extreme storm events.

In 2018 a storm event caused severe inundation and the seawall was breached. The storm was reported extensively. Images showed residents kayaking down Maraetai Drive, business owners and staff cleaning up after the storm and emergency services sandbagging properties. A resident described the ocean washing over the coastal road and into her front garden; its force had snapped wooden posts supporting her neighbour's fence.[39] The recent 2023 Cyclone Gabrielle did not adversely affect Maraetai Beach because the wind direction was not from the north east or north west.

Figure 17: Photo of 2018 storm event at Maraetai Beach (Source: unknown)

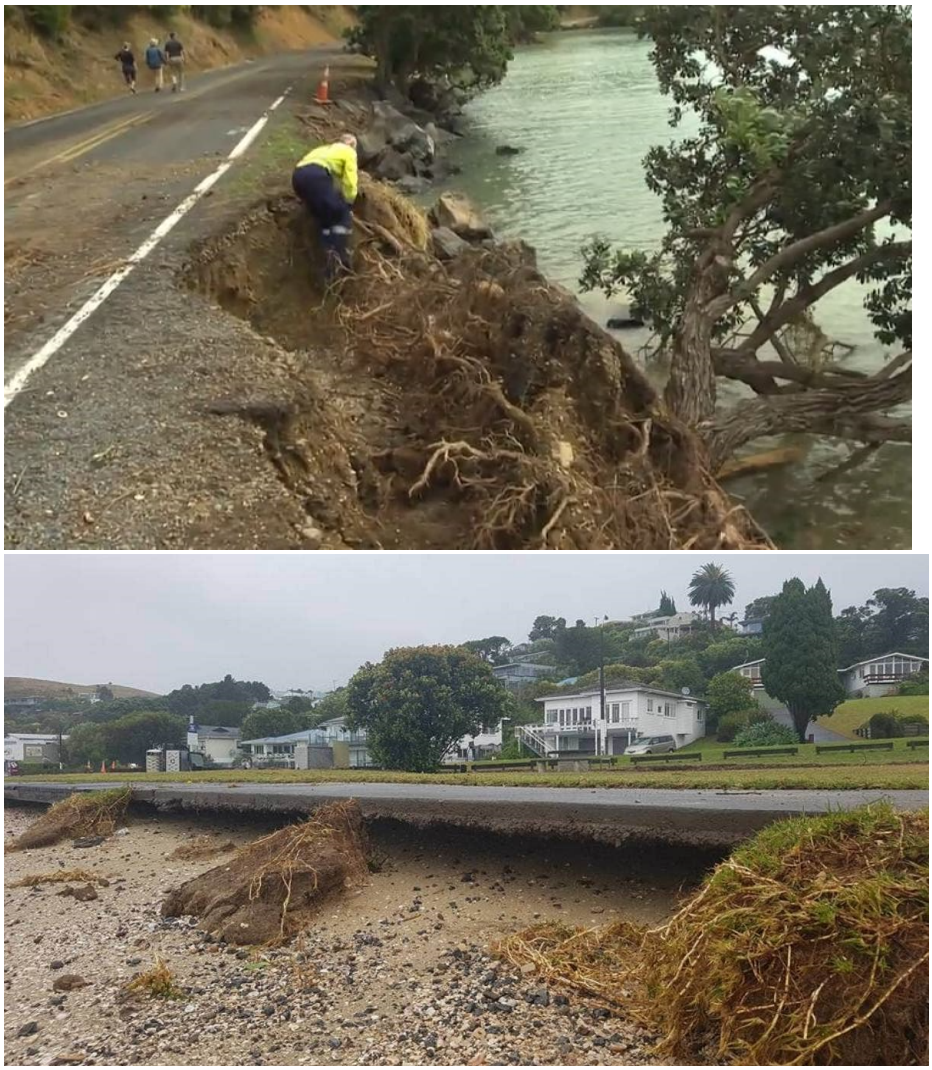

Figure 18: Photos of 2018 storm event road erosion Maraetai Coastal Road (Source: unknown)

The seawall is frequently exposed to weather events. Photos by residents attest to the issues currently facing the area (See Figure 19 below).

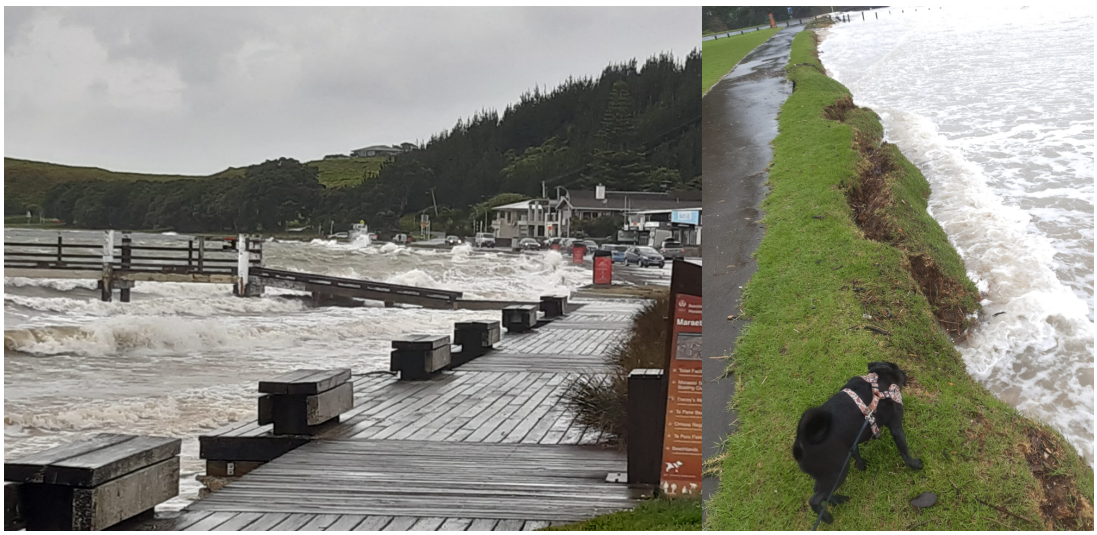

Figure 19: Photos of storm at Maraetai Beach (Source: Steve Owen)

Slow erosion is less consequential than inundation at Maraetai Beach.[40] This is due to the relatively sheltered hydraulic environment the beach experiences. Existing beach profiles indicate a dynamic beach system with eroding and accreting areas. The erosion appears largely due to either storm impacts and/or prolonged periods of unfavourable wind-wave direction, rather than a permanent state of shoreline retreat. The beach is able to restore levels during periods of minimal wind-wave conditions .

Erosion has been undoubtedly exacerbated by human intervention. The car park on the low foredune restricts the buffering ability of the dune and increases the extent of beach lowering in front of the erosion protection system fronting the car park.

Other localised changes have impacted the sediment transport system. These include the increased urbanisation of the catchment, increasing stormwater flows, construction of the marina that may have modified longshore drift patterns, and the pattern of supply to the beach from longshore drift. The health of the shellfish community is significant to maintain the beach material.

Maraetai properties are also at risk from liquefaction in the event of an earthquake.[41] This could compound effects from climate related storm events. Extremely loose, dense shelly sand deposits underlie sections. These Holocene-aged sediments are less well consolidated and cemented than older successions. The location of residences close to sea level also increases the likelihood of soils spreading laterally. Liquefaction can result in loss of foundation load capacity, post-shaking vertical settlement and lateral spreading of ground with the possibility of building ‘stretching’.

6.4 Umupuia: what is happening

Umupuia is the epicentre of Ngāi Tai. Marae, wharenui Ngeungeu, wharekai Raukohekohe, urupā burial grounds and other wāhi tapu are located here. The area is highly significant culturally and spiritually for Ngāi Tai and is not substitutable.

The storm event in 2018 adversely affected Umupuia. Inundation cut power, closed roads and eroded parts of the coastline despite engineering solutions including those at Magazine Bay. The road to Umupuia is highly exposed to inundation. It is currently flooded more than 1-in-5 years or 20% AEP. That is a 5% chance of flooding in any one year. About 100 people use the road daily.

The water system is also exposed. Stormwater infrastructure is regularly repaired because of storm damage. The septic tanks of the few residences, baches and regional park facilities pose a contamination risk if inundated.

In the 2018 storm event road erosion was close to the border of Ngāi Tai's urupa. Large amounts of water came down from Kohukohunui, behind the marae. To mitigate this, and prevent recurrence of inundation, Ngāi Tai carried out extensive planting.

Figure 20: Photo of 2018 flood at Umupuia (Source: unknown)

PART THREE: NARRATIVES

7. Talking about adaptation and retreat

It is certain that adaptation action is needed for Ōmana ki Umupuia. But what is not easy to predict is the form this will take; where and when and the acceptability of these adaptation options to the community. The SAP identified recommended options, but these were only for council land and assets. However, some of these could trigger more widespread adaptation options. For example, if water infrastructure is moved from running alongside Maraetai Drive, houses on the backshore would then be without sewage or stormwater services; decisions would have to be made to move or use septic systems. These alternatives may not be feasible, either, and pose a health risk if inundated. The issues facing communities are not simple and will involve complex trade-offs.

In this section we explore these tensions, triggers and decision points by focusing on the adaptation responses and actions of residents, businesses and tangata whenua in the case study area. Local government, including water and road infrastructure providers, were also interviewed. The IPCC definition that risk perception is based on a diversity of values and objectives, and that these will affect risk tolerance levels, is tested and examined in greater depth. How risk is perceived, and the values that informs that perception, is the starting point to understand how managed retreat and other adaptation options are themselves understood.

The key issues addressed includes both a broad examination of hazards and climate change as a phenomenon, and more detailed lines of inquiry about experiences of climate change and managed retreat as an adaptation option. The aim was to understand how people see adaptation and to identify the challenges, barriers and opportunities to actioning a managed retreat solution. Three main themes surfaced from research. We have captured these simply under the titles of 'Place', 'Nature' and 'Trust'. Within each of these themes are more complex discourses that speak to the values that pertain to these high level categories. The values that emerged in the study were shared among participants but interpreted in different ways. The findings from the case study informs the last part of the section which outlines policy recommendations.

7.1 Theme 1: Place

Place is a specific location that has distinctive physical and human characteristics. These may include the climate, terrain, landscape, vegetation, wildlife, natural resources, population, culture, language and history. Place is closely related to the concept of 'sense of place' which describes the emotional and cultural associations that people have to specific places.

'Place attachment' is a dimension of a 'sense of place'. It was first explored in the 1960s to describe grief-like behaviour by geographically displaced communities.[42] At its simplest, it is the emotional and psychological bond that people form with specific places. It is a deep sense of connection and belonging that arises from the experiences, memories and relationships that people have with a particular place. A strong or positive place attachment covers both cognitive/emotional, and practical or action components.[43]

Place attachment is influenced by a range of factors, including personal experiences, culture, social interactions, and physical features of the environment. For example, an individual may form a strong bond to a specific location because of the aesthetics of the landscape, the presence of family or whanau or close friends, or its cultural or historical significance. Place attachment should then be seen as valued-laden and about human-nonhuman relationships. It has important implications for well-being.

Place attachment plays an important role in responses to climate change depending on whether these links are strong or weak. Place attachment is not a static concept and should be viewed as fluid and on a continuum. However, as impacts become more visceral, visible and severe, a range of emotions will be experienced. For those with strong attachments the effects of climate change may be consequential to their wellbeing. Responses could range from a deep sense of loss and/or anger and anxiety as changes to place and loss of biodiversity are witnessed or the destruction of cultural or historical sites anticipated. These responses feed into, not only how climate change is understood and interpreted, but the perception of risk and solutions to it.

Place attachment is often treated as a barrier in discussions on adaptation and in particular managed retreat.[44] But there are possibilities for positive associations. Place attachment can also be a source of resilience and adaptive capacity. Those with strong bonds may become highly motivated to act: to protect, conserve, preserve, advocate or defend the natural environment and community relationships. The flow on effects can inspire participation in policy processes and collective action. At the other end of the spectrum, such bonds could also emerge as efforts to entrench the status quo and resist transformative changes, transitions, or adaptation options – such as managed retreat – that are more extreme.

Place attachment featured as a common experience of residents, businesses, iwi and community members in the case study. Understandably, local government and consultants/experts exhibited no attachment. They described the area purely in technocratic terms. Expressions of place attachment reflected the continuum from 'strong' to 'weak' and were informed by an individual's experiences, relationships, economic interests, history, memories, and values about place. In what follows the two ends of the continuum are presented. The graduations between these sub themes are also included and noted.

<u>Strong attachment</u>

An element shared by participants who exhibited a strong place attachment was a discourse of 'thick temporality'.[45] This refers to descriptions in which time is multi-layered so that the past, present and future are interconnected and compressed. Often the past figured most prominently and coloured the future and present. Threaded through the interlacing of temporalities were whanau or familial ties and memory snapshots that were drawn on to show the deep sense of belonging which they were proud of. The length of time residing in the area was less important than the actual corporeal experience of living there; of growing up or cementing relationships.

A long-time resident who lives in the house she inherited from her father exemplifies residents who have ties back to the original subdivision of 1923 and the subsequent halcyon years of Maraetai as a beach destination with baches for urban Pākeha. After a brief conversation about flooding, she

brought out the subdivision map (Figure 7) and went back in time to recount the transition from bach to permanent residency:

> So, Dad's father was a pharmacist. He owned the pharmacy, on the corner of Queen and Customs street, and Dad spent most of his life down here when it was an old bach. It was like the one next door, but it was bright yellow, with green blinds, purple curtains with a rose carpet. And once mum and dad rebuilt here in '87 it was all gone, yeah. But what we've got now is amazing and living in that house was just incredible… we had friends, the Rhines, who stayed in the last bach. They were from Papakura; the 3 girls have sold the place now but they're about the same age as my sister and I. We used to ride horses and we did gymnastics. Dad had a rundown sailing dingy, and I could row at three!

The past continued to permeate her narration about living on the backshore of Maraetai. Climate change was understood not as a future risk but as the repetition of the past; specifically, the 2007 flood. Commenting on the modifications made to accommodate flooding she noted:

> My sister and I have done quite a bit to it since Dad died… like outside we changed because of the flood. That's where the water was coming, so we got rid of the carpet and put this floor down. 'Coz Dad had replaced the carpet about 6 times, so we were like, 'hey let's do something different. If it gets wet, we can mop it'. The water came up above the skirting boards, so about this high.

Descriptions of climate change, as a repeat of the 2007 flood, was a re-occurring theme in all narratives including for those with low place attachment. Dialogue would begin with an open-ended question seeking opinions on climate change, and answers would be given in reference to the 2007 flood event, followed by explanations that flooding only occurs when wind direction is a north easterly and tide levels line up. This predilection to reach back into the past and touch on memories about recent floods when asked about climate change reflects the challenge with describing a global phenomenon. But it can also be used to deflect or downplay climate change science, particularly when fronted with scenarios that show an increase in intense storm events and flooding. Those with strong place attachment were convinced that the issue was with the 'weather' not climate change.

Another long-time resident spoke about his memories and intention to pass the family home to his son. Similar to the previous resident, he shifted between memories of the beach community of the 1970s and earlier 2007 flood and the future, but recast climate change as a 'weather' event. Evident in his narration is also loss:

> When I came here 50 odd years ago it was shell, the beach. There was sand under the wharf and there was sea grass and lots of activity in the water. We used to go down with bait catchers to get fish for the cat. Off the rocks on the western side of the bay, we could catch piper which is a miniature swordfish. The sea grass went all the way up to the moorings and it was a firm mud, it was not squelchy, it was just a sandy mud. And we actually picked up scallops out in the bay. So, the whole terrain has changed, yes, there's been subdivisions, Pine Harbour, etc. And we've

> seen the dirty silty water come round the point… …I know, I [should] accept this climate change or extreme weather, whichever way you put it. But I don't: the last time it eroded across the road, we had a low-pressure system over us, it was only a 3.4 high tide. It can get up to 3.7

His home, he was certain, would be unharmed by the 'weather':

> Yes, there's a couple of houses there that have been flooded, they have been a few times. So, I can accept, see that that will eventually not be liveable. But then as I said earlier, I think it could be a decade or two.

A resident who has also been in the area for 50 years recollected his associations:

> And as a kid 'cause I was born in Papakura, so between all of South Auckland, I mean, this was our place to come to for the beach. And as a kid, I used to look at it and think, oh how wonderful, what a beautiful place, I'd love to live there when I grow up. Anyway, I managed to scrape up enough through my earnings to have a substantial deposit to put on a property in Maraetai. I just fell in love with the place, and I wanted to live here and I wanted to be out of suburbia. And in those days, it was a hamlet, just a coastal hamlet surrounded by countryside, so it had a coastal, rural element to it and it still does today, although it's become a little more urbanised. And anyway, long story short, we got married in 1974 and we moved into the house that I'd purchased and stayed there for 23 years and got to know the place very well and got to know the people very well.

Pākehā with strong place attachments focused on the beach as a location of activities through which bonds and relationships were built. They also talked about the view and juxtaposed living by the beach with less appealing suburbia:

> Look at this, wouldn't you want to wake up each morning with this?
>
> We don't want to sell here, it's beautiful. Because of the sea, because of the view. We don't want to be in suburbia
>
> I wouldn't want to go and live out in the middle of suburbia just so there's more inheritance for the kids. Life is for living. We're not going to compromise our lifestyle for the kids.
>
> I just retired and people at work they say, 'oh what are you going to do'? Well, I thought, we basically live in a resort. So, doing nothing is actually enjoyable. Whereas if you're stuck in a suburb all looking at your neighbour's house then you want to go out, you want to have a hobby, you have to be busy. Whereas we can sit out here for two hours doing nothing. My mother sits here all day just watching, people watching.

Notions of having to leave their houses in the event of managed retreat was treated sternly, with comments about it being 'drastic', 'horrific' and 'heavy-handed' to be 'forced' to move. All interviews were emphatic they would not go, some used the metaphor of dying to underscore their refusal to move:

> It would break my heart to leave here. We talked about this; you can't live near any water! So where do you go?! Can't live near a river or creek, on top of a hill? We're gonna stay. I mean how do you find a home, its people, familiarity, memories, tradition, the property being in the family for so long it's never been sold. I just love it here I don't know where I would go.
>
> We don't want to move. We want to stay here until we have to go to a home or die or something?
>
> I don't want to move. The whole point of us moving here is that we live by the sea so, no, we would not move. Probably take me out in a box actually was the plan.
>
> I'd hate to move. I don't want to because I am going to die here. Wouldn't you want to die here? Yeah, just take me out in a box. I'd probably sit in there and drown. This home is where I brought my kids up, it's where they come home to. They've all jumped off the wharf. They've all gone to school here. The grandkids do it now, so it's just on the repeat cycle. I'd just get drunk and let the sea carry me out.
>
> We'll stay here as long as we can. To the end.
>
> Yeah, I suppose if the water comes up here I'll be close to dead or moving out.

Connections to place by tangata whenua conveyed slightly different notions of place attachment with a less emphasis on recreational activities, nostalgia for beach culture; and more on having a reciprocal, affective relationship with place and people:

> I have nothing but love and respect for the place, aye. It's an incredible place to live. Really is, you got all that up the front. We've got all that up the back here. People come out here, so you know it's overpopulated in the summertime. But every night they leave and go home again. So that just leaves us in the wintertime. Well, not many people come out so, yeah, we were trying to enjoy it during the winter. Because it's a heavenly place to live. This place is unbelievable.
>
> It's all forgiving and healing.
>
> You know down here we have nothing but laughter. We talk a lot of bullshit, but you know there's a lot of laughter that comes with it. It's a real mean place to be. You couldn't ask for a better place.

Some narratives showed instances of grief and loss. Not just for the idea of moving in the case of extreme climate impacts, but the overarching exploitation and degradation of the environment. This sentiment echoed Pākehā residents who also traced the steady decline of the area with deep sadness and lament. But what differed with tangata whenua was a belief in restoration and responsibility to act. Sadness was accompanied by agency, understood as a collective action:

> Relationships, traditional customary activities have become obsolete because forests and shellfish are gone, those opportunities are gone.
>
> The problems that have been created are not always of our doing, so yes, we have kuia being dug up every 10 minutes, and yes, we have a problem with the cultural sites being impacted but I think the answer is that people will have to act, with the traditional knowledge or the best science.
>
> Where we find strength is our understanding of mātauranga Māori and where we don't know everything, we support one another to find the answers if we don't have them; and we have common ground finding the best for our iwi, finding the best for Māori.

<u>Weak attachment</u>

Weak, or weaker, associations with the area tended to focus purely on the activity of doing – or recreational and amenity values. These were still highly valued but considered substitutable. Social ties featured less prominently. Time was discussed in the present and future, less in the past. The idea of access to amenities was a common theme along with property values and the idea of losing value on assets:

> Oh it's the best of both worlds here, you're not far from town but you've still got a small coastal community. There are some great facilities, a great park to bring up kids. Some great parks, coastal networks, and ease of getting to water but you can jump on a ferry and the motorway is just a punch through if you need to go to places too.
>
> It changes the face of, of the space that you kind of want to live in, because of course, it's also going to have a massive impact on the walking network and the trail network that's around the whole of Maraetai, which means that if that's inaccessible, then it totally shifts the value of that space. Significantly reduces the value of that space, in terms of the amount of recreational appeal that it provides, because it's really broad at the moment. And, and you can do, you know, you can go wander along there, you can go and make use of the boat club and everything.
>
> I think that [climate change] will have an impact on the amount of people that choose to live in this space as well because there isn't so much to do, and there isn't that many plays. Whereas now everything's going at your fingertips, you can kind of just go for a walk down the beach, take the kids to the playground, go to the boat

> club, go to grab a coffee, go to get a curry, everything's within 100 metres of you, whereas you take those away, what can you do?

The focus on assets and activities aligned with the viewpoint of local government employees, planners, consultants, politicians, and those who spend weekends or visited with friends and family. These interviewees did not reside in the area and access was a key point. Both water and road infrastructure were considered the most 'at risk':

> As I understand it, Maraetai is a pretty susceptible coastline. So obviously with that main road going through it, well, that means we're connected along that coast road. That's obviously one of the main pieces of infrastructure that is really going to be impacted.
>
> How do I feel about it? What does it mean? At some point that road is going to be mostly inaccessible? And so what are we going to do? What's the future of that? Is it gonna be a one-way system? Is it gonna be turned into a park? could it be used as a pedestrian connection, potentially, and the whole of the beachfront is only accessible by foot or on a bike?
>
> There's no money to keep on pouring into protecting that asset in terms of the road. So at some point, we're gonna have to think of more of a medium to sort of mid-term solution and removing traffic.

Similar to those with strong attachment, the length of time residing was not a predictor of weak attachment. However, residing in the area itself was corelated with stronger attachments to place. So, residents who had long associations with the area were not necessarily strongly attached. The place was seen through an economic lens and valued for how much it was worth on the property market. These residents also concentrated on who would fund managed retreat, and strongly advocated for buy-outs at market prices by local governme:

> Thinking ahead… that will also have a knock-on effect, presumably on property values, I would have thought, but that might not be the case because of the demand, and the lack of exit and the lack of housing, full stop. So that might continue anyway, in terms of prices continuing to accrue over time.
>
> That would force us to move if they removed the stormwater, I mean the sewerage facility, yeah. But, if they removed that, well then they should compensate the property owners if they were going to do that. I mean these properties are sold with all these amenities and you can't just take the amenities away and walk away can you? I think it should be the current market rate when the decision is made…

Business also featured in this category because, in general, sentiments were tied to the importance of customer relationships, not place. If the community had to move, they would to follow:

> We are staying here for the business. That's why we're here. Moving the business, that's no big thing. It's not like having to ship a house. I mean, if we had to move then the residents would as well. If the regulars go, we go.
>
> If you can't do business here, or can't live here, that's fine we don't mind moving. At the moment we are fine, we haven't got any big troubles like that because of the weather. But in the future who knows what's going to happen.
>
> Well, I kind of have a vested interest in what goes on in the community. And in particular the area of the beach itself because it's a pretty attraction for people. Whether or not they're local it is the fact that they come to the beach.
>
> I think it was the location that appealed to me. It's close to the beach and that was really a good sort of a drawcard for people to come into the area… I'm not even sure that I'm going to be there in the area in five years, so it doesn't really affect me.

7.2 Theme 2: Nature

Nature is the physical and biological components of the Earth. It includes natural ecosystems and human-modified ecosystems such as urban environments and agricultural landscapes. The concept of nature is dynamic. Nature featured prominently in narratives and how it was framed reflected how people related to nature. The quality and configuration of this human-nature relationship strongly correlated with the types of preferred adaptation strategies and understanding of climate change.

Three subthemes emerged from narratives, which I have captured as 'Inert, 'Force' and 'Kin' to describe the conceptualisation of nature. The first and second themes are variations of anthropocentrism which refers to the tendency to view the world from a human-centred perspective. Humans are placed in a higher hierarchical position than other entities such as non-human species, minerals and other inorganic matter. The value of these entities is in serving human needs and interests. Nature is understood as 'the environment' ('the water') and otherised as a separate object, external to humans. This can take a passive or aggressive form.

The rationale for positioning humans above other species and matter is based on a belief in the exceptional qualities of the human species; generally described as having unequivocal creative and cognitive abilities. These characteristics are then valorised and given as reason to dominate other entities. An adjunct logic to anthropocentrism is a view that climate change is a problem that can be solved by human applications of technology. This technological optimism is evident in mitigation and adaptation discourse and was prominent in the two subthemes discussed below. The focus for residents and business was the reconstruction and building up of the existing seawall along Maraetai Beach. This seawall was imagined as a 'pragmatic' or rational solution to keep back 'the water' from intruding on human territory and the right to reside by residents and business. The notion of making room for nature was dismissed.

Inert

Nature appeared as neutral or inert in most of the climate change narratives by residents, business and local government. When residents were prompted to talk freely about climate change the discussion centred on 'the water' 'coming over' the road into sections and property. The significant flooding event in 2007 was drawn on as an example of what can occur but was also downplayed and normalised. There was no mention of sea level rise nor a direct connection to climate change because the emphasis was on weather patterns, tides, low pressure systems and north easterly winds. When water did 'come' it was considered 'out of place':

> When we have a flood here there's four things that we have to have, to get that to happen. So we have to have a northerly wind, low pressure, a king tide and there's one other thing, the storm coming from the north. So, if we don't have those things the water doesn't actually come over here, not specifically here, but probably further down it does. And we've also lost all our sand this year. It did come back just before Christmas, but I went to Shelly Bay around the corner one day and the sand was up over the steps there.
>
> We're very lucky 'cause we're up high compared to everybody else. And it's been something that's happened in the past here so it's not anything new.
>
> Down at Maraetai Beach, the water obviously comes across the road. And I've been here obviously since I was a little girl so I've seen it many times growing up. You know, kids are kayaking down the middle of the street and that sort of thing. And in fact, the last storm that we had we didn't get as much water inundation, but I know that it did a lot of damage to the boardwalk that they had built along the beach.
>
> It happens when we've got the right tide and the right wind. And I think the biggest thing from my assumption is that it's usually the water pushing back up because obviously there's some big pipes that come down onto the beach. And so when the tide and the wind is howling and it's pouring with rain, and the tide's up, and so it's usually like a 'nor easterly, northerly wind. And then it just seems…the water is not going out, it's coming in. And then it comes across and into residents' houses, gardens and businesses.
>
> And obviously as residents we understand that when it's blowing the right way and it's raining the right way and the tides the right way, that this is something that will happen. And we go in and we get the sandbags out and prepare ourselves for it. And then the tide goes out and the weather happens and we clean up and along we go again.
>
> You've basically got to live upstairs. So, if the water comes in, as it can do all around here, you can still survive. And also, you've got a hill if you have to get out, if you get a warning you can scamper up the hill. It's not so bad.

> Well, over the past 50, 60, 70 years the water has flooded over the road at extreme tides and high winds from the north. But it's always drained away within a couple of hours. When council put a protective structure from the wharf along to the end of the houses, it ended up trapping the water once it came over because all the drains were blocked up around sea level. So, the water was on the land.
>
> I've been here five and a half years and there was a flood the first year that we were here. After we'd been here about six months, it came across the road and part way into the property. And that was all. It didn't come in the house. It didn't come in the garage or anything like that.

Some residents spoke of being protected from flooding by Waiheke Island and Great Barrier Island. Climate change was grasped primarily through the lens of flooding and then diminished as a risk based on previous experiences. A few acknowledged climate change as a future phenomenon, but again reached back into the past to argue that it wasn't a concern. This ambivalence is evident in the below remarks:

> It's just something that's going to happen isn't it really? I don't really know too much about it. You know, we've had storms here before. We've had the whole waterfront flooded with boats on the road, that kind of thing in the past. And you know, some have raised their houses because of that, some haven't, 'cause they think they'll get away with it. The last storm I don't think was too bad. We didn't have that much damage. I don't know. I can't say 'cause I wasn't here, I was away. But, when I got back it didn't seem like a hell of a lot.
>
> I accept this climate change, or extreme weather, whichever way you want to put it. The last time it eroded across the road, we had a low-pressure system over us, but it was only about a 3.4 high tide. And it can get up to 3.7.

The idea of a seawall appealed as a way to keep nature ('the water') where it should be. But also popular were modifications to protect and defend private property including raising levels to build beyond council requirements and always having sandbags at hand:

> Well, they could do what they've done around at Magazine Bay, that block wall. I don't know why they couldn't do it here. It makes sense to do it here. This is more popular and used than Magazine Bay, where they've got the wall.
>
> We've been to the Netherlands where of course they have flooding issues. And they build the big sluice gates to block off the seas. So, my husband reckons they could do that if need be, particularly for here, build big sea walls around the harbours and things like that.

In contrast to residents and businesses, local government and experts did not replace climate change with weather pattens. However, nature was still abstracted and viewed as out of place and

in need of intervention. The below is typical and reflects this Western technocratic perspective of nature and representation of climate change as a collection of measurable data:

> Well, 1.1 metre sea level rise will see the whole park basically gone. You can see this on a nice little map and the discussion paper. These showed it underwater.
>
> What we need to do is pretty much either shift the campground, shift the track, monitor the coastal erosion cliffs, and restore the cliff instability through replanting and things like that.
>
> Our seawall at Maraetai, it'll *[the sea]* go over the top with strong winds that are predicted. So moving forward, I see that as a little bit of a losing battle. So that's why we need managed retreat. We need to have a plan B, because simply staying here and building a wall higher and higher is probably not the answer.

<u>Force</u>

These narratives framed climate change as extreme 'weather' events that are not causally related to human actions. These events are not inert but threatening – like tsunamis and other natural hazards. Nature is otherised but positioned in a more dangerous space than former discussions which replaced climate change with past floods and as result softened the potential harmful effects:

> Nothing stays the same. Evolution and change is constantly occurring with or without man's influence. One only needs to study a few historic and recent scientific reports, such as archaeology and palaeontology, to understand this principle. As with so many other issues in the world, weather patterns are in a state of continual change.
>
> Man is no match for nature, regardless of how intelligent man thinks he is. Examples of this principle are such things as seismic activity, tidal waves or tsunamis… volcanic activity, eg the recent Tongan Eruption, Christchurch Earthquake, tornado and high wind activity, cyclonic weather conditions etc.
>
> Who produces the most carbon emissions? So many factors out there. Someone was telling me recently, even the Tongan eruption has caused change in our weather patterns and stuff. And it's like act of God stuff. It's a hard one, isn't it? To be honest, if we knew now, I wouldn't mind my rates going up to pay for a seawall or putting money aside to help pay for it if it was to preserve this property.
>
> None of these forces of nature are new. The world has been around for millions and millions of years and science has proven that it has undergone changes of major proportions
>
> I mean we don't know which way things may have gone without humans, do we? But no, I think it's humans who created what's happening but then we don't know

> for sure. It could've been major earthquakes or a major tsunami. So, a lot of it is chance.

For these interviewees, more than putting 'water' back in its rightful place, the seawall and other preferred defensive measures were understood as armature against nature. The risk was not nature nor climate change but the design and governance of the wall. Risk was then recast, not as climate change, but the risk of local government failing to build a wall that could tame nature. This failure was not seen as a one-off occurrence but had existential overtones:

> Since these weather events are beyond man's control the best we can hope to achieve is to mitigate against the effects of weather events such as what we have recently experienced. My wife and I experienced one such event during an horrific storm in 2017... a flood on our property causing some land collapse, which has since been rectified. The issue was exacerbated – and could have been avoided in hindsight – through a tardy Council not keeping the stormwater drainage system operational during such times.
>
> While man is no match for nature, to do nothing is not an option.
>
> I originally come from the UK where my dad still lives in Weston-Super Mare. And they get flood warnings. But they've got a quite high wall and massive gates that swing closed… I would be definitely keen to have a bigger seawall.
>
> Well, I think this is very Third World what they've got along here at the moment... they've just shovelled the gravel back in and a month later it gets pushed out again. So, if that wall was lifted half a metre and capped with a boardwalk along there then we'd have more protection from storm surge.

<u>Kin</u>

The sentiment that nature was not an external 'other' but related to through kinship bonds and ties of mutual reciprocity appeared in discussion with tangata whenua. Climate change was not dismissed but neither was it considered surprising or new. Rather it was seen as another example of how the relationship between te taiao (the environment) and humans was broken because of ongoing exploitation and appropriation:

> Along coastal edges, along river ways, along ridges, areas that flood a lot, areas that are sheltered, areas that have soils and materials that lent themselves to growing and harvesting kumara and harvesting the water was our traditional water way. We know water and the practice to date has been to destroy, to drain, to cut down, to quarry, to lift up. That has shown to be unsustainable and now we're in this turmoil.
>
> We view sea level and these seasonal challenges as something we've been challenged with for as long as our history. It's not a new thing, we don't see it in the same light, we recognise that it's going to rain and it's going to rain heavily and the

> flooding that is predicted is something we need to consider far more now than we have done in the past.
>
> It's about the whakapapa relationship asking you to recognise the environment, it is the older sibling, it's our turn to reciprocate.

The preferred adaptation options and ways of responding to climate impacts were layered and not focused on engineering solutions. What was empathised instead in these narratives was the importance of relationship with others:

> Where we find strength is in our understanding of mātauranga Māori. But where we don't know everything, we support one another to find the answers. We have common ground finding the best for our iwi, finding the best for Māori. We are both scanning the same things and what one might not pick up, the other does.
>
> So, observation and responsive. Look at kauri die back – it's through our cultural connections that we begin to answer the questions.
>
> All I can say is relationships…not just in our whanau connections, but in our indigenous whanau outside of New Zealand. There are multiple indigenous relationships that are not obvious that whanau hapū have. Our relationship with our Pacific whanau is not new, nor with our Asia whanau. Above all else we are able to mobilise because of our cultural connections and it's done in other places too – look at how quickly a whanau is able to mobilise when there is a tangi.

Making room for nature or co-evolving was also viewed as the best way to 'manage not control' climate change. This involved treating nature as a sibling by listening and responding:

> We've demonstrated what the land is saying to us. What it is saying is we have gone in and put houses in there. They weren't listening to the environment, they weren't actually considering what the environment was actually saying to them, they saw a stream in their way and they needed to remove the stream, needed to pipe it somewhere else so it doesn't flow anymore. That's the challenge you have with climate change.

It also meant that humans should not only make room for nature but understand that nature – understood as kin – has agency and demands acknowledgement. To ignore this leads to the worst outcomes:

> This area needs to be protected. This area should have some planting over here to stop erosion. All they wanted was stuff to help them play. For launching their boats, for getting down to the beach. And "we want stairs down to the beach". A place for launching those things called jet skis. It was "we want", "we want". Not "I care so much about our environment". Nobody cares about our environment.

> Yep, and the reality is you're here for two seconds of a lifetime. This will always be here. You will go one day. But, in terms of like Tangaroa, he used to come up here and he still does underground. These people need to understand that they have encroached into the natural environment.
>
> Locals are wanting concrete paths and wooden paths and those sorts of different things to make their life easier. Oh no, but it's muddy, it gets muddy and wet there. Walk around it, you know? You are in the natural environment in a coastal zone. And you're trying to highly modify that to suit your needs, but what you're asking for is not permeable. And so water will not drain away.

In this theme, nature is viewed as sibling with deep, intertwined connections to humans. This framing was particularly evident in tangata whenua narratives on climate impacts and adaptation. This viewpoint reflected a post-human understanding of the relationship between human and non-humans. Post-humanism is a theoretical and philosophical framework that critiques anthropocentrism and questions the traditional notion of what it means to be human. Post-humanism posits that humans are not the only or even the most important actors in the world, and that the boundaries between humans and non-human entities are blurred and porous. It challenges the idea of the autonomous, rational, and sovereign human subject, and highlights interconnectedness and interdependence. Holders of this view were opposed to a seawall and saw it both as hubris and ignorance. The preferred option was managed realignment or making room for nature.

7.3 Theme 3: Trust

Trust is a belief or confidence in the reliability, integrity and veracity of someone or something. It is a psychological state with an expectation that another entity will act in accordance with this. Trust is influenced by social, cultural and contextual factors, as well as differences in cognition and emotional states. It is a fundamental aspect of human relationships and social interactions, and it plays a crucial role in relationship, communities, politics and society. Trust enables cooperation and collaboration, while distrust can lead to suspicion (at its most benign) and conflict.

Distrust of established institutions, experts and recognised sources of authorities and their claims is called 'post-trust'.[46] It reflects scepticism towards institutions and a disillusionment and/or disengagement from public life. The concept of post-trust is associated with populism and 'post truth' politics which refers to a bias of emotions over objective facts. Both beliefs disregard and dismiss evidence-based policy-making in favour of opinions and place greater faith in an individual's senses and experiences. It is a form of self-reliance in the face of uncertainty which is acute with human-induced climate change because of its distribution and imperceptibility.

Two subthemes came to light in interviews. The most prevalent was distrust of local government and climate change science. These overlapped often with deep distrust of climate change science intertwined with dialogue on the incompetence and/or corruption of local government described as "the Council". This subtheme is titled 'Post-trust'. The second subtheme, captured as 'Resilience', surfaced in conversation with tangata whenua, local government, consultants are other experts.

Trust was framed by these interviewees as an epistemic challenge of climate change; the inability to know and have all the answers. Whereas 'post-trust' beliefs posit the individual as the main source of truth. This second theme focuses on how relationships and science can help close the knowledge gap.

Post-trust

Interviewees in this subtheme adhered to an idea of bearing witness. Sceptical of climate science, one's own experiences and knowledge were drawn on to argue that scientific projections and information on impacts were inaccurate and based on incorrect assumptions. Sea level rise was frequently the source for dismissing established science:

> I know NIWA and again I have my doubts about some of the things they do. There's a tide station just around the corner, in the middle of the Tamaki Strait and it's 180 degrees out or there abouts. And I've told them. I argued and contacted LINZ and NIWA and they all think I'm a crackpot. And I said 'look I fish here every week'. I've sat on top of there in zero wind and I even sent them photographs of it and proof of my drift and everything else. And it's contrary to what the tide information says on the thing, but they don't care…
>
> Yeah, I did hunt for a report recently about sea level rise, to see if there was some official tracking being done. And they said there was. Three mill a year was normal over history and it hadn't changed, whether that's right or wrong. And I know in some places the land is rising.

Those who 'denied' the scientific basis for climate change drew heavily on their own senses as the primary source of evidence for their beliefs about anthropogenic climate change. The denial was not that the climate was changing, but rather that humans were at fault and the future would be worse than the past:

> I think that the changes that man has made to climate is probably in the scheme of things quite small. Because nothing stays the same, change is occurring continually. Change is all around us, it's happening all the time. Change is happening at a rate quicker than change itself. Nothing stays the same. Now, the world has been through a number of cyclic changes, right?
>
> Yeah, I'm a little bit of a disbeliever and I mean I've been on the water all my life. And sure, there's been climate change, but as far as sea levels rising and that sort of thing I haven't noticed it to be a big change. And I think the weather patterns have probably got more to do with it. You know, more rain and that sort of thing. And I mean cyclones. It's different to what we grew up in 40 years ago, 50 years ago. It's just that the climate is different now.

The idea that authorities were untrustworthy and unreliable was a prominent theme. Business did not question authority but then also exhibited weak place attachment compared to residents. The institution targeted was the Council. Most expressed high degrees of frustration and talked about

the Council's incompetence in servicing the area. Examples were given ranging from the failed seawall to collecting recycling. The assumption in these narratives was that Council held primary responsibility for responding to the impacts of climate change impacts ('the weather'):

> Look, I don't have any faith in the Council. None whatsoever. If the Council was really concerned about some of these things, they wouldn't have let all this water runoff, all this silt out here.
>
> The Council decided to put in its own sewerage system. So, they wanted everyone off septic tanks there, so that was a good start. And so, they put in a stand-alone system, they thought it was too expensive to pump out to Manukau. And so the Council put their own system in here but – long story short – the consultants they used, or themselves, cocked up the calculations.
>
> Out here they put a bloody vertical wooden wall in. And so, you've got the waves coming in and the waves go down and they've excavated all the sea and the sand goes away. And the other half goes straight up the top and then drips back down. Again, a bloody school kid could have worked that out, you know, with a little bit of modelling.

A strand in the discourse on Council's ineptitude was that incompetence was not because of ignorance but because of politics and money. In these discussions reference to central government surfaced:

> Are they overloaded with consultants and stuff that they don't need, you know? How are they spending their money? Are they spending it wisely? Are people getting exorbitant salaries, some of them?
>
> Despite the presence of Environmental Scientists and various experts, panels, committees etc consents continue to be granted for housing and commercial development throughout Auckland. Let us not forget that MONEY must be a prime motivator for such decision making and awarding of consents.

Not only was Council viewed as corruptible, but established sources of information such as mainstream media were also rendered false based on this same premise:

> Some people are brainwashed into believing everything they read is true. So, I need to understand things and think about things a bit harder, so I do sometimes do my own research. And I get really pissed off when I see, like environmental reporters that write an article and I think you have no idea. I'm not being racist here. But it was actually a Māori group that got funding to do research on rising sea levels and how it affected them. So, they were being paid to say that it was going to be bad to give them money. And that was the basis for this article.

> In some places in the world the sea level is falling. And so yeah, I'm very sceptical of people who just pluck out what the news media want to feed you and doom and gloom. I think there's a bit more to it than that.

Resilience

In contrast to responses that sought to replace science with self-sensory knowledge, and saw the Council as responsible, tangata whenua narratives spoke about collective responsibility and the need to draw on indigenous connections, science,and traditional knowledge to make sense of climate change. Interviews acknowledged the imperceptibility of climate change and the 'ecological web of trust'[47] in which humans must listen to the environment and others when planning how to respond to climate impacts. The listening was viewed as a type of 'call and response' dynamic. Uncertainty and vulnerability were framed positively as part of the human condition:

> There are things that I am not aware or, but our whanau connections can help.

> So, observation, response, observation, response and what is my responsibility in that? Whose responsibility, is it? Well, if you look at coastal marine areas, it's everyone. We've all got a part to play, so whose fault, whose responsibility, it's a good question. I can't really answer that.

> Ngāti Whanaunga and Ngāi Tai used to do a lot together, we used to do waka building, the maunga, the moana, harvesting. And we have this ongoing relationship. But fundamentally it is trust that she's got my back and I've got her back.

Emphasis on listening meant pre-emptively responding to climate change:

> Before it gets to you, you need to respond. So, for example, reduce the damage to the environment, the further loss of whenua. We have responsibility there and we have responsibility to not support or build in wetlands or build in low-lying lands that are known to flood.

> Think, create, and share. It's not closing down, it's about listening and what we are seeing. And what we are currently seeing is…observation and response to what happens using the traditional knowledge.

Experts, including local government, also acknowledged the uncertainty of climate change but viewed this as resolvable by drawing on Western science. These narratives displayed a high degree of trust in climate science to the point that assumptions were made that climate change is longer debateable but is observable and experienced:

> We're in a position to now to actually see first-hand the results of climate change. It's not something that you have to go to National Geographic to view it's happening on your doorstep.

> But for those folks that live on the very front, I mean, they're in dire straits. Aren't they? Really, they're going to have to up sticks and move and all that commercial activity down there, they'll be gone. That would be the new beachfront. Yeah, so it's a lot of unknown from our perspective, it's almost fantasyland, you can never really grasp it.

7.4 Summary of key themes

We identified three main themes from the semi-structured interviews conducted: 'Place', 'Nature' and 'Trust'. Within these broad categories subthemes emerged which displayed some contrasting viewpoints on climate impacts and adaptation solutions. Key observations include those set out below which reflect the predominant viewpoints.

PLACE

- Place attachment is strongest for those that value social and cultural ties
- Length of time in a place is not a predictor of strong(er) place attachment
- Pākehā values of recreation dominate over tangata whenua values

NATURE

- Climate change as a phenomenon is de-risked and understood as 'weather'
- Nature is viewed as external and controllable
- Engineering options are preferred over making room for nature

TRUST

- Climate change science is considered to be unreliable and debateable
- Authorities are seen as being open to corruption and should not be trusted
- Self-sensory knowledge is considered to be more reliable
- Experience of extreme events does not create openness to change

Managed retreat as an adaptation option was uniformly negated. Building or reconstructing the existing sea wall was preferred. When asked who should pay or fund this, interviewees all agreed that responsibility lay with local government. There was a similar response when asked who should pay for managed retreat. Some spoke about individual responsibility and risk taking, but despite opinions on self-responsibility, discussion concluded that local government was responsible and should pay. The amount of compensation should be at market price. Others also mentioned that this made sense because the 'whole of South Auckland enjoys the beach'. Interviewees did not reflect on the long term implications of the coastal environment. The beneficiary pays concept was strategically drawn on to shift responsibility to local government and the 'rest of Auckland'.

A final observation was the disconnection between local government, expertise, tangata whenua and the community – both business and residents. Whereas the former group accepted climate science and climate risks, the latter both disagreed with the science and downplayed the risk of flooding to the point that it was seen less as a risk than simply part of living near the coast. Risk tolerance levels were exceptionally high, and ideas of moving were strongly opposed. When asked

about triggers for moving, the removal of roads nor increase in insurance rates or even withdrawal of insurance mattered. These were seen as inconveniences that could be worked around. The only trigger that provoked an interest in managed retreat was removal of sewage services and/or six-monthly floods.

PART FOUR: FINDINGS

8. Key lessons for managed retreat policy

This section takes the insights provided by the case study and uses them to draw out some implications for the development of managed retreat policy and the proposed Climate Adaptation Act.

8.1 Community engagement

- Local and central government should engage at the earliest opportunity with communities who are to be relocated or could be affected by the managed retreat process in the short, medium and long-terms. This includes communities that rely on infrastructure that will be moved such as roads, water systems, parks, ports and businesses. It also includes areas where individuals and families could move to.

- Where numerous people are affected, consideration could be given to the use of a citizen assembly. A citizens' assembly is a collection of individuals selected to be representative of the affected community. It meets over a set period of time to discuss an issue and make recommendations based on deliberation.

- To help negotiate the trade-offs between different adaptation options, legislation could place a weighting on values, so there is a clear methodology for decision-making and greater transparency. The weightings could then be calibrated by local context nuances but also in a method that is clear and transparent to help avoid political capture.

- Engagement could be funded through the Climate Emergency Response Fund, or another appropriate funding source, with particular focus on ensuring tangata whenua participation is properly supported to reflect te Tiriti principles of partnership. This will help engender trust.

- Tangata whenua, science communication professionals and independent ecologists and engineers should be present during deliberations as well as local and central government representatives and the insurance sector.

8.2 Data, evidence and communication

- Data needs to be be easily accessible by the community. It should be relevant locally and sufficiently detailed to ensure that complexity is understood.

- Acceptance of science is key to the adaptation and managed retreat process. Early engagement will need to include the communication of established climate science by science communication professionals. Funding may be needed to build climate science communication capacity and capability, with provision for upskilling scientists and training specific science communicators through specialist courses at the tertiary level.

- Mātauranga Māori needs to be valued and reflected in risk assessments and climate science communication. This should be Māori-led and appropriately funded.

- Alignment between local and central government on risk terminology is important. This should be guided by central government and used by local government in community engagements and communication. Risk thresholds should be defined at a national level, and calibrated at a local level, and be transparent and evidence based.

8.3 Culture and historical knowledge

- Greater understanding of place-based history is critical to acknowledging tangata whenua when designing and implementing an engagement and planning process. Cultural injustices need to be acknowledged and must not be repeated.

- Relevant knowledge will include understanding of areas that may not contain designated, cultural heritage sites but are, for example, part of the broader history of land confiscation and colonisation.

- Managed retreat can be an opportunity to redress past injustices and environmental harm.

8.4 Funding roles and responsibilities

- Roles and responsibilities for funding managed retreat should be clearly articulated by central government to local government and communities. The tools and mechanisms available should also be well articulated.

- Clarity on funding should include that required for adaptation options that are considered prior to managed retreat. For example, if managed retreat has been identified in a risk management process as highly likely in the medium and/or long-term, then details on who pays for protective structures in the lead-up to a trigger should be known well in advance and communicated.

8.5 Pragmatic realignment

- Pragmatic realignment or partial managed retreat should be considered as an adaptation option in some areas. This approach acknowledges the benefit of adopting a flexible approach which permits individual responses. Pragmatic alignment is a general term that refers to a transitional, locally-informed approach to adaptation.

- Individuals could be permitted to remain but be made fully aware of the risk that services such as stormwater and road infrastructure may be removed, and public defensive structures will not be maintained. They should also be informed that local government has an obligation to provide basic services but that these may be costly.

9. Final thoughts

What is evident from the case study is that Ōmana ki Umupuia is laden with values and is highly vulnerable to climate change impacts and hazards. Coastal inundation, rainfall inundation and erosion susceptibility were the highest risks cited. Understanding of these has developed as a result of concerted and ongoing riskwork undertaken by government and experts.

A disjunct has appeared between local communities and the technocratic efforts to follow central government directives to control and manage the risks of climate change. The SAP is an example of riskwork that may resonate with some in the area, but not all. Engagement on the basics of science might be needed before further riskwork takes place, or at least concurrently. Risk is not an objective fact but a perception that is influenced by economic interests, politics, history and society and culture.

The case study has also highlighted that history is painful for tangata whenua. Ngāi Tai lands were taken by the Crown or private actors. The land from the illegal Fairburn Purchase was sold on to others. Ngāi Tai have steadfastly held onto Umupuia, but because of human-induced climate change, this location along with cultural sites in the coastal area are now at risk from inundation and erosion. It is important that this historical process of loss of land and sense of place is not repeated through managed retreat or other adaptation options that disrespect te taiao and undermine tangata whenua status and ability to fulfill kaitiaki duties. An approach that fails to 'listen and respond' to nature has the potential to do this.

Attachment A: Physical characteristics of the case study area

Ōmana ki Umupuia is around 6.5km in length and is connected via Maraetai Coast Road which is part of the Pōhutukawa Coast. Moving from the west to east is Ōmana Regional Park which leads to the residential strip of Ōmana Esplanade, Maraetai Beach and a further 3.7km east to Umupuia via Waiomanu Bay. Each of the focal areas are relatively small but distinct in the set of challenges faced. Ōmana Regional Park is only 2.5km in length, Maraetai Beach 650m and Umupuia 2.17km. Elevation above sea level is low with less than 2m along some parts of Maraetai Coast Road at Maraetai Beach. The most densely populated area is Maraetai with 2,346 residents but only 30 houses are located in the backshore of Maraetai Beach. In the following sections the physical characteristics of the three main focal points are addressed in greater detail.

Ōmana Regional Park

Ōmana Regional Park is located on the slope of a headland between Beachlands and Maraetai Beach. It covers 42ha of grazed and mown grassland, with pockets of well-established indigenous plantings. It has public open spaces on both the eastern Ōmana Esplanade Beach Reserve and western Kellys Reserve and Te Puru Reserve coastal boundaries. The Park has a recreation reserve (0.4ha) on the eastern coastal side of Ōmana Beach Road at the park entrance. The southwestern corner of the park (1.1ha) is classified as local purpose (esplanade reserve).The Park includes a shared-use concrete path that forms part of the Beachlands to Maraetai walkway. At its highest point it is 40m above sea level and 5m at its lowest along the coastal perimeter.

Figure 21: Photo of Ōmana Regional Park (Source: Auckland Council)

The Park contains a variety of landforms and landscapes, including an extensive intertidal rock platform of regional geological significance, shelly beaches, an estuarine wetland and regenerating indigenous bush remnants in the gullies.

Ecosystems include pōhutukawa that line the Waitemata sandstone cliffs, broadleaf forest remnant with taraire, puriri, tanekaha and an estuarine ecostone in Te Puru Stream / Te Ruangaingai Stream,

which grades from mangrove-saltmarsh to regenerating kanuka shrubland. In the shallow gullies well-established indigenous plantings break up grazed areas of pasture.

There is a broad intertidal shore platform of Waitemata sandstone which provides habitat for a range of coastal birds including pied shag, white-faced heron, variable and pied oystercatchers, pied stilt, New Zealand dotterel, spur-winged plover and various gulls and terns.

The forest remnants and plantings have the usual common native birds including kererū, morepork, kingfisher, shining cuckoo, fantail, grey warbler, silvereye and tūī. Kākā are occasional visitors. Swamp harrier, pūkeko, spur-winged plover and welcome swallow occur in the open country.

Maraetai Beach

Maraetai Beach is a north-facing embayment in the Tamaki Strait which is a 5km stretch of water separating the North Island from Waiheke Island. The beach is bounded by rock outcrops to the west and east and has a shore normal of about 15 degrees. Maraetai Beach consists of a steep beach that meets a gently sloping intertidal rock platform.

The upper foreshore comprises coarse shells, hash and sand and the lower foreshore comprises a low slope veneer of sediment on an intertidal rock platform. Local wave action is the dominant process of sediment reworking. The low slope platform can be classified as an intertidal flat but the extent of exposure at the low tide is small.

Figure 22: Photo of Maraetai Beach (Source: Wiki commons)

Maraetai Drive runs along the central sections of the beach and over the steep hills that back the beach. Grassed reserves are located at the western and eastern ends of the beach. A stormwater outfall/stream is located at the western end of the beach and a smaller ocean outfall is located at the central beach. A historical wharf is located at the centre of the beach and a boat club at the

western end. Two cafes, one ice cream shop and a restaurant are located in the low lying mid-section of Maraetai Drive.

Residential housing is along the central backshore sections of the beach and over the steep hills that back the beach. Ground levels in many of the backshore residential properties are situated below the road level and are subject to ponding during storm events as a result of high intensity rainfall and wave overtopping. Maraetai Drive runs adjacent to the Maraetai foreshore to the north, and as such, elevation of the site ranges from 2m to 4m above sea level, very gently sloping towards the north.

The shoreline is exposed to wind and waves from the northwest to northeast. However, waves are both depth and fetch limited. Rangitoto, Motutapu, Motuihe, Waiheke and Pōnui Islands shelter the Maraetai shoreline from the more open coast wave climate within the Hauraki Gulf.

The Maraetai embayment has a tidal range of 3.4m (spring). The distance wind can travel over water to generate waves or fetch is limited by Waiheke Island to the north, Brown Island to the west, the mainland to the south and Pōnui and Pakihi Islands to the east. The maximum fetch (10km) is to the northwest and the prevailing winds are from the southwest to west.

The geology consists of greywacke rocks of the Late Triassic to Early Cretaceous (230-110 million years ago) from the Waipapa Group. Alluvial deposit is from the more recent Holocene period. Beach material at Maraetai is predominantly coarse sand with a high shell content. The alluvial and estuarine deposits comprise silty and clayey soils.

Umupuia

Umupuia is characterised by rock reef with headlands and a narrow sandy beach. It may be a depositional area augmented by shell production. The native forest cover in the area has been significantly reduced due to human activities. The construction of roads, buildings, and other infrastructure has led to habitat loss and fragmentation. Farming practices such as grazing and land use change have contributed to soil erosion and nutrient run-off into nearby waterways. Additionally, recreational activities such as boating and fishing can also have negative impacts on the local marine ecosystems.

Since 2008, the beach has been closed to the collection of pipi, cockles, mussels and oysters[1] under Section 186A of the Fisheries Act 1996 in order to restore the population. Ngāi Tai ki Tāmaki Umupuia Te Waka Totara Trust has made the closure applications for Umupuia Beach every two years as each section 186A notice is due to expire. The Minister of Fisheries then reviews the application and approves or amends it. The most recent application expires on 18 December 2024.

In recent years, there have been efforts to restore and protect the ecology of Umupuia. Initiatives such as planting native trees, restoring wetlands, and improving water quality have been implemented to support the recovery of the local ecosystems. The goal of these efforts is to maintain the ecological integrity of Umupuia and ensure the long-term sustainability of the area's biodiversity.

Figure 23: Photo of Umupuia (Source: Auckland Council)

Attachment B: Interview method

Our analysis draws primarily on interviews and document analysis over the period of 6 months from January to June 2023. The interviews were semi-structured and included local government, scientists/experts, homeowners, renters, infrastructure providers, tangata whenua, community members and other relevant parties. A snowballing technique[48] was used to identify interviewees from a short list provided by the Auckland Council. To start with, interviews were conducted with local government staff with knowledge or experience of working in the area, local politicians, and key people in the water and road infrastructure services. The researcher then followed up with the Franklin Local Board. From this meeting, residents and business introductions were facilitated which led to others. The researcher also visited the site of the case study fortnightly and conducted cold call interviews over the same period.

Questions that were asked followed a pattern of high-level inquiry before detailed questions were solicited on managed retreat and other adaptation solutions (see below). Fifty-six participants were interviewed: 23 residents including renters and homeowners, 9 business owners or workers, 15 local government, 2 infrastructure providers, 1 media representative, 1 local politician, 3 iwi representatives, and 2 from the local boat club. Council employees included coastal marine scientists, park officials, planners, risk and finance, communications, and sustainability team members. Interviews lasted between 30 to 90 minutes and focused on knowledge, experience, and opinions more generally. All interviews were both digitally and manually recorded, and permission was obtained before interviews were recorded. The semi-structured questions are listed below:

- How is climate change viewed?
- How are climate risks seen and framed?
- How is the community responding and adapting to climate change?
- How is managed retreat and the other adaptation options perceived?
- What would trigger managed retreat?
- Who should be responsible for managed retreat and other interventions?
- How should these solutions be funded and why?

All interviews were transcribed and imported into NVivo software where they were thematically coded to single out differing and similar views. What emerged were common features and an underlying logic which coalesced around three themes or narratives that are examined above. The objective was not to unearth the psychological motives behind the responses, but to discern the characteristics that were shared, and explore what this may mean for designing managed retreat policy and legislation. Some suggestions were offered regarding why particular responses came to the fore more than others, but analytical emphasis is placed more on the implications of these viewpoints.

These narratives are co-constituted in the interview context and should be understood through this prism. It is also important to recognise that interview responses should not be treated as giving direct access to experience; people may or may not do what they say will do.[49] What is relevant to this study is how people frame answers to the questions. Framing refers to how an issue is understood and portrayed. Participants construct meaning by taking an angle on perceived reality

and making these more salient. The objective is to promote a “particular problem definition, casual interpretation, moral evaluation, and /or treatment recommendation”[50]. To frame also means to omit. We therefore paid attention to what was left out of discussion as much as what was included.

Attachment C: SAP details

The granularity provided in the SAP provided a helpful starting point for detailing the risks in the three focal areas of the case study. The SAP also includes non-council assets and land, such as water and road infrastructure, because of the critical connections between the two. The SAP aims to help facilitate the development of sub-regional, high-level adaptation approaches (eg from 'protect' through to 'managed realignment/retreat').

The hazards considered in the SAP are: coastal inundation, rainfall inundation and erosion susceptibility. This aligns with the risks identified in the Auckland Region under the CCRA. The data in the SAP is based on reports and assessments that measure the exposure of Auckland Council-owned land and assets to these hazards over the short-term (5 to 20 years), medium-term (20-60 years) and long-term (60-100+ years). The assets are categorised as either economic, social, cultural or environmental.

Economic assets include 3-water infrastructure, transport (roads, rails, port areas); social assets are recreational reserves, beach areas, cycle ways, sea walls, waves etc. Cultural assets include potential sites of historic significance. These may not be recorded so the values will be unknown. Examples include urupa, marae, archaeological sites, monuments and buildings. Environmental assets are areas of natural significance but do not include coastal transition zones such as dunes, riparian planting and revegetation areas.

Risk to the four wellbeing categories were rated using established methodologies for each of the three hazards:

- Coastal inundation was based on a 1% AEP event (equivalent to a storm surge with a 1% chance of occurring in any given year, or 1 in 100-year return period) and this event with 0.5m, 1.0m and 2.0m sea level rise added to the present-day storm surge levels.

- Coastal erosion was against a 1% AEP rainfall flood event for the maximum development scenario which is the maximum amount of impervious surfaces. For example, if it is residential and 60% of every site can be covered with buildings and paved areas, this changes the rate at which water will run off from this surface.

- Erosion susceptibility was measured by the rate of erosion that changes with different sea level rise scenarios derived from the IPCC RCP8.5. This was based on a note from the Ministry for the Environment *Coastal Hazards and Climate Change: Guidance for Local Governmen*t (2018).[51]

ENDNOTES

[1] This is not a formally designated area nor aligned to the use of the term in Auckland Council's Shoreline Adaptation Plan (SAP). See Carpenter, N et al. (2023). Shoreline Adaptation Plan: Kahawairahi ki Whakatiwai / Beachlands and East-Pilot. Auckland Council. See https://akhaveyoursay.aucklandcouncil.govt.nz/beachlands-and-east

[2] There are some limitations to drawing similarities see for example https://www.treasury.govt.nz/sites/default/files/2023-03/oia-20220446.pdf

[3] https://www.stats.govt.nz/information-releases/subnational-population-estimates-at-30-june-2022-provisional/

[4] https://www.stats.govt.nz/tools/2018-census-place-summaries/auckland-region

[5] https://www.knowledgeauckland.org.nz/publications/predicting-auckland-s-exposure-to-coastal-instability-and-erosion/

[6] https://www.stats.govt.nz/tools/2018-census-place-summaries/maraetai

[7] Auckland Council. (2022). Regional Parks Management Plan 2022. Auckland Council publication.

[8] Ibid.

[9] https://www.stats.govt.nz/tools/2018-census-place-summaries/maraetai

[10] See https://www.reinz.co.nz/REINZ-data?hkey=ca401e07-ce41-40bb-9d2c-eaf461c381f4

[11] See https://www.times.co.nz/tag/beachlands-south-limited-partnership/

[12] Moore, D., Rigby, B., Russell, M., Russell, Matthew, & New Zealand. Waitangi Tribunal. (1997). Old land claims / D. Moore, B. Rigby, M. Russell. (1st release.). Waitangi Tribunal

[13] La Roche, A. (2011). Grey's Folly: A History of Howick, Pakuranga, Bucklands – Eastern Beaches, East Tamaki, Whitford, Beachlands and Maraetai. Auckland: Tui Vale Publications

[14] Holman, D. (1995). Heritage Study of Beachlands and Maraetai. Study complied for Manukau City Council

[15] Ibid

[16] Ibid

[17] Clough. R. (2006). Te Puru, Beachlands Study Area, Manukau City Council Future Planning: Heritage Assessment. Report prepared for Manukau City Council

[18] Murdoch, G. J. (1990). A History of the Omana Regional Park. Report compiled for the Auckland Regional Council Parks Service

[19] Carpenter, N et al. (2023). Shoreline Adaptation Plan: Kahawairahi ki Whakatiwai / Beachlands and East-Pilot. Auckland Council. See https://akhaveyoursay.aucklandcouncil.govt.nz/beachlands-and-east

[20] Auckland Council Cultural Heritage Inventory, accessed at http://maps.aucklandcouncil.govt.nz and https://chi.org.nz

[21] Private papers, Anonymous, Maraetai 2023

[22] Murdoch, G. (1993). A Brief History of the Human Occupation of the Hunua Catchments Parkland. Report prepared for Auckland regional Council

[23] See https://www.ipcc.ch/site/assets/uploads/2021/02/Risk-guidance-FINAL_15Feb2021.pdf

[24] IPCC, 2020. The concept of risk in the IPCC Sixth Assessment Report: a summary of cross-Working Group discussions, guidance for IPCC authors

[25] Ministry for the Environment. (2020). National Climate Change Risk Assessment for Aotearoa New Zealand: Main report Arotakenga Tūraru mō te Huringa Āhuarangi o Āotearoa: Pūrongo whakatōpū. Wellington: Ministry for the Environment

[26] There are four RCP scenarios, RCP2.6, RCP4.5, RCP6, and RCP8.5, each with different assumptions about future greenhouse gas emissions and socio-economic development. The numbers in the scenario names refer to the radiative forcing levels (in watts per square meter) that are expected to result from the greenhouse gas concentrations in the year 2100, relative to pre-industrial levels

[27] Auckland Council. (2019). Climate Change Risks in Auckland. Auckland Council, technical report, TR2019/019

[28] Ibid. p33

[29] Auckland Council. (2020). Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan. See https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/Pages/te-taruke-a-tawhiri-ACP.aspx

[30] See https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/Pages/default.aspx
[31] Auckland Council. (2022). Regional Parks Management Plan 2022. Auckland Council publication. See https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/parks-sports-outdoor-plans/regional-parks-management-plans/Pages/regional-parks-management-plan-2022.aspx
[32] Carpenter, N et al. (2023). Shoreline Adaptation Plan: Kahawairahi ki Whakatiwai / Beachlands and East-Pilot. Auckland Council. See https://akhaveyoursay.aucklandcouncil.govt.nz/beachlands-and-east
[33] The Climate Change Response (Climate-Related Financial Disclosure for Financial Institutions and Other Matters) Amendment Act 2021 was passed by the New Zealand Parliament in May 2021 and came into effect on July 1, 2021
[34] See https://www.insurancebusinessmag.com/nz/news/breaking-news/rms-launches-flood-model-for-new-zealand-254380.aspx
[35] Hughes, et al. (2021). Impacts and implications of climate change on wastewater systems: A New Zealand perspective, Climate Risk Management, 31, 100262
[36] Carpenter, N et al. (2023). Shoreline Adaptation Plan: Kahawairahi ki Whakatiwai / Beachlands and East-Pilot. Auckland Council. See https://akhaveyoursay.aucklandcouncil.govt.nz/beachlands-and-east, p51
[37] See https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/unitary-plan/Pages/default.aspx
[38] Auckland Regional Council. 2009. Report for Discretionary Activity Application. Permit no: 37038
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