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Weaving Indigenous Climate Adaptation: Māori Experiences, Actions and Intergenerational Futures

A thesis presented in fulfilment of the requirements for the degree of

Doctor of Philosophy

in

Emergency Management

at Te Kunenga ki Pūrehuroa Massey University, Wellington, New Zealand

Lucy H. Kaiser

2026

The image used on the preceding title page (figure 1) is an excerpt of a painting, used with permission, from Ōraka Aparima artist Emma Spall©. The author offers an interpretation for the painting, in the context of this thesis: A darker stormy sea juxtaposed against golden light- hope shining through the tumultuous uncertainties of climate change.

Abstract

This thesis examines how Kāi Tahu ki Murihiku (Ngāi Tahu of Southland) whānau (families) experience and address climate change. It develops an Indigenous led framework for adaptation grounded in whakapapa (genealogy), kaitiakitaka (stewardship), and mokopuna-centred futures (grandchildren centred futures). The study asks how climate change impacts are experienced and addressed by Takata Whenua (Indigenous Peoples) in Aotearoa (New Zealand).

Methodologically, it advances *Te Kahu Huruhuru o Kohikohi* (the feather cloak of Kohikohi), a kaupapa Māori (Māori principles) narrative bricolage that weaves interviews, hui (gatherings), pūrākau (traditional narratives), policy texts, and scientific data within a kaupapa Māori ethical framework. Qualitative materials include 20 interviews with Kāi Tahu leaders, knowledge holders, and practitioners, supported by multi-level policy analysis.

The analysis shows that while Indigenous emergency management and climate governance can be effective, Indigenous knowledge is often marginalised or extracted within dominant disaster risk reduction and adaptation systems. In Aotearoa, Māori climate responses draw on mātauraka (knowledge), iwi (tribe) and hapū (sub-tribe) planning documents, kaitiakitaka, and long-standing governance practices, yet institutions frequently fail to recognise Māori values, authority, and sovereignty. These dynamics provide the backdrop for the study's conceptual and empirical contributions.

Two conceptual tools are offered. The *Indigecene* describes climate research as an epistemic setting where Indigenous knowledge is treated as supplementary rather than sovereign. The kupeka (fishing net) metaphor adapts Callon's theory of framing (bracketing in), externalities, and overflows (bracketing out) to show how technocratic systems recognise metrics while excluding whakapapa, cosmogeny, and Māori governance. Together, these tools enable symmetrical science, a collaborative approach that gives equal analytic and ethical weight to Māori and Western epistemologies.

Findings identify four interwoven strands of impact: physical, relational, cultural, and emotional. Whānau describe storms, erosion, and species shifts, alongside socio-ecological and genealogical links to te ao tūroa (the natural world). They reflected on pressures on intergenerational mātauraka, with emotional responses ranging from grief to resilient hope. These narratives also reveal adaptive strategies shaped by whakapapa, ahi kā (continued occupation), and mokopuna centred responsibilities. Government and mainstream-centred adaptation often produces cultural externalities such as dispossession, weakened customary authority, and epistemic extractivism. By contrast, Indigenous-led initiatives, including biocultural restoration, co-governance, strategic partnerships, and whānau entrepreneurship, reinforce decision rights, identity security, and long-term adaptive capacity.

Implications are identified for research, policy, institutions, practice, and communities. The thesis advances priorities for Indigenous-led methodologies, symmetrical science, and mana whenua leadership across climate and hazard governance, alongside long-horizon partnerships that align with intergenerational responsibilities. It calls for the embedding of Indigenous Data Sovereignty and the development of symmetrical monitoring systems. These include Māori indicators (such as mauri (life force)), mahika kai (customary food gathering), and maramataka or tohu (lunar calendars and environmental signs)) alongside mainstream technical metrics. The findings further highlight the need for coherent implementation pathways, sustained resourcing, and governance arrangements that move beyond short-term, project-based inclusion. The thesis argues that just and effective adaptation in Aotearoa requires a shift from procedural participation toward Indigenous-led governance and whakapapa-centred, intergenerational climate futures.

***Keywords**:* Māori; climate change; adaptation; symmetrical science; Indigenous

Language and Orthography Statement

Te Reo Māori (the Māori language) is used throughout this thesis as a living Indigenous language and as an expression of mātauraka Māori. As this research engages with Kāi Tahu-specific mātauraka relating to climate change and the environment, the kāi tahu dialect which often replaces "ng" with a "k" (i.e. mātauraka instead of mātauranga) is privileged. Some publications within this thesis (particularly Chapter Two and Chapter Four), address Māori concepts of climate change in a more generalised sense, therefore a generic dialect (tangata whenua instead of takata whenua) is used. Additionally, participant choice of dialect in interviews was preserved within extracts.

Māori words, phrases, and concepts appear intentionally throughout the thesis and are, in some instances, translated in text to support reader accessibility. Preceding the appendix, a glossary is provided for kupu Māori (Māori words), with translations determined by the author for contextual relevance and simplicity. It is important to acknowledge that English translations cannot fully capture the depth and relational nature of many Māori concepts, and some meanings are best understood within their cultural and relational contexts (see McAllister et al. 2023). Where words, phrases, or concepts are not translated in the text, the glossary provides support for readers unfamiliar with te reo Māori.

In terms of orthography, macrons are used in accordance with contemporary conventions. Where quoted sources use double vowels, the original spelling has been retained to respect the integrity of those texts. Some names and terms appear in hyphenated or em-dash form (e.g. Tāwhiri-mātea) to reflect conventions used in particular sources, (for example, direct quotations from literature, Iwi and Hapū Management Plans, Iwi Climate Change Strategies), while others are written as spoken (e.g. Tāwhirimātea). This variation reflects the fluidity of written and oral Māori, and the diverse ways in which knowledge is held and expressed.

ŌRAKA (COLAC BAY)



APARIMA (RIVERTON)



Pepeha (Personal Introduction)

Ka taki te Tītī
Ka taki te Kākā
Ka taki hoki ahau
(Tihei Mauri ora!)
Ko Takitimu te māuka
Ko Aparima te awa
Ko Te Ara a Kiwa te moana
Ko Kāi Tahu, Kāti Māmoe, Waitaha kā iwi
Ko Takutai o te Tītī te marae
Ko Ōtautahi ahau
Ko Martine rāua ko Tim Carter ōku mātua
Ko Lucy Kaiser ahau

The introduction of this pepeha (ka taki ti tītī... tihei mauri ora!) is a well-known tauparapa (invocation) usually said at the beginning of a whaikōrero (formal speech). A common translation of this taupara is "The tītī (mutton bird) is calling, the kākā (native parrot) is calling and I wish to call. Behold, there is life!"

The tītī (a treasured food resource for Southern Kāi Tahu) spend their year flying across the expanse of the Pacific Ocean and come home to nest at the Tītī Islands (southwest of Rakiura Stewart Island) - a place I am linked to through my whakapapa (geneaology). Kākā (indigenous parrots) are social birds who stay local, were traditionally snared as pets, for meat and for their feathers. This thesis begins, as the Tītī, with a journey to gather international kōrero (discussions) of Indigenous Peoples' emergency management practices. The attention of this thesis then turns inwards, like the kākā- to local examples of how Takata Whenua are experiencing and responding to the impacts of climate change nationally and locally in Murihiku Southland. The learnings from this literature as well as my personal whakapapa has informed my approach to designing this PhD research project, through which I hope to gain the mana (authority) to speak.

The images on the previous page (figure 2) depict Ōraka (Colac Bay) and Aparima (Riverton), focal points of this research. Photo credit: Author.

Acknowledgements

This thesis has been shaped, strengthened, and carried by the collective. It stands on the shoulders of our Kāi Tahu, Kāti Māmoe, Waitaha tūpuna whose resilience, innovation, and deep relationships with the whenua and moana continue to guide us. Throughout this journey I have been reminded that research is never an individual pursuit. Like weaving the strands of a kahu huruhuru, every insight, every kōrero, every challenge and every encouragement has come from the many hands, hearts, and minds who have upheld this kaupapa. To every participant who contributed - kā mihi. Your voices, your generosity, and your trust are the heart of this work, and I honour each of you.

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To Kristie-Lee, Finn, Brandy, Alice, Lauren, Marion, Mary Anne, Danielle, Sara, Rachel, Simon, Libby, Scott, and all my colleagues and friends who have walked alongside me- thank you for your camaraderie and encouragement. To Hau, Sonny, Nona, Shari, Akuhata, Lara, Shannen and all my whānau at Te Toi Whakaruruhau o Aotearoa, your aroha has kept me grounded. Thank you to our Kāi Tahu climate change rōpū, especially Rachel, Sonny, Angie, Mau, Kera, Thomas, and the many others whose commitment to whānau and to your mahi inspires me. My sincere thanks also to my cherished academic village(s), of ESNZ, Massey, UC and NHC. To my wonderful and wide network of mentors, Hugh Campbell, Lori Peek, Tā Mark Solomon, Tania Gerrard, Sarah Beaven, Tom Wilson, Sarah-Jayne McCurrach, Graham Leonard, Dee Sciacia, Jonathan Procter, Richard Smith (and many others) - your guidance has shaped this journey. A very special

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To my incredible sister, Emma Spall, Ōraka Aparima artist, thank you for sharing your beautiful artwork for this thesis, and for paddling the waka with me on our whakapapa journey. Thank you to Pete, and to Elsie and Harrison for your love of the natural world. My gratitude also to Mum and Dad for their unwavering support, to my aunties, uncles, cousins, and to our tūpuna who continue to guide us. I love you all.

Finally, to my beautiful son Max and my dear husband Scott, this PhD has been a labour of love for me, but equally a labour of love from you both. Thank you for your patience, your belief in me, and your endless aroha. You are my home.

Mō tātou, ā, mō kā uri ā muri ake nei.

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CHAPTER ONE

INTRODUCTION



Mā te huruhuru, ka rere te manu

Adorn the bird with feathers so it may fly

The photo on the preceding page (figure 3) depicts feathers from a Kākāpō (a rare parrot), gathered by Emma Spall on a journey to Whenua Hou, (Codfish Island) 2025. Whenua Hou is an important breeding ground for other treasured manu (birds), such as tītī, who are being threatened by the impacts of climate change.

1.1 Introduction

Takata Whenua (Indigenous Peoples) have a long history of preparing for, managing, responding to and recovering from the disastrous impacts of environmental and other hazard events as well as long periods of adversity. In Aotearoa New Zealand, Māori knowledges, values and practices reciprocally constitute cultural attributes (Kenney & Phibbs, 2015). These attributes shape Māori, tribal, and familial approaches to disaster planning that are effective in minimising and managing disaster risk, as well as ensuring community resilience.

Climate-change-related disasters, however, render several tensions newly salient. There is a persistent tension between place-based obligations and intensifying biophysical pressures, particularly where sea-level rise, coastal erosion, and flooding threaten marae (traditional communal meeting place and buildings), kāika (local villages), and urupā (burial grounds). Tribal rights to remain on whenua tupuna (ancestral land) may be misaligned with state adaptation frameworks that normalise managed retreat. This paradigm risks severing whakapapa (ancestral) relations and undermining ahi kā (continuous occupation). Accelerated hazard timelines compress decision-making, placing strain on consensus-oriented governance and intergenerational deliberation. Finally, technocratic risk models (privileging what is optimisable and metrically legible) can marginalise relational, spiritual, and genealogical dimensions of vulnerability that are central to Māori epistemologies and practice.

Addressing these tensions requires coordinated action across scales: beginning with whānau-level decision-making, proceeding through rūnaka (local Māori council) governance, and extending to national, international, and global arenas where Indigenous rights and obligations are articulated, negotiated, and enforced. Alongside their roles as kaitiaki (guardians) in responding to the material impacts of climate change, Māori communities face profound challenges concerning the continuity of cultural identity, the viability of key institutions, and the integrity of relationships that anchor mana (authority), mauri (life force), and oraka (wellbeing).

Analysing the interface through which climate-change issues are identified, prioritised, and mediated by iwi (tribes), hapū (sub-tribes), and marae necessitates a framework that can accommodate these relational, cultural, and political dimensions. Kāi Tahu[1]'s climate-change strategy, *He Rautaki Mō Te Huringa o te Āhuarangi* (2018), provides one such exemplar: it grounds adaptation in whakapapa and whenua relationships, affirms mana motuhake (self-determination) and collective governance, and aligns operational decision-making with tikaka (cultural customs and protocols)-based assessments of risk while engaging statutory requirements for clarity, comparability, and actionability.

This research analyses Māori and indigenous perspectives, planning, management and responses to climate change impacts. It draws on kaupapa Māori (Māori-led and centred) and sociological research epistemologies and methods to understand how Indigenous knowledges and practices operate from local, regional, national and global frameworks. Elements of this research are co-created in partnership with the communities participating in the study. Sociological theory, methodology and methods are used to frame the research. Discourse and thematic analysis are drawn on to analyse qualitative data obtained through hui (meetings), uiui (interviews), wānaka (workshops), hīkoi (journeys) and documents where appropriate.

There is a large body of research concerning indigeneity and climate change, that examines the unique relationships that Indigenous Peoples globally have as guardians of their land and environment, as well as responding, mitigating and adapting to impacts of climate change. Yet, in Aotearoa New Zealand, a limited number of studies have focused on the potential impacts of climate change on the Murihiku/Southland region. Research conducted by Earth Sciences New Zealand (formerly National Institute of Water and Atmosphere (NIWA)) and the Ministry for the Environment (MFE) have summarised the broadly anticipated impacts of climate change on the region assuming increased temperatures of between 0.5-0.8°C by 2040 and between 0.7-3.0°C by 2090 (MFE, 2017; NIWA, 2023; Zammit et al. 2018). Some potential impacts of climate change on the region

[1] an iwi or tribe based in the South Island of Aotearoa New Zealand, otherwise known as Ngāi Tahu

identified by MFE include increases in annual precipitation, increasing flooding and intensity of weather events, coastal inundation, erosion and sea level rise, changes in species distribution, and changes/loss in habitat and biodiversity[2].

This research recognises that there is also a gap in knowledge on what climate change impacts are being experienced by Takata Whenua, and how Takata Whenua are responding and planning for current and future impacts, particularly in Murihiku Southland. King et al. (2010) acknowledge that while Māori are experienced in dealing with climate variability, new strategies will need to be developed to understand, sustainably address and plan for climate change in the long term. Approaches taken by Māori across Aotearoa may include defining their own aspirations in documents such as iwi and hapū management plans (IHMPs) and strategic documents, collaborating and driving new research and strategies, drawing on customary kaupapa (values) and mātauraka (knowledge), and participating in kōrero (discussion) at the marae and kura (school) level to regional and national business and political forums (King et al. 2010).

1.2 Aims and Objectives

The **Aims of this research** are to understand:

1. **How climate change impacts are being experienced by Takata Whenua** and,
2. **How Takata Whenua are responding and planning for current and future impacts**.

Through published papers, hui and wānaka, this doctoral thesis will also contribute to extending planning and policy frameworks for climate change in both mainstream and Māori contexts by developing new Māori-centred and localised frameworks.

[2] Map of potential impacts of climate change, Ministry for the Environment, n.d.: https://environment.govt.nz/assets/Publications/Files/Climate-Impact-Mapkey_final.pdf

To understand these experiences and processes, a kaupapa Māori qualitative approach needs to be taken to trace the climate change impacts and implications for Murihiku/Southland Takata Whenua, therefore, the overarching question for the study is:

Q. How are the impacts of climate change being experienced and addressed by Takata Whenua in Aotearoa?

Three key objectives were developed to investigate the main research question of this PhD research. The first objective: **(a) identify what the impacts of climate change are for Takata Whenua**.

The second objective**: (b) identify how impacts of climate change are being addressed and planned for at the takiwā/rūnaka/iwi levels**.

The final objective: **(c) identify how Takata Whenua-led approaches to managing the impacts of climate change are situated within an Aotearoa New Zealand context.**

These aims and objectives necessitate a methodological approach capable of examining both the experiential and structural dimensions of Takata Whenua climate change responses. The following section outlines the research design developed to address these requirements and to provide a coherent framework for this research.

1.3 Research Design

The research design is located within a bicultural paradigm that privileges kaupapa Māori principles, using them as the basis from which Western social science theories are interrogated, reframed, and re-positioned. Ontologically, the research adopts a constructivist stance, recognising multiple realities, while its epistemology is interpretivist, privileging Māori perspectives and experiences. The theoretical approach draws on Kaupapa Māori theory, which emphasises tino rakatirataka (sovereign authority), reciprocity, and ethics. Sociological theorists such as Michel Callon are also

drawn on to explore how climate science is framed by Western science and the underpinning power dynamics of this process.

Methodologically, the study employs a qualitative approach that prioritises co-creation of knowledge with participants and is guided by ethical principles including aroha ki te takata (respect for people), kanohi ki te kanohi (face-to-face engagement), and titiro whakaroko kōrero (listen first, speak later). Data collection has been conducted in ways that respect tikaka and kawa (cultural protocols), and data collection methods include semi-structured interviews, hui (meetings), and hui-a-wānaka (collective discussion and learning), as well as document analysis of iwi and hapū management plans (IHMPs) and climate strategies. Data analysis has drawn on discourse analysis to examine power and meaning in narratives, complemented by narrative and thematic analyses using iterative coding processes. Member checking and collaborative interpretation has ensured cultural integrity and accuracy. The research design is conceptualised as a bricolage approach, metaphorically represented as a "kahu huruhuru" (feather cloak), weaving together diverse knowledge systems, methods, and narratives to produce a holistic and culturally grounded understanding of Takata Whenua responses to climate change. Ethical foundations are central, with the research designed by and for Māori, adhering to Te Tiriti o Waitangi[3] principles and Māori ethical frameworks, ensuring informed consent, voluntary participation, and protection of sensitive cultural knowledge.

The research design establishes the methodological foundations of this study. The following section locates this methodology within the author's positionality and the whakapapa, places, and policy contexts that shape Kāi Tahu engagements with climate change.

[3] Te Tiriri o Waitangi (The Treaty of Waitangi) is the 1840 agreement between Māori and the British Crown that established a framework for shared authority, guaranteeing Māori tino rakatirataka while granting the Crown governance, forming the constitutional basis of Aotearoa New Zealand.



FIGURE 4: TAKUTAI O TE TĪTĪ MARAE. CREDIT: AUTHOR

1.4 Situating the Research: Whakapapa, Place and Policy

My positionality as a researcher is founded in whakapapa. Through my father, I descend from Kāi/Ngāi Tahu Tahu (appendix 1), Kāti/Ngāti Māmoe and Waitaha through the Cameron whānau line, with ancestral connections to the four rūnaka of Murihiku, particularly Ōraka Aparima and Takutai o te Tītī marae (figure 4), the focus of this doctoral thesis. Our whakapapa (ancestry) traces to Kohikohi, a Kāi Tahu wahine (woman) of high rank, and her husband Captain Howell, whose union represents a pivotal moment in the entangled histories of Kāi Tahu and early European settlement in southern Te Waipounamu (the South Island of Aotearoa New Zealand). Through my mother, I have British ancestry. This lineage situates me within a whakapapa network that spans both Indigenous and colonial worlds, shaping my understanding of the relational and political dimensions of climate change adaptation.

The ahi kā (continuous occupation) of Kāi Tahu, Kāti Māmoe and Waitaha in Murihiku is enduring. Despite the profound disruptions of colonisation, these iwi have maintained continuous occupation and kaitiakitaka (guardianship) responsibilities across southern landscapes, from the coastal margins of Te Ara a Kiwa (the Foveaux Strait) to the inland plains and alpine valleys. This vast and beautiful territory, stretching from Rakiura (Stewart Island) and the Tītī Islands to the inland lakes, and the Fiordland ranges anchor our rakatirataka (sovereignty) and inform our obligations to whenua (land), wai (water), and atua (deities). It is a landscape rich in mahika kai (cultural food cultivation practices and places), sustaining generations through seasonal mobility and resource exchange. Historically, tribal mobility has been a sophisticated adaptive strategy, enabling Kāi Tahu and earlier iwi to maintain balance across ecosystems and uphold intergenerational wellbeing.

Mahika kai remains central to Kāi Tahu identity and resilience. Practices such as gathering kai from rivers, forests, and coasts, and harvesting tītī (mutton birds) from the offshore islands, are acts of whakapapa, reaffirming relationships with place and kin. These practices embody ecological knowledge accumulated over centuries and continue to shape Kāi Tahu responses to environmental changes. The seasonal journeys to the Tītī Islands, for example, reflect a worldview in which mobility, reciprocity, and stewardship are inseparable from cultural survival.

I was raised in Ōtautahi (Christchurch), away from the deep south. Growing up in an urban context has shaped my awareness of the complexities of maintaining cultural identity, connection and environmental relationships across dispersed geographies. These experiences inform my commitment to research that privileges Māori voices and locationally-grounded knowledge systems.

The 2010 and 2011 Ōtautahi earthquakes profoundly shaped my personal and professional interest in emergency management, particularly witnessing how Kāi Tahu mobilised to coordinate the emergency response and the long tail of recovery for the city (Carter & Kenney, 2018). My subsequent research in Indigenous emergency management has

continued to inform the trajectory of this doctoral work. Māori and global Indigenous responses to disasters consistently reveal patterns of collective action, governance innovation, and ongoing marginalisation within state-led systems. These insights are deeply relevant to climate change, which is intensifying both slow and sudden-onset hazards and increasingly blurring the boundaries between emergency response and long-term adaptation.

Although emergency management and climate change adaptation are intrinsically linked, they remain siloed in much of the academic and policy literature. Indigenous communities, however, experience them as overlapping domains shaped by the same governance arrangements, knowledge tensions, and cultural responsibilities (Kaiser & Kenney, 2025a). This research positions emergency management and climate adaptation as interconnected arenas of Indigenous resilience. As a Kāi Tahu researcher, my approach is guided by kaupapa Māori principles and by the responsibilities conferred through whakapapa. I have obligations to uphold the mana (prestige) of whānau (families), hapū and iwi, to respect tikaka and kawa, and to ensure that research outputs contribute to the aspirations of Kāi Tahu ki Murihiku and wider Takata Whenua communities. This research intends to be whakamana (empowering) for participating whānau by ensuring their narratives, priorities, and mātauraka are central to climate adaptation planning. My insider status provides access to cultural narratives and relational networks, but it also demands reflexivity to navigate the intersections of identity, power, and knowledge within academic and policy spaces.

These obligations underpin the design of this study through *Te Kahu Huruhuru o Kohikohi*, a kaupapa Māori methodology that weaves together whakapapa, mātauraka Māori, and qualitative inquiry (Kaiser et al. 2025b). Like the kahu huruhuru (feathered cloak), this approach binds diverse strands (whānau (family) narratives, pūrākau (intergenerational stories), policy analysis, and climate science) into a framework that honours Kāi Tahu values and relational ethics. Situating myself within this whakapapa ensures that the research is conducted with integrity and reciprocity, and that its outcomes strengthen cultural continuity and resilience.

To contextualise this research, the following section broadens to the geographic, demographic, economic and political context of Murihiku Southland, and the legislative and policy landscape of climate change adaptation in Aotearoa New Zealand.

1.4.1 Geography, Demographics, and Economy of Murihiku Southland

Murihiku Southland, situated at the southern tip of Te Waipounamu (the South Island) in Aotearoa New Zealand, is a vast, geographically diverse region encompassing approximately 34,000 square kilometres, making it the country's second-largest region by landmass (Environment Southland, 2024; Great South, 2024; Land, Air, Water, Atmosphere, n.d.) (Figure 5). The region is defined by its dramatic contrast between the rugged, sparsely populated Fiordland National Park (which comprises 58% of the land as public conservation estate) and the fertile Southland Plains, host to the majority of the region's economic activity and population (Environment Southland, 2023; Grant, n.d.)).



FIGURE 5: MAP SHOWING THE BOUNDARIES OF THE MURIHIKU (SOUTHLAND) REGION OF AOTEAROA NEW ZEALAND. SOURCED FROM GOOGLE MAPS.

As of June 2024, Murihiku is home to an estimated 103,800 residents (Stats NZ, n.d.). The region has a high-performing primary sector economy, contributing significantly to New Zealand's Gross Dometic Product (GDP) through agriculture, especially dairy and sheep farming, with 12% of the nation's pastoral exports originating here (Great South, 2024;

Environment Southland et al., 2025). This reliance on land-based exports and a significant coastal boundary (3,612 km of coastline) means the regional economy and way of life are exceptionally exposed to climate-driven risks like sea level rise, intensified rainfall, and environmental shifts (Environment Southland et al., 2025).

The region maintains a strong bicultural identity; while 80.5% of residents identify as New Zealand European, the Māori population accounts for 16.8% of the total Stats NZ, 2025). The mana (authority) of Kāi Tahu is upheld by four Papatipu Rūnaka (regional iwi governance bodies): Awarua, Hokonui, Ōraka Aparima and Waihopai (Great South, 2024; Ministry of Business, Innovation & Employment (MBIE), n.d.), and the locations of each of the four main rūnaka marae are pictured below (figure 6).

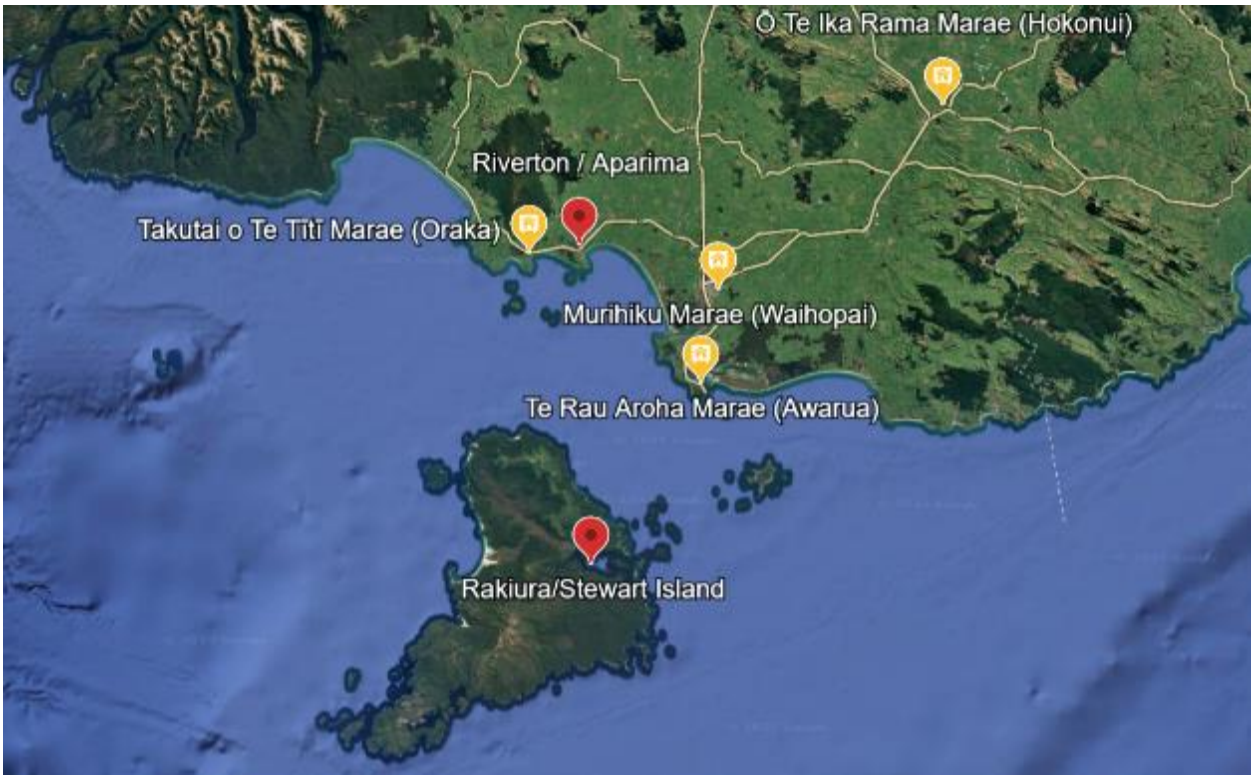


FIGURE 6: MAP ILLUSTRATING THE FOUR MAIN MARAE OF MURIHIKU RŪNAKA AND THE LOCATIONS OF ŌRAKA, APARIMA AND RAKIURA (STEWART ISLAND). SOURCED FROM GOOGLE MAPS.

1.4.2 Climate Change Projections for Murihiku

In Murihiku (Southland), climate change is projected to bring warmer average temperatures with more hot days and fewer frosts, alongside a southwest increase in annual rainfall but heavier extreme downpours - conditions that intensify flood risk and erosion (Intergovernmental Panel on Climate Change (IPCC), 2022). Heavier rain events are expected to transport larger pulses of contaminants through waterways and overwhelm stormwater systems, increasing exposure to sediment-bound pollutants during floods (Hughes et al., 2021). Sea levels will continue to rise and, when combined with local vertical land movement, will markedly increase the frequency of extreme coastal flooding and inundation of low-lying settlements in the region through mid-century and beyond (IPCC, 2022; Stephens et al. 2021). Fire weather danger and drought risk are projected to rise in parts of the South Island, lengthening wildfire seasons and compounding stress on rural communities and ecosystems (Pearce et al., 2011; IPCC, 2022). Shifts in species distributions are already being observed and are expected to accelerate, especially in the marine realm under ocean warming and acidification, affecting fisheries and biodiversity around Foveaux Strait and the wider southern coast (Pinkerton, 2017). In addition, warmer conditions and more variable rainfall will increase environmental suitability for a related rise in the incidence of vector-borne and enteric diseases. These factors have the potential to elevate public health risks that require strengthened surveillance and adaptation planning (Hales, 2019; IPCC, 2022)(Figure 7).

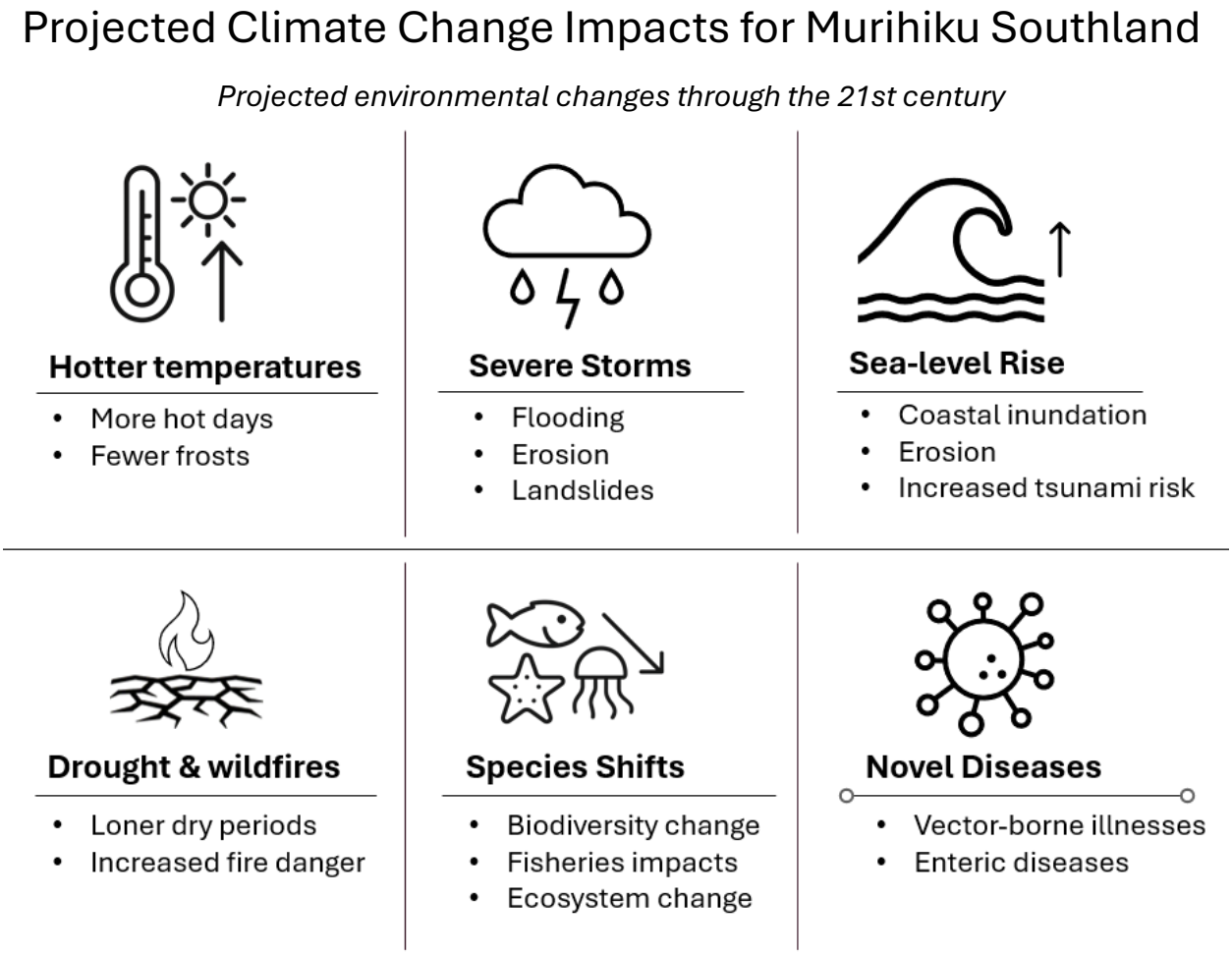


FIGURE 7: PROJECTED CLIMATE CHANGE IMPACTS FOR MURIHIKU/SOUTHLAND. SOURCE: AUTHOR

Climate change is also increasingly experienced through the mechanisms and institutions of emergency management. The intensification of storms, floods, landslides and coastal inundation generates more frequent emergency events, placing iwi, hapū and rural Māori communities at the forefront of response and recovery. Recent national reviews, (Bush International, 2023; New Zealand Government, 2024), following the 2023 Cyclone Gabrielle response, have underscored that Māori authorities, marae, and local collectives were often the first to mobilise. Reports (Bush International,2024, New Zealand Government, 2024) recommend that emergency systems must better recognise Māori governance, knowledge and capabilities. These suggestions illustrate the growing

entanglement of climate impacts, emergency management practices, and Indigenous responses to hazard events, as well as the need for Māori research scholarship that enhances understanding of climate adaptation in Aotearoa.

1.4.3 Public Perceptions of Climate Change in Murihiku

Despite the high degree of climate vulnerability in the region, the general public perception of climate change as an issue in Murihiku Southland is superseded by immediate concerns about socioeconomic pressures. The 2023 Community Perceptions Survey identified that while climate change is acknowledged, it ranks third among public concerns, following the cost of living and access to healthcare (Environment Southland, 2023). 62% of respondents expressed concern about the impacts of climate change, suggesting a moderate level of societal engagement with long-term climate risk, and communities rated their overall understanding of these impacts at an average of 6.8/10 (Environment Southland, 2023). This perception gap, (where immediate, tangible economic issues overshadow existential, long-term environmental threats), provides the socio-cultural backdrop for formal regional action. The resulting Regional Framework for Action on Climate (RFfAC), a collaborative effort involving local councils and Te Ao Mārama Inc. (representing local rūnaka), formally positions "Adaptation for our future" as a core focus area (Environment Southland et al., 2025). However, the measured, consensus-driven nature of the local government's policy framework stands in stark relief to the whakapapa-based adaptive strategies being rapidly enacted by Murihiku whānau. These transformative practices, described within this doctoral thesis, are culturally driven and relational, often operating beyond the boundaries of formal government planning and policy.

1.4.4 Climate Change Adaptation Policy Landscape: Murihiku and Aotearoa New Zealand

Climate change adaptation in Aotearoa New Zealand operates across several levels. Rūnaka and iwi planning holds its own authority, underpinned by whakapapa,

kaitiakitaka, and longstanding responsibilities to place. These Indigenous frameworks exist within a wider statutory environment that is designed by the Crown. Because of this structure, Māori planning often needs to be channelled through Crown instruments in order to gain formal legal force. This reflects the design of the system, not the status or capability of Māori knowledge holders.

This section maps the core policy and legal documents at four levels: rūnaka (Kāi Tahu ki Murihiku), iwi (Kāi Tahu Whānui), the regional tier (Southland/Murihiku local government), and national government. Authority and implementation power are distributed unevenly across these levels. Māori strategies are relational, place-based, and intergenerational. They frequently precede and influence regional and national work. However, long-term implementation usually depends on statutory uptake through Crown plans, funding pathways, and formal agreements.

At the rūnaka level, planning focuses on ancestral lands, cultural sites, and community resources. It aligns closely with Iwi and Hapū Management Plans, documents which express rūnaka priorities and responsibilities which are required to be taken into account by councils for planning purposes (Saunders, 2017).

The following pages contain tables, summarising some of the key climate change documents for rūnaka, Kāi Tahu iwi, regional councils and national government.

TABLE 1: RŪNAKA LEVEL (KĀI TAHU KI MURIHIKU) CLIMATE CHANGE DOCUMENTS/MECHANISMS

Document/Mechanism	Scope & Focus	Status/Legislation
Te Tangi a Tauira (The Cry of the People)	**The Iwi Hapū Management Plan (IHMP)** for Kāi Tahu ki Murihiku (the four Southland Rūnanga: Waihōpai, Awarua, Ōraka Aparima, Hokonui). This document takes a comprehensive view of the Māori world and how Murihiku Rūnaka will adapt for future generations. It guides the Rūnaka in policy and planning processes related to natural resources and the environment.	A 'living, working document' recognised and required to be taken into account by local and regional authorities under the Resource Management Act (RMA) 1991.
Local Rūnaka Adaptation Action	Specific, local action plans developed by individual Rūnaka (e.g., Waihōpai, Ōraka-Aparima) to protect marae, mahika ka*i* (traditional food gathering areas), and cultural assets from sea level rise and flooding.	Varies by rūnaka. Often enacted through specific projects (e.g., resilience pilots, infrastructure planning) and fed into council planning via Te Ao Mārama Inc.

The Iwi-level strategy provides an overarching mandate for climate response across the entire Kāi Tahu tribal area (Te Waipounamu/South Island).

TABLE 2: IWI LEVEL (KĀI TAHU) CLIMATE CHANGE DOCUMENTS/MECHANISMS

Document/ Mechanism	Scope & Focus	Status/Legislation
Te Tāhū o te Whāriki (*Anchoring the Foundations*)	**Ngāi Tahu Climate Change Strategy** (2018). This is the key strategic document, establishing a Vision and Strategic Direction based on nine pou (pillars). It covers both mitigation and adaptation, requiring the iwi to identify vulnerable assets and develop exit strategies/alternatives.	Active Strategic Plan (until 2050 targets). It directs the activities of Te Rūnanga o Ngāi Tahu and its commercial entities (Ngāi Tahu Holdings).
Te Kounga Paparangi	**Ngāi Tahu Climate Change Action Plan** (Operational). This is the action plan grounded in six *pou* that sets ambitious, measurable goals (*Tiaki Targets*) for the organisation's operations, covering water, waste, emissions, and biodiversity, all of which directly support adaptation capacity.	Active Action Plan. Sets targets, such as reducing emissions intensity from agricultural production by 2030, which increases environmental sustainability and resilience.

Regional policy is driven by statutory requirements and collaborative efforts between local government and Iwi/Māori entities (represented by Te Ao Mārama Inc.).

TABLE 3: REGIONAL LEVEL (MURIHIKU/SOUTHLAND) CLIMATE CHANGE DOCUMENTS/MECHANISMS

Document/Mechanism	Scope & Focus	Status/Legislation
Regional Climate Change Strategy for Murihiku Southland (Phase One)	Defines how local government agencies (Environment Southland, Gore, Invercargill, Southland District Councils) and Te Ao Mārama Inc. will work together toward shared outcomes and aspirations for the region's climate response.	Adopted. It is the foundation for the Framework (below) and informs the Long-Term Plans of the four councils.
Regional Framework for Action on Climate (RFfAC)	The key policy document providing a structured, ongoing process. It identifies "**Adaptation for our future**" as one of four core focus areas. The Framework guides actions to strengthen resilience, enhance economic resilience, and equip communities.	Active document establishing a 10-year outlook, refreshed every three years. It leads toward a full **Murihiku Southland Climate Action Plan** expected to be finalised in 2027.
Regional Policy Statement (RPS)	Under the RMA, the RPS sets the resource management objectives and policies for the region. As climate change is a statutory matter, the RPS is the primary vehicle for embedding adaptation requirements into lower-tier planning (Regional and District Plans).	Statutory document under the **Resource Management Act 1991 (RMA)**. Councils must comply with national direction when preparing their RPS.

National policy sets the regulatory environment, funding mechanisms, and high-level strategy for adaptation across the country.

TABLE 4: NATIONAL LEVEL CLIMATE CHANGE DOCUMENTS/MECHANISMS

Document/Mechanism	Scope & Focus	Status/Legislation
National Adaptation Plan (NAP)	New Zealand's first National Adaptation Plan (2022). It supports all New Zealanders to adapt, live, and thrive in a more damaging climate. It sets out the national approach to managing risks and establishes institutional and legislative frameworks.	Active Plan. Requires all councils to **give regard to the NAP** when preparing regional/district plans (since Nov 2022) under the **Climate Change Response Act 2002**.
Climate Change Response Act 2002	The overarching legislation establishing the legal requirements for climate change policy, including setting the framework for the Emissions Reduction Plan and the **National Adaptation Plan (NAP)**.	Current Legislation. Contains the Zero Carbon Amendment Act (2019) which set the structure for national climate policy.
Resource Management Act (RMA) 1991 (and successors)	The current primary environmental legislation governing how local authorities manage land-use and the environment, which is fundamental to adaptation planning (e.g., coastal hazards). The Government is currently repealing and replacing the RMA with new legislation.	**Current (but being repealed/replaced).** The planned replacement Acts are the **Natural and Built Environment Act (NBEA)** and the **Spatial Planning Act (SPA)**, although the specific framework is subject to ongoing reform and change by the current government.
National Adaptation Framework (NAF)	The latest framework (released in late 2025) establishes a long-term system for managing risks from floods, storms, and other natural hazards. It prioritises consistent hazard data, clear mandates for councils, and a new approach to cost-sharing for adaptation investment.	The new strategic document establishing the government's approach to cost-sharing and roles/responsibilities.

The overview of adaptation documents presented above illustrates the breadth of climate-related planning already underway across rūnaka, iwi, regional councils and central government. Together, these materials demonstrate that climate adaptation in Murihiku and Aotearoa is shaped by a diverse set of inputs, strategies, mandates and planning horizons, with rūnaka and iwi frameworks, sitting alongside statutory regional and national instruments (figure 8).

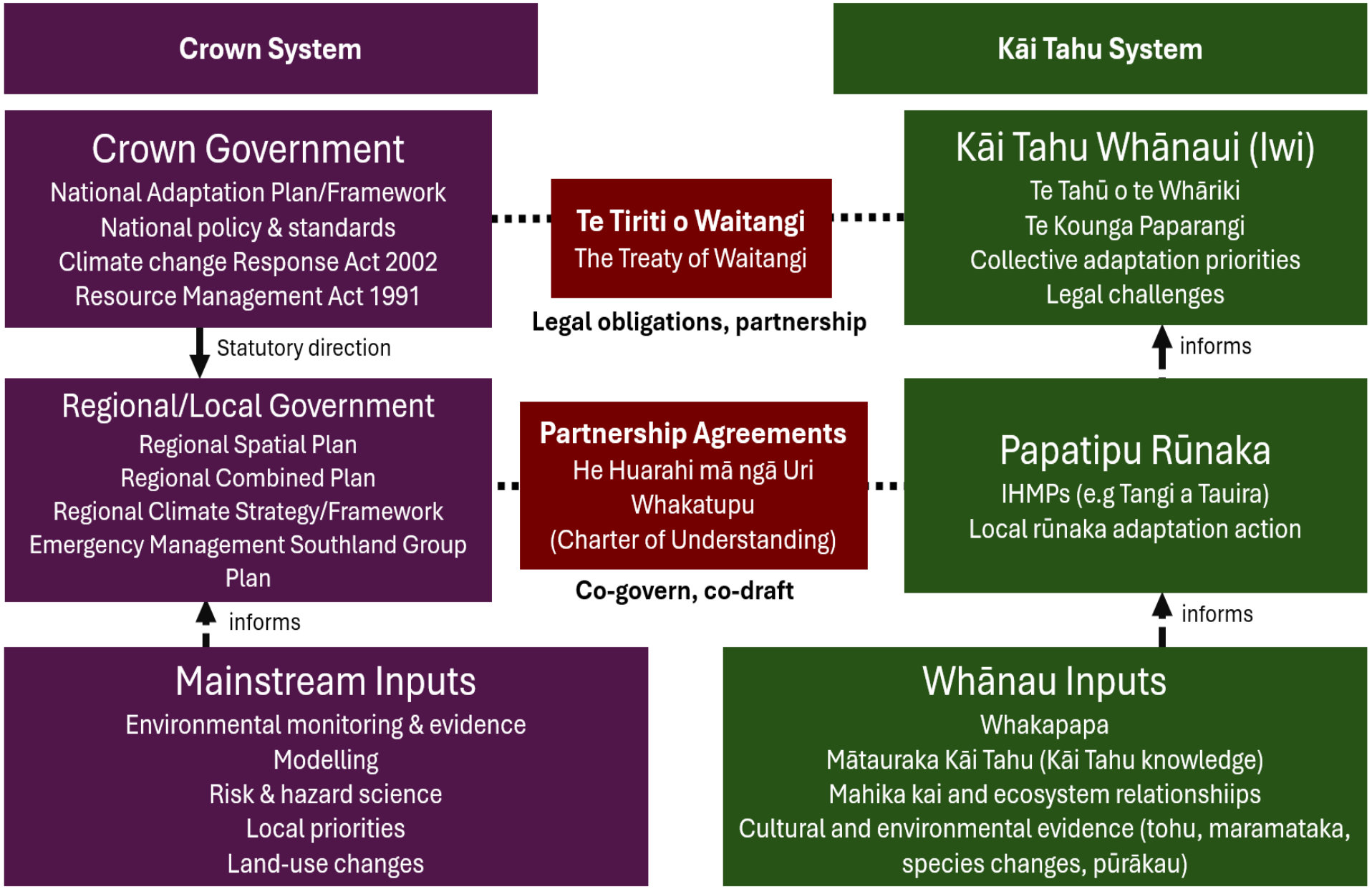


FIGURE 8: CROWN AND IWI CLIMATE CHANGE ADAPTATION STATUTORY LANDSCAPE FOR MURIHIKU. SOURCE: AUTHOR

What this landscape suggests is that adaptation is being articulated through multiple knowledge systems, governance arrangements and institutional and political priorities. However, climate adaptation policy in Aotearoa does not operate in isolation from emergency management. In practice, climate change is now one of the primary drivers of emergencies, with extreme weather events regularly prompting activation of the Civil Defence and Emergency Management (CDEM) system. Iwi and hapū frequently undertake parallel roles in both spaces: preparing communities, protecting cultural landscapes, coordinating response on marae, and leading recovery initiatives (Kaiser & Kenney, 2025b).

Climate change and emergency management increasingly operate within a single hazard governance system in Aotearoa New Zealand. The Emergency Management Bill (No. 2) retains an all-hazards, four-Rs philosophy and explicitly encompasses hazards arising from natural processes, human activity, or both, while strengthening roles for communities and iwi in governance and planning (Emergency Management Bill (No. 2), 2025; Beehive, 2025b). In parallel, the National Adaptation Framework (NAF) identifies climate change as a driver of severe weather and natural hazard risk. It organises national action around information sharing, roles and responsibilities, investment in risk reduction, and cost sharing, positioning adaptation within a risk-management logic that mirrors emergency management practice (Beehive, 2025b; MFE, 2025a). The New Zealand Planning Bill (2005) and its companion reforms further embed risk-based land-use planning, with goals to adapt to climate change and reduce natural-hazard risks through regional combined and spatial plans, and with provisions for Māori interests and participation (MFE, 2025a; Planning Bill, 2025).

Recent reviews underscore why this convergence matters. The Government Inquiry into the Response to the North Island Severe Weather Events (2023/2024) concluded that the emergency management system was not fit-for-purpose for multi-regional events and requires system-wide change. The inquiry directly informed new emergency legislation

(Emergency Management Bill (No. 2) while highlighting governance, role clarity, and readiness deficits that also constrain climate adaptation (Beehive, 2024; DIA, 2024).

At the same time, national science and resilience investments that provide common evidence bases (hazard models, loss modelling, slope and flood information) are used across both adaptation and emergency management, reinforcing their practical interdependence (Natural Hazards Commission, n.d.). The January 2026 landslides at Mt Maunganui and Pāpāmoa illustrate this interdependence in situ: extreme rainfall consistent with climate projections triggered life-threatening emergencies that required coordinated responses, iwi-led cultural and welfare support, and risk-informed decisions about future land use (AP News, 2026; RNZ, 2026a, 2026b).

Taken together, these developments, (emergency law reform, a national adaptation framework and standards, hazard-focused planning law, system reviews, shared hazard datasets/portals, and recent multi-hazard events), indicate that adaptation and emergency management are aligned. Policy and legislative settings now require shared risk information, integrated planning instruments, and governance arrangements that enable mana whenua decision-making across both adaptation and emergency systems (Emergency Management Bill (No. 2), 2025; MFE, 2025b; Planning Bill, 2025). By contrast, funding settings for resilience, risk reduction, and climate-adaptation action remain fragmented across agencies and programmes, which can slow situational delivery even as the policy architecture converges.

1.4.5 Climate Adaptation funding in Aotearoa

Māori-relevant public investment for climate and hazard work is currently distributed from separate government and Non-Governmental Organisations (NGO) agencies. The Ministry for the Environment (MFE) *Māori Climate Platform Fund* finances marae-based adaptation and mitigation projects, with an indicative envelope of approximately NZD $9 million in 2025 and project grants of $0.3–2.0 million that must be completed by 30 June 2026 (MFE, 2025c). Recent Official Information Act releases confirm that the Platform's

non-departmental funding has been reduced twice since inception, reinforcing the volatility of short-cycle, contestable allocations (MFE, 2025d). A further stream, the Energy Efficiency and Conservation Authority (EECA)'s *Community Renewable Energy Fund*, finances solar photovoltaic and battery systems for community buildings including marae, targeting approximately 217 sites by 2026 through non-contestable regional partnerships (EECA, 2025). At the local level, as of January 2026, Auckland Council has released *Te Ara Urutau – Climate and Emergency Ready Fund*, to support community organisations across Tāmaki Makaurau to take meaningful action on climate change and be emergency ready (Auckland Council, 2025).

Emergency Management Funding

The National Emergency Management Agency (NEMA)'s *Civil Defence and Emergency Management (CDEM) Resilience Fund* is an annual, contestable programme that supports projects which build emergency management capability and strengthen hazard risk resilience across the 4Rs, aligned with CDEM Group Plans and the National Disaster Resilience Strategy (NEMA, n.d.). The fund currently makes NZD $889,000 available each year for initiatives that deliver system benefits and collaborative approaches to disaster resilience. Recent rounds have supported work such as AF8 Alpine Fault[4] preparedness, tsunami evacuation planning and signage, community flood monitoring and warning, and power-outage mapping, among others. While primarily targeted to CDEM Groups and councils, funded outputs often intersect with Māori community needs (e.g., marae preparedness toolkits in prior rounds), illustrating the overlap with climate-driven risk reduction and community resilience efforts (Devdiscourse, 2023; Inside Government NZ, 2023)

[4] AF8 [Alpine Fault magnitude 8] is a programme of scientific modelling, coordinated response planning, and community engagement, designed to build resilience to the next Alpine Fault earthquake. https://af8.org.nz/

Natural Hazard and Climate Research Funding

The Natural Hazards Commission Toka Tū Ake (NHC) is also a major national funder of hazard research, investing around $10 million per year across programmes such as the contestable Biennial Grants and the *Triennial University Research Programme* to support risk reduction, modelling, decision-support and community resilience (NHC, 2025a; NHC, 2025b; NHC, 2026). The Biennial Grants have funded Māori-led and Māori-centred research projects. Since 2020, NHC has also supported *Te Toi Whakaruruhau o Aotearoa-the Mātauranga Māori Disaster Risk Reduction Centre*, in partnership with Massey University. Recent national reforms have established *the Natural Hazards and Resilience Platform*, a seven-year, $70 million initiative to coordinate multi-hazard science across the 4Rs with a strong focus on working alongside iwi/Māori and other end-users. This includes a dedicated "Vision Mātauraka" theme, specifically targeted at Māori-centred research that addresses Māori resilience priorities (Natural Hazards and Resilience Platform, 2024; Ministry of Business, Innovation & Employment, 2025a).

Additionally, the Government will introduce *Research Funding New Zealand* in 2026 as a single national funding decision-maker, to streamline allocation across major research funds and align investments with a new outcomes-focused framework. As of January 2026, details indicate a phased transition from existing bodies, including the Ministry of Business, Innovation & Employment (MBIE) Science Board and, over time, the Royal Society Te Apārangi, and the Health Research Council (Health Research Council of New Zealand, 2025; MBIE, 2025b; Science Media Centre, 2025).

For Māori-centred climate and hazard research, these reforms present opportunities to embed mātauraka Māori (Māori knowledge) and strengthen iwi partnerships within coordinated programmes and datasets. This focus is contingent on implementation that maintain Māori governance roles and tikaka-aligned processes (MBIE, 2025b; Science Media Centre, 2025). However, centralisation and increased ministerial control over funding priorities risks stifling innovation through homogenising and politicising research funding. This may narrow the scope of Māori-centred climate and hazard

research unless strong mātauraka Māori obligations, Māori governance roles and protections for kaupapa Māori methodologies are embedded within the new framework (Science Media Centre, 2025).

Funding Fragmentation

The net effect of the aforementioned reforms is a fragmented funding architecture where iwi, hapū and marae-centred adaptation projects are supported primarily through time-limited and scattered funding pools. The separation between climate-adaptation funding, emergency-management funding, and science/research investment persists despite substantial overlap in activities. Exemplars include protecting marae and taoka (treasured) species and places from climate-driven hazards, investing in essential energy and water resilience, and strengthening local decision-making.

These patterns of fragmentation, uneven resourcing, and structural separation across policy domains mirror recurring themes that shape Indigenous climate adaptation internationally. These include uneven recognition of Indigenous knowledge, persistent tensions between Indigenous governance and state-led systems, and the demonstrated strength of Indigenous-led science and action. Chapter Two of this thesis examines these dynamics through international Indigenous emergency management scholarship as a necessary precursor to understanding how the same governance, epistemic and relational issues reappear in Aotearoa's climate adaptation landscape.

Having outlined the formal planning and funding environment that frames climate adaptation in Aotearoa alongside its linkages to emergency management, the following section outlines the conceptual, methodological and analytical threads of the thesis and show how they are applied across the empirical work chapter by chapter.

1.5 Chapter Outlines

Chapter Two: An emic 'gaze' on the role of traditional knowledges and cultural practices in emergency management contexts (publication one)

Although this thesis focuses on climate change, Indigenous peoples worldwide encounter climate impacts through many of the same mechanisms that structure disaster and emergency management. Climate change is increasing the frequency and intensity of storms, floods, wildfires, coastal erosion and other hazards that activate emergency systems. As a result, the global Indigenous emergency management literature offers a vital analytical foundation for this research. This journal article, (published in *AlterNative: An International Journal of Indigenous Peoples*, 2025), presents a rapid review of global literature on Indigenous emergency management, offering an emic (insider) perspective rooted in Māori worldviews. It highlights how Indigenous communities employ traditional knowledge, cultural practices, and collective values to predict, prepare for, and respond to disasters. Despite the effectiveness and innovation of these approaches, Indigenous knowledges remain marginalised within mainstream emergency management frameworks due to colonial legacies and epistemological tensions. In this article, the dominance of Western scientific paradigms is critiqued and advocacy for greater Indigenous autonomy, representation, and reciprocity in emergency management research, policy, and practice, promoted. The article concludes with recommendations for decolonising the sector and embedding Indigenous leadership and governance in disaster risk reduction strategies.

Chapter Three: Reweaving the Kupeka: Climate Science framing, externalities, overflows in the Indigecene (publication two)

This journal article (currently in review *for Kōtuitui: New Zealand Journal of Social Sciences Online*), examines how Indigenous knowledge is framed within dominant climate science paradigms through the concept of the *Indigecene*. Using Michel Callon's 1998 theory of framing, externalities, and overflows, the chapter critiques technocratic approaches that privilege quantitative data while sidelining relational, spiritual, and genealogical dimensions of Indigenous epistemologies. A fishing net metaphor illustrates how Western science captures what it values (metrics and models) while Indigenous knowledge that does not conform slips through the mesh. The article explores Māori

cosmogenies, whakapapa, and cyclical temporalities as alternative frameworks for understanding climate change, contrasting these with linear Western models. It interrogates the appropriation of Indigenous concepts in social theory and adaptation practices, highlighting risks of decontextualisation and epistemic injustice. The chapter concludes by advocating for a new Indigenous-woven fishing net (a kupeka) for framing climate science. Indigenous-led framings, theories and methodologies are pathways for advancing climate futures and science that are grounded in sovereignty, relational and intergenerational knowledge and practices.

Chapter Four: Tangata whenua responses to climate change (publication three)

This book chapter (published in *Tū Rangaranga*, 2022*)* explores how tangata (takata) whenua (Māori communities) in Aotearoa are responding to climate change through culturally grounded strategies rooted in mātauraka Māori, tikaka, and kaupapa. It critiques the limitations of national legislation and policy frameworks in adequately supporting Māori climate aspirations, while highlighting iwi-led initiatives such as Iwi/Hapū Management Plans and climate strategies like *Te Tāhū o te Whāriki*. The chapter underscores the importance of Indigenous leadership, planning, and activism in shaping resilient, locally relevant responses, and calls for stronger integration of Māori perspectives in climate governance.

Chapter Five: Te Kahu Huruhuru o Kohikohi: weaving a kaupapa Māori methodology for climate change research (publication four)

This journal article, (published in *MAI Journal*, 2025), explores the qualitative kaupapa Māori methodology created by the author to guide the doctoral research: *Te Kahu Huruhuru o Kohikohi* (the feathered cloak of Kohikohi). This methodology bridges Māori ways of knowing with Western research, drawing on whakapapa and incorporating Kaupapa Māori and bricolage to create an adaptable, multi-perspective approach. The kahu huruhuru metaphor represents the diverse experiences of Kāi Tahu ki Murihiku and other Māori communities in responding to climate change. By honouring Māori

epistemologies and engaging in community dialogue, the methodology offers a decolonising approach for climate change adaptation, combining Western and Indigenous perspectives for meaningful solutions. This chapter also includes an addendum providing further specificity on the methods used to conduct this doctoral research.

Chapter Six: Weaving Climate Narratives: Physical, Relational, Cultural, and Emotional Impacts for Southern Māori (publication five)

This journal article, (currently in review for *AlterNative: An International Journal of Indigenous Peoples*), explores Māori narratives of ecological change, displacement, and climate justice through a Kaupapa Māori narrative analysis of twenty interviews with Kāi Tahu ki Murihiku whānau, rūnaka leaders, and knowledge holders. Framed by the whakataukī (Māori proverb) *he tai timu, he tai pari* (the ebbing tide, the incoming tide), the chapter examines how climate-linked disruptions, (such as intensifying storms, coastal erosion, species migration, and loss of mahika kai), are interpreted through te Ao Māori (Māori worldviews). Four interwoven strands of impact are presented: physical, relational, cultural, and emotional, and each strand is embedded within meta-narratives of colonisation and climate change. Within the article, analysis of participants' talk highlights how environmental change challenges tūrakawaewae (a place where one has the right to stand), cultural practices, and intergenerational knowledge transmission. Emotional responses such as grief, fear, and hope are explored as culturally situated expressions of responsibility to whenua and mokopuna. The chapter concludes by advocating for adaptation frameworks that honour whakapapa, embed Māori governance, and resource iwi-led initiatives to sustain identity and wellbeing in a changing climate.

Chapter Seven: Mō tātou, ā, mō kā uri ā muri ake nei: Visioning mokopuna futures through climate change adaptation strategies (publication six)

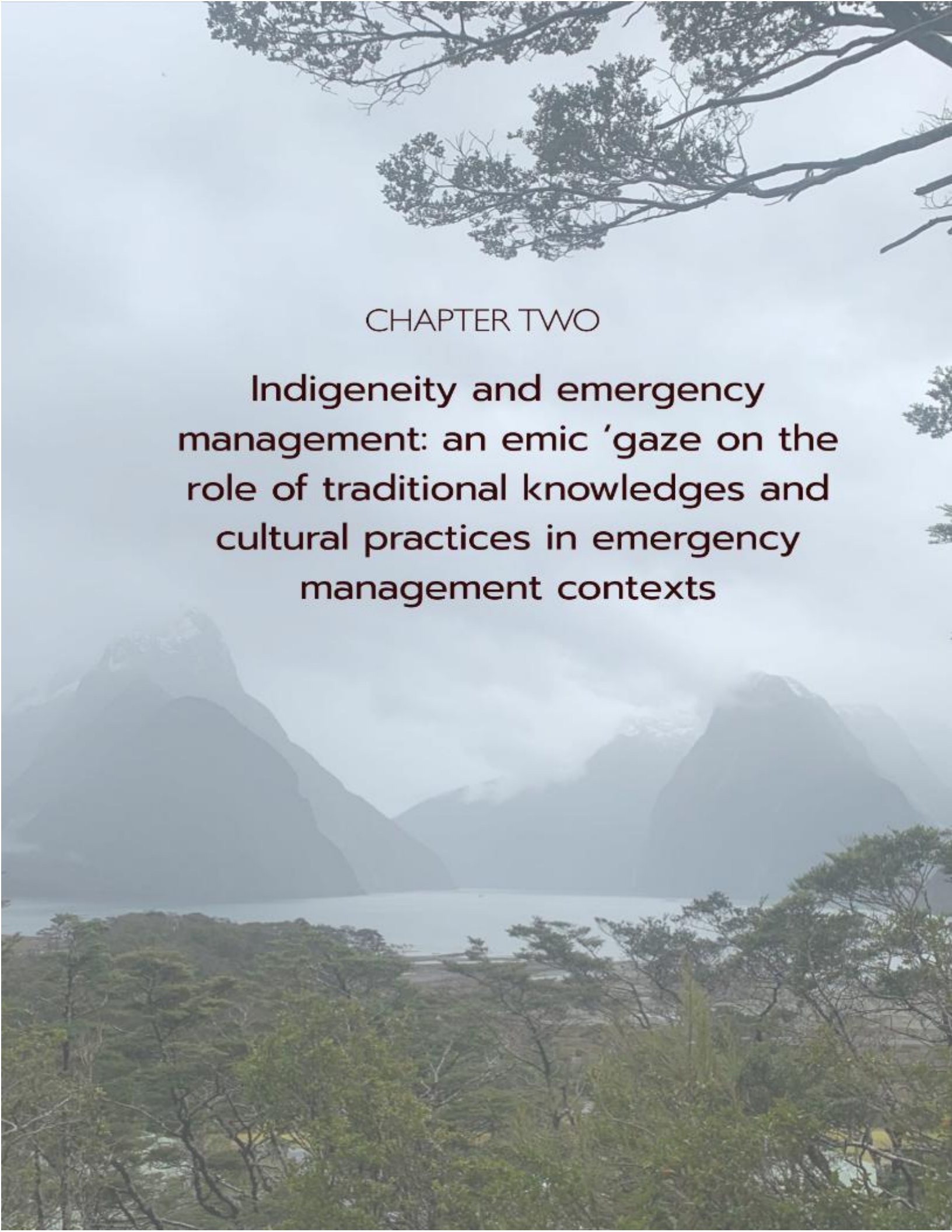
This journal article, (currently in press for *the 2025 International Disaster Risk Management (IDRiM) Conference Special Issue*), investigates Māori-led climate

adaptation strategies in Murihiku Southland, framed through whakapapa, kaitiakitaka, and mokopuna-focused futures. Drawing on twenty interviews with Kāi Tahu whānau, rūnaka leaders, and environmental practitioners, the Chapter explores how adaptation is conceptualised and enacted by whānau through cultural resurgence, ecological restoration, and intergenerational governance. Using *Te Kahu Huruhuru o Kohikohi* methodology and Callon's concepts of framing, externalities, and overflows, the analysis critiques technocratic adaptation models that marginalise Māori priorities and reframes adaptation as a relational, ethical, and future-oriented practice. The findings highlight four interconnected strategic themes: whakapapa as adaptive infrastructure; ahi kā (continued occupation) kaitiakitaka (environmental stewardship) and utu (balance); kotahitaka (unity) and strategic partnerships; and visioning mokopuna futures. These strategies transform externalities such as cultural erasure and land dispossession into overflows-creative, locally grounded responses that exceed mainstream planning paradigms. The Chapter concludes by calling for adaptation frameworks that embed Māori governance, affirm mātauraka Māori as science, and resource iwi-led initiatives to ensure climate resilience for future generations.

Chapter Eight: Tying Off the Strands: Towards Indigenous-Led Climate Futures

This concluding Chapter synthesises the thesis journey, returning to the central question of how climate change impacts are experienced and addressed by Takata Whenua in Aotearoa. Chapter Eight draws together four key arcs: global and national framings of Indigenous emergency management and climate adaptation; iwi and hapū-led strategies that precede and exceed government policy; the development of a Kaupapa Māori methodology; and narrative analyses of Murihiku whānau experiences and mokopuna-focused adaptation strategies. The synthesis highlights three core contributions to Indigenous climate adaptation scholarship in Aotearoa. The *Indigecene* concept and the kupeka (net) metaphor reframe epistemic and theoretical boundaries in climate science. Secondly, Murihiku narratives identify four interwoven strands of impact, (physical, relational, cultural, and emotional), interpreted through whakapapa and cosmogenic

frameworks rather than deficit-based framings. Finally, Māori-led adaptation is articulated as a systemic practice embedded in whakapapa, ahi kā, kotahitaka, and mokopuna futures, transforming externalities of colonisation and climate disruption into overflows of cultural resurgence, ecological restoration, and governance innovation. The chapter also provides a discussion of limitations of the research and recommendations for policies and future research.



CHAPTER TWO

Indigeneity and emergency management: an emic 'gaze on the role of traditional knowledges and cultural practices in emergency management contexts

While this thesis is centred on climate change, Indigenous climate disruption is frequently experienced through hazard events and emergency systems. Around the world, Indigenous communities engage with emergency management in ways that reveal broader tensions between Indigenous knowledge, governance authority, and technocratic state structures. These dynamics are directly relevant to climate adaptation, which operates within the same institutional architectures and epistemic hierarchies. Chapter Two presents a published journal article that examines global Indigenous emergency management as a key analytical lens for understanding how Indigenous knowledge is framed, included, or excluded within wider hazard and climate governance systems. This global context provides the groundwork for the theoretical and methodological developments that follow in Chapter Three.

Reference: Kaiser, L. H., Kenney, C. M., & Phibbs, S. R. (2025). Indigeneity and emergency management: an emic "gaze" on the role of traditional knowledges and cultural practices in emergency management contexts. *AlterNative: An International Journal of Indigenous Peoples*, *21*(2), 285-297.

The photo on the preceding page (figure 10) depicts Piopiotahi (Milford Sound), located in Fiordland National Park in Murihiku/Southland, New Zealand. Credit: Author.

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We, the student and the student's main supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the student's contribution as indicated below in the Statement of Originality.

Student name:	Lucy H. Kaiser
Name and title of main supervisor:	Christine M. Kenney
In which chapter is the manuscript/published work?	Chapter Two

Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:[1]

Lucy Kaiser is the primary author of the journal article and is responsible for leading the design and implementation of the research, the analysis and writing the manuscript. Kenney and Phibbs have contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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Indigeneity and emergency management: an emic 'gaze' on the role of traditional knowledges and cultural practices in emergency management contexts

Authors

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Abstract

There is increasing recognition within disaster research and practice that Indigenous cultural technologies may be drawn on to strengthen disaster risk reduction. This rapid review presents an emic and discursive analysis of Indigenous emergency management noted in disaster research literature between January 2000 and July 2022. There is a limited body of peer reviewed research literature that specifically discussed Indigenous Peoples' engagement with emergency management. Review findings indicate that Indigenous knowledges and practices are shaping emergency management initiatives locally, regionally and nationally. Yet epistemological tensions between Western European science and Indigenous understandings of emergency management have impacted effective uptake of Indigenous knowledges within disaster science and emergency management sectors. Despite challenges due to deeply embedded colonial practices worldwide, there are opportunities for the advancement of Indigenous Peoples to have greater autonomy in emergency management research, policy and practice.

***Keywords*:** disasters, emergency management, emic, Indigenous, Māori, traditional knowledge

2.1 Introduction

There is growing international recognition as well as research evidence that highlights the need to draw on traditional bodies of knowledge to shape disaster risk reduction (DRR) policies and practices (Kelman et al. 2012; United Nations Office for Disaster Risk Reduction (UNDRR), 2022). The current impacts and predicted global consequences of climate change have equally contributed to an awareness that community-led emergency management and recovery initiatives are relevant to integrated DRR research and governance (Paton & So-Kum Tang, 2008). Further to the ratification of the Sendai Framework for Disaster Risk Reduction in 2015, the UNDRR, formerly known as the United Nations International Strategy for Disaster Reduction (UNISDR) has recommended that inclusive approaches that encompass the engagement of culturally diverse and Indigenous collectives in disaster management planning and implementation, be widely introduced (UNISDR, 2015). Although limited, there is an emerging body of research literature (Kenney & Phibbs, 2015; Kenney & Solomon 2014), which showcases that Indigenous community-led emergency management responses are effective and thus, valuable as a complement to formal Coordinated Incident Management System procedures, which are commonly operationalised in acute disaster settings. Yet, a detailed examination of the peer-reviewed evidence documenting effective Indigenous engagement in emergency management has not been conducted. This article contributes to addressing that knowledge gap. The article is based on findings from a rapid review of peer-reviewed research literature on Indigenous Peoples' perspectives regarding emergency management, and immediate responses to catastrophic natural hazard events.

2.2 Background

Emergency management is a multi-disciplinary field encompassing an organised and coordinated approach to preparing for, responding to, recovering from and mitigating the impact of disasters. In Aotearoa New Zealand, the emergency management sector uses an integrated approach, based on four areas of activity, known as the four Rs: Reduction,

Readiness, Response and Recovery (National Emergency Management Agency [NEMA], 2020). Emergency management is a component of what is more widely referred to as disaster risk reduction. DRR is defined by the UNDRR as actions that aim to "prevent new and reduc[e] existing disaster risk and manag[e] residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development" (UNDRR, n.d., par. 1) DRR is considered to have a broader scope than emergency management, incorporating systematic efforts to analyse and reduce the causal factors of disasters as well as enhancing the resilience of communities. Traditionally, preparedness and response have been the central focus of emergency management, in a reactive sense. However, the number and scale of disasters happening globally, the associated costs and greater awareness of inequities in disasters, has resulted in a paradigm shift over the last decade (UNDRR, 2015).

The Sendai Framework for Disaster Risk Reduction (2015), adopted by UN member states in 2015 is a global agreement that outlines how nations should approach their wider societal risk from disasters. The Framework states that “it is necessary [for states] to empower local authorities and local communities to reduce disaster risk, including through resources, incentives and decision-making responsibilities, as appropriate” (UNDRR, 2015, p. 13). Many emergency management agencies globally have adopted principles from this document into their own approaches (Department of Prime Minister and Cabinet [DPMC], 2019; Faivre et al. 2018), The Framework highlights the need for greater inclusion of Indigenous Peoples in DRR and emergency management.

Indigenous knowledge systems facilitate risk identification and communication, underpin cultural values linked to ancestral, social and cultural relationships, and shape disaster management assets, tools and collective governance. While there is no single definition of Indigenous emergency management, there are several commonalities relating to how Indigenous emergency management operates across the four Rs. Indigenous knowledge and cultural practices can effectively inform risk reduction activities, by providing intergenerational and empirical information about long-term risks to human life and property. Principles of collectivism and stewardship mean that some Indigenous Peoples

are well-positioned to engage in readiness and response activities in the event of a disaster. Additionally, many Indigenous groups have existing social, cultural and health initiatives supporting their communities that can contribute to recovery following an event. This rapid literature review identifies some of the knowledge and activities that Indigenous Peoples are operationalising for emergency management.

2.3 Research design and method

A rapid literature review is a type of knowledge synthesis in which components of the systematic literature review process are simplified or omitted to produce information in a short period of time (Khangura et al. 2012). We chose to conduct a rapid review as it is a time effective approach for gathering, analysing and synthesizing key research findings (Greenhalgh et al., 2004; Popay et al., 2005). The review enabled mapping of a representative set of studies on Indigenous Peoples and emergency management in acute settings, including information about the extent of, and emerging trends within, Indigenous approaches to management. To ensure the literature analysed was contemporary in nature, the body of literature subjected to review was restricted to recent publications within the last twenty years, specifically articles and other documents published from January 2000 to July 2022. An initial review was conducted from April 2019 through to June 2020 with an additional review conducted in August 2022 to identify literature published between June 2020 and July 2022. Search terms were selected based on their relevance to the topic and likelihood of capturing published research, representative of Indigenous Peoples' emergency management knowledge and practices. Bibliographic reference lists and electronic databases were searched to identify English language research and policy literature that examined Indigenous emergency management concepts and approaches. Databases, including Scopus, Web of Science, Google Scholar, Dissertation Abstracts, Best Evidence, Psych Info, and Sociological Abstracts, were searched using the key search terms: Indigenous *and* disaster management, emergency management, disaster risk reduction, volunteering. The search was also expanded to identify relevant policy-related literature and reports that could

provide both context and inform sets of understanding about the ways in which Indigenous approaches might shape government and local authority initiatives. A limited number of documents were identified.

In total, 242 relevant articles were identified that addressed Indigenous emergency management. Further to an initial screening of documents, 60 abstracts from the most relevant articles were selected. The search also generated a diverse set of relevant grey literature, including seven key texts, which were included in the review. These additional documents comprised government reports, media articles and policy tools that commented on the ways Indigenous knowledges and approaches to emergency management shaped the policies of frontline response agencies and emergency management infrastructures.

There are limitations of the rapid review format due to the simplified format and restrictions to English language. Further search using terms such as “aboriginal”, “first nation”, “tribal” and specific Indigenous community names could have netted more results. This is also the case for the terms “disaster risk reduction”, “disaster resilience” and “crisis management”. A retroactive search using these terms did not generate significantly different results than our original search, however.

The literature was analysed using a form of critical discourse analysis, providing “an examination of institutions and structures that inform the production and interpretation of language and identification of power imbalances within a socio-cultural context” (McCartan, 2022, p. 2). The authors of this article are wāhine (female) Māori (Indigenous peoples of Aotearoa New Zealand) researchers working in the disaster risk reduction/emergency management space. As such, this review has been conducted using an Indigenous “emic” lens to analyse the literature (Markee, 2013, p. 1). Emic, and its corresponding antonym, etic are rooted in linguistic research conducted by Pike (1967), but have commonly been utilised in the field of Indigenous psychologies (Markee, 2013, p. 1). “Emic” refers to culturally and locationally-bound “insider” perspectives whereas “etic” viewpoints use an external or universal “outsider” framing (Hilaire, 2023, p. 1). There are

complexities with taking an emic approach, as there is no universal form of indigeneity that creates a singular worldview, in fact indigeneity is a plurality of many Indigenous communities, each with their own challenges, worldviews and actions. In a global and political sense however, shared traits of Indigenous Peoples are identified by the United Nations as "having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them" (United Nations, 2004, p. 2).

In conducting this research, it is not our intention to flatten indigeneity into a singular experience. Instead, we are using an Indigenous lens as a form of tūrangawaewae (a place where we can stand and speak from). The authors are located in Aotearoa New Zealand, therefore our analysis is strongly rooted in our iwi (tribal) identities of Kāi/Ngāi Tahu (a Māori tribe of the South Island of Aotearoa New Zealand), Kāti/Ngāti Māmoe (a Māori tribe of the South Island of Aotearoa New Zealand), Waitaha (a Māori tribe of the South Island of Aotearoa New Zealand), Ngāti Toarangatira (a Māori tribe of the lower North Island of Aotearoa New Zealand), Ngāti Mutunga (a Māori tribe of the Western North Island of Aotearoa New Zealand) and Te Ātiawa (a Māori tribe of the western and lower North Island and the upper South Island of Aotearoa New Zealand). As such, our analysis and recommendations are informed by our cultural and locational contexts. This review calls into focus how contemporary research and policy is flattening Indigenous communities, their knowledge and experiences and excluding them from research and policy spaces.

2.4 Findings

In contrast to the considerable body of research literature pertaining to adaptive Indigenous approaches to the impacts of climate change (Kenney & Phibbs, 2021; Petzold et al. 2020; Shaffril et al, 2020), it was evident that the body of quality-assured research articles exploring Indigenous emergency management was relatively small. The majority of the materials analysed was locationally-based, featuring a case study or multiple case

studies of a particular Indigenous community. There were a total of 84 case studies included in the literature. The largest group of regionally-based case studies were from Asian countries (*n* = 37), followed by the Pacific (*n* = 27), North America (n = 13) and Africa (*n* = 7). There was only a single case study from South America and none from Europe.

Most of the reviewed disaster literature documented research conducted from an etic perspective, and the ways in which research findings were presented were primarily informed by a Western European episteme. There is an inherent tension in bringing a Western gaze to analyse knowledges created by and within another episteme, in order to advance science. Misinterpretations of Indigenous bodies of knowledge contribute to the misrepresentation of research findings in emergency management literature and other fora. Bruno Latour (1991) suggests that representation is not simply the act of researchers producing a likeness of the subject of their research, they control the narrative through what is bracketed in and bracketed out of the representation. Researchers, in effect, speak for their subjects and in the process of translating data into findings, determine what is of value. In the articles that were analysed, for example, Indigenous case studies were categorised by authors in terms of "usefulness". This judgment was, for the most part based, on a Western European emergency management canon and positioned regarding their level of relevance to international DDR policy.

An argument can be advanced that the ways in which Indigenous knowledges and practices are situated, misrecognised and or bracketed out of initiatives by emergency management infrastructures constitute forms of symbolic violence (Bourdieu, 1996), whereby power is exercised upon Indigenous agents with emergency management and/or organisational complicity (Bourdieu & Wacquant, 1992). As an alternative, the Indigenous authors of this article have re-evaluated the selected literature and the themes that have emerged using an Indigenous lens, which has enabled contextualised discussion of topics that have not been fully addressed in the literature.

2.5 Discussion

The following sections of this article discuss evidence of Indigenous Peoples' emergency management knowledge and practices. They have been purposefully organised to provide the key themes that emerged across the global case studies of Indigenous emergency management to be followed by a meta-discussion of the colonial context of emergency management and the challenges this creates. Key themes that emerged in our analysis of Indigenous emergency management were: risk identification and communication; emergency management assets and tools; underpinning value systems; and Indigenous governance and leadership in emergency management.

2.5.1 Risk identification and communication

A theme that emerged within Indigenous disaster emergency management was the surveillance of natural phenomena including changes in animal behaviours, flora and weather patterns as effective forms of risk identification. Observation of animal behaviour as a warning for an impending disaster included phenomena such as birds flocking or livestock escaping before an earthquake (Halvorson & Hamilton, 2007) and ants shifting their shelters to higher ground as forewarning a flood (Bordoloi & Muzaddadi, 2015). Pareek and Trivedi (2011) reported that an Indigenous community in Rajasthan, India had identified the flowering of Ficus plants, an abundance of both butterflies and termites, as well as frogs making an unusual amount of noise, as predictors of increased rainfall. Paul and Routray (2011) surveyed a community in Bangladesh and found that 34% of households predicted impending cyclones by Indigenous means such as observing flies attaching themselves to cattle and sea birds flying inland in groups, as signs that a cyclone would soon break ground (Paul & Routray, 2011). The majority of the respondents in this particular survey learnt these methods through experience or from elderly people and neighbours. A further example is a Māori community's observations of phenomena such as unusual whale strandings, which combined with an increase in the amount of

tangihanga (funerals), is understood as a tohu (sign or premonition) of disruptions to the environment (Smith et al. 2016).

Indigenous communities' methods of predicting natural hazard disasters by inspecting weather patterns were also explored in the literature. Veland et al. (2010) identified that Warruwi (Indigenous people of south coastal Tasmania, Australia) elders in an Australian Northern Territory community recognised that cyclones often followed the same path due to the topographical location of coral reefs. Equally, Huy and Shaw's (2008) case study documented the Cham (Indigenous peoples of central Vietnam and Coastal Cambodia) that held collective knowledge of the rainy season and the ability to forecast exact drought years helped Indigenous farmers plan and manage crop cultivation. Pareek and Trivedi (2011) have documented a series of traditional sayings of Marwari elders, in the northwest Indian state of Rajasthan, that use changes in wind direction or outside temperature, to indicate climatic variations. As one local Indigenous saying notes: "Nada tankan, balad bikavan met baje tu, adhe saawan" this is translated by Pareek and Trivedi to explain that in mid monsoon, if the southeast wind blows, then the farmers of the Marwar region cry because the changes indicated an impending famine (Pareek & Trivedi, 2011, p. 185). In the aforementioned exemplars, all the communities had faith in the robustness of these Indigenous mechanisms for predicting disasters and perceived this knowledge to be a precious resource for their communities. Collective ownership and mobilisation of these knowledges are key to ensuring the effectiveness of Indigenous hazard risk assessments and communication of risks at the local community level.

Through intergenerational knowledge, risk reduction has become part of the social and cultural fabric of Indigenous Peoples. The risk communication examples presented above were generally effective early warning emergency management mechanisms. They were based on the enduring relationships between Indigenous communities and the environment, as well as collective and common understandings. Indigenous communities maintain cultural lexicons and intergenerational knowledges that inform emergency management practice (Baumwoll, 2008; Paul & Routray, 201; Veland et al., 2010) as seen in Indigenous-specific emergency management assets and tools.

2.5.2 Emergency management assets and tools

Within the literature, case studies of Indigenous building, engineering and environmental/resource management tools as preparedness practices were analysed. Indigenous engineering and building practices, as well as disaster management systems, relied on local materials and historical knowledge of the environment (Irfanullah et al., 2011; Khan, 2008). The ongoing effectiveness of these practices is due to Indigenous Peoples' long history of empirical observation and connection to the environment (Iloka, 2016), as evidenced in the following case study exemplars.

Shaw et al. (2008) brought together several case studies that explore Indigenous engineering and building techniques. The Karez well systems implemented as a form of drought management by the Uyghur people in the northwest of China, was identified as "an efficient drought reduction technology" (Fang et al., 2008, p. 4). Traditional mud hut building techniques in the Rajasthan region of India demonstrated "a high level of performance for generations" (Sharma & Joshi, 2008, p. 9) and that the intergenerational translation of building technologies and inclusion of all members of the family, created a sense of ownership and enduring skillsets (2008, p. 11). Likewise, using Indigenous and locally relevant knowledge is a cost-effective mechanism for participatory emergency management in Mongolia (Borkhuu, 2008) and Nepal (Rautela, 2005; Thapa et al., 2008;). The innovative potential of Indigenous practices is also highlighted. These include examples of culture-based fishing practices for flood management in the Assam region of northeastern India (Bordoloi & Muzaddadi, 2015), the creation of integrated tsunami warning systems in the Solomon Islands (McAdoo et al., 2009) and GIS flood risk mapping in Vietnam (Tran et al., 2009). Aboriginal traditional burning practices applied in bushfire and wildfire management in Australia, have been recognised as more effective than normative emergency management practices (UNDRR, 2022), despite being marginalised by government and the formal emergency management infrastructure (Archibald-Binge & Wyman, 2020; Bowman et al., 2004; Trauernicht et al., 2015). McGee et al. (2019) present a Canadian example in which it is argued that, in comparison with

non-Indigenous People, the "desire to stay home in Mishkeegogamang (the Mishkeegogamang Ojibway First Nation Band traditional territory in Ontario, Canada), desire to retain control, and desire to fight the fire may be stronger for Indigenous peoples" (2019, p. 272). McGee's (2019) research findings suggest that emergency management practices are strongly embedded in the cultural fabric of the community.

The preceding examples of Indigenous emergency management practices are respectively efficient, low cost, effective and innovative. Diverse research projects have indicated that Indigenous knowledges need to be synergised with scientific knowledge, which require high level government support. Yet, Indigenous communities usually have limited agency in research for setting appropriate parameters for the wider application of Indigenous disaster preparedness tools and practices (Mercer et al., 2009). In addition, advocacy for expanding Indigenous preparedness tools and practices so that they can be applied globally, frequently ignore the premise that their successful use in emergency management is linked to the locally-bound nature of the knowledge and practices (Lauer, 2012).

2.5.3 Underpinning value systems

Within the literature, cultural attributes and worldviews that value collectivism and guardianship are evidenced in Indigenous approaches to emergency management. They are also the foundation of Indigenous responses to disasters. For example, the kaupapa [principles] of kaitiakitanga" [cultural guardianship and responsibility] to the people and land of Canterbury (Carter & Kenney, 2018, p. 4-5) or "arohanui ki te tangata" [love to all people] (Carter & Kenney, 2018, p. 5) grounded the Māori response to the 2010-2011 earthquakes. This collectivism is operationalised in multiple ways. Kenney (2015) summarised for a 2015 UNISDR report the actions of a collective of Māori women who instituted a Kaumātua (elders)'s Day, a targeted well-being initiative in the aftermath of the Canterbury earthquakes in Aotearoa New Zealand. She stated "the women adopted a culturally accepted collectivised approach to leadership which sets aside hierarchical power relations, agendas and egos to focus on serving the needs of the community" (p.

68). In a discussion of climate change strategies in Fiji, Neef et al. (2008) highlight the importance of collectivism in the form of communal pooling of resources to secure new land and build resilient housing during flood periods, contributing, in turn, to enhanced community preparedness. Collective notions of responsibility and guardianship for Indigenous Peoples illustrate approaches to emergency management practices safeguarding communities and the environment.

Environmental guardianship, or stewardship, is another underpinning value that was identified as central in the literature. Māori observation of tohu (environmental signs) and weather are discussed in several texts as signals from atua (Māori deities), that careful stewardship is needed to appropriately look after the environment, exemplified in the following comment referring to a large oil spill off the eastern coast of Aotearoa New Zealand:

I was just thinking, I hope this doesn't, because we haven't looked after Tangaroa [manifestation of the sea]… that he takes it out on us. You've just got to do things so right, otherwise we're adding to the disrespect that's been done. So I was really careful about those things, I just didn't want more harm to happen. (Smith et al., 2016, p. 5)

Environmental guardianship encourages the intergenerational passing down and maintenance of responsible social and environmental relations (Veland et al. 2010). Environmental guardianship and the practices associated with it, are prioritised by Indigenous Peoples and inextricably tied to the cultural fabric of Indigenous communities (Watson, 2017b). The close relationship with the environment is also noted as key for food security in emergency management contexts. Guardianship of the land in this regard, is exemplified in a case study of an Indigenous platform in Honduras in which local women-led sustainable food cultivation and harvesting practices, are detailed (Plataforma Comunitaria Comité y Redes de Honduras & Huairou Commission, 2015). Incorporating Indigenous sustainable land use planning in urban design constitutes a prime example of effective stewardship as showcased in Khailani and Perera's, (2013) Malaysian case study.

More generally, values of collectivism and guardianship are threaded through Indigenous emergency management frameworks. Actions such as volunteering, collectivising resources, organising shelters, feeding communities and caring for the natural environment are regarded as natural, and explained by research participants as "it's just what we do" (Carter & Kenney, 2018, p. 4). It is the implicit and genealogical nature of these values that allow Indigenous communities to rapidly and effectively mobilise in response to disasters. These values also inform Indigenous emergency management frameworks for leadership and governance (Jayasinghe et al., 2020).

2.5.4 Indigenous governance and leadership in emergency management

A final theme that emerged during the literature review was Indigenous emergency management leadership and governance; (Carter & Kenney, 2018; UNISDR, 2015; Veland et al. 2010). The adoption of Indigenous leadership and governance by mainstream emergency management (Mercer et al. 2009; Morgan & Fa'aui, 2018; UNISDR, 2015; Vermaak & Van Niekerk, 2004) and, vice versa, the incorporation of mainstream approaches into Indigenous emergency management governance (Ford et al. 2016; Saini, 2008) were also addressed. Indigenous and mainstream emergency management leadership were often treated as distinct bodies of knowledge and practice. In some cases, this distinction resulted in tensions between Indigenous collective responsibility and identity and the eurocentric conceptualisation and privileging of a hierarchical leadership and governance structure (Carter & Kenney, 2018; Jayasinghe et al. 2020). Asfaw et al. (2019) draws attention to mainstream approaches that are "reactive and top-down" in terms of leadership, creating limitations for building local emergency management capacity (2019, p. 61). Veland et al. (2010) highlight the issue of "difference blindness" in mainstream emergency management leadership which "mistakes the universal need for emergency services with the assumption that this requires provision of uniform emergency services regardless of culture, place and local capacity" (p. 98). To support their argument, the authors provide an example of highly effective Northern Territory First Nations tribal governance systems that were activated in a cyclone event. Success

hinged on non-hierarchal organisation and leadership, good knowledge of the local community and cultural nuance and established trust with Aboriginal community members.

Also discussed in the literature were examples of pan-tribal Indigenous emergency management governance, including an exemplar following the 2010 earthquake in Canterbury—a region in the South Island of Aotearoa New Zealand. The Māori Recovery Network was established which was led by local Māori stakeholders, and included other Māori actors. The network focused on supporting and addressing the needs of Christchurch residents following the earthquake (Carter & Kenney, 2018; Jayasinghe et al. 2020; Kenney, 2015). Māori situated throughout Aotearoa New Zealand mobilised a range of resources including personnel, food, shelter, financial support, clothing and access to government services, through this network. Significantly, Māori health professionals and Māori wardens took leave from regular employment to travel to Christchurch—the largest city in the South Island of Aotearoa New Zealand, and assist in the response (Kenney & Phibbs, 2015).

Indigenous-centred models of emergency management leadership and governance have been adopted into mainstream policies and decision-making processes on occasion. Morgan & Fa'aui (2018) discuss the "Mauri Model Decision Making Framework" and accompanying recovery indicators that were included in the Rena Long-Term Environmental Recovery Plan by the Ministry for the Environment (2011). This marked the "first instance in Aotearoa New Zealand that an Indigenous concept was given as a goal of a government-led strategy" (Morgan & Fa'aui, 2018, p. 985). The UNISDR (2015) report discusses the grassroots platform organised by Indigenous women in Honduras to encourage more sustainable agricultural practices following Hurricane Mitch in 1998. The initiative would make such an impact that partnerships were then established with the Honduran Ministry of Agriculture and Husbandry, Ministry of Planning, National Emergency Authority and even with a regional Central American body, the Coordination Center for Disaster Prevention in Central America. The successful initiative is being expanded to other communities" (Plataforma Comunitaria Comité y Redes de Honduras

& Huairou Commission, 2015, p. 31). These two case studies represent effective Indigenous leadership and decision-making for emergency management processes that were successfully adopted by mainstream organisations and "a shift from a reactive to a more proactive and comprehensive approach including supporting local initiatives in building capacities on mitigation, preparedness and response" (UNDRR, 2019, p. 61).

Less successful examples have also been discussed in the literature and encompass the insertion of mainstream emergency management practices and policies into Indigenous emergency management leadership and governance frameworks (Ford et al. 2016; Saini, 2008). Watson (2017b) highlights the serious consequences of imposing emergency management interventions on Indigenous communities. Emergency management laws have been used for policing First Nation Australian communities (Watson, 2017b) and to the displace communities from their traditional lands (Hsu, et al 2019; Saini, 2018). The Nicobarese (an Indigenous tribe in Southern Nicobar, part of an island chain in the eastern Indian Ocean), were devastated by the 2004 Indian Ocean tsunami when they were moved off their tribal land and mainstreamed into a different community. This had a strong negative impact on the cultural and social fabric of the Nicobarese (Saini, 2018). According to Saini (2018) "the destruction of traditional livelihoods, lack of alternative livelihoods, and their limited role in the planning and execution of the post-tsunami interventions made the Nicobarese dependent on the Government of Indonesia. Sitting idle for years, they became sedentary, consumerist, and alcoholic" (p. 322). Hsu (2016) notes that Indigenous Peoples residing in the central highlands of Taiwan were similarly displaced from their lands in the aftermath of Typhoon Morakot. Communities were placed in new residential and cultural settings, which were so completely alien to the displaced collectives, that the social fabric of the displaced communities was severely undermined (Hsu et al, 2019).

The literature in the preceding sections has traversed a range of successful activities and challenges in the Indigenous emergency management space. Underpinning the above examples of Indigenous emergency management, is a wider meta-context. A research,

policy and practice arena that has been exclusionary and marginalising towards Indigenous voices.

2.6 Meta themes: colonisation as a context

An overarching meta-theme is the impact of colonisation and the minimal presence of Indigenous perspectives in emergency management research. There is a lack of acknowledgement and reciprocity of Indigenous voices, knowledges and practices. Indigenous knowledge is often dichotomised detrimentally against western science, viewed as un-scientific or simply an add-on. The following discussion includes a hybrid of literature analysed in the rapid review as well as supporting literature to critically reflect on the implications for Indigenous and mainstream emergency management.

2.6.1 Colonisation and marginalisation in emergency management research

Colonisation is an inherent part of the lives and experiences of Indigenous Peoples. A small number of the reviewed research articles mentioned colonisation as a factor that influenced emergency. However, this theme was entirely absent from discussions in government reports (Department of Prime Minister and Cabinet [DPMC], 2019) and other grey literature included in the review. Moreover, the review identified limited evidence of researchers applying decolonising research methodologies (L. Smith, 1999). Where colonisation was included, a range of themes were identified including exclusion (Morgan & Fa'aui, 2018; Pasternak & Dafnos, 2018); marginalisation (Phibbs, Kenney & Solomon, 2015; Veland, et al., 2013), representation (Veland et al., 2010) and Western scientific hegemony (Lauer, 2012).

Pasternak and Dafnos (2018) argue that the open-ended and ambiguous paradigm of emergency management itself is a colonial modality of governance that obscures assertions of Indigenous sovereign powers. The language used to position Indigenous Peoples within research can de-colonise or re-inforce cultural hegemonies (Smith, 1999).

Terms such as vulnerability, empowerment or adaptation are problematic when they are used in an uncritical manner (Howitt et al. 2012). As Pettenger (2007) reflects, vulnerability can be used alongside resilience to justify "standardised action upon climate change that may fail to recognise nuanced values, needs and desires within and between communities" (2007, p. 6). While colonisation was not discussed as a root cause of inequity, many authors provided an implicit discussion of the effects of colonisation. Indigenous communities who live on hazard-prone land for example, do so due to past community displacement (Neef et al., 2018; Rumbach & Foley, 2014) or lack of access to education, information and resources (Alcántara-Ayala, 2004). There is a material reality to disaster vulnerability that is underscored by historical, socio-political forces and power dynamics (Ellemor, 2005; Lambert, 2014; Phibbs et al., 2018). Public narratives of Indigenous communities as having a culture of handouts rather than aspiring to assist themselves has contributed to United Nations agencies often situating Indigenous communities as disempowered victims within the global aid system (Mercer et al., 2009; Saini, 2018).

Research conducted by non-Indigenous research teams on disaster-affected Indigenous communities has the potential to further reinforce colonising practices (Kelman et al., 2012). This is particularly salient when research is being conducted through mainstream emergency management practices and paradigms (Kelman et al, 2012), that apply command and control top-down approaches. The global nature of emergency management policy means that national and local strategies are usually derived from overarching international policy frameworks. Thus, opportunities for including the voices and practices of Indigenous communities in these mainstream documents are limited. This is exemplified in a vague call within the Sendai Framework for Disaster Risk Reduction (UNISDR, 2015) to "empower local authorities….to work and coordinate with civil society, communities and Indigenous peoples and migrants in disaster risk management…" (cl:27(h) p. 18). Little to no information on how authorities can effectively implement this model is provided. Progress is hindered by a lack of attention to Indigenous concerns and exclusion from international and national emergency

management structures (Secretariat of the Permanent Forum on Indigenous Issues, 2017). As a result, few Indigenous stakeholders have the requisite influence to shape the development of emergency management policy.

2.6.2 Acknowledgements: reciprocity of Indigenous voices

Throughout the literature, Indigenous practitioners, knowledge holders, local governance leaders or policymakers are primarily spoken for by non-Indigenous researchers and policy writers. Although some researchers (Mercer et al., 2009; Zander et al. 2013) have acknowledged the support of Indigenous community members as workshop facilitators and navigators of language and cultural barriers, these Indigenous contributors to research were rarely credited by name. There is equally scant evidence of Indigenous stakeholders as authors in emergency management publications. An additional concern, as Veland & Dominey-Howes (2010) argue, is that authors and spokespeople can be selected opportunistically by researchers as follows:

Generally seeking out members of the community as if they are interchangeable, representative or reducible to a singular identity of 'community' would misrepresent the Indigenous community structure. (Veland et al., 2010, p. 200)

Lauer (2012) and Kelman et al. (2012) advocate for a democratisation of emergency management. This approach would theoretically enable emergency management policy designers and practitioners to access, combine and apply "the best wisdom that communities can provide" (Kelman et al., 2012, p. 12). Yet, this aspiration still faces challenges. As Giddens (1984) concept of best wisdom when applied to emergency management would suggest, knowledge is determined by whichever stakeholders have been accorded agency. Their level of authority to make decisions is conferred and/or constrained by government, local authorities and legislative structures (Foucault, 1979, 1991). Advancing Indigenous agency in the field of emergency management is further undermined by the under-representation of Indigenous communities within the sector.

Watson (2017a) points to global disaster policymakers, such as the UNISDR, who developed the Sendai Framework for Disaster Risk Reduction (UNISDR, 2015), suggesting that "the notion of 'being Indigenous' becomes a segregated cultural site that the state (with international support) aims to 'preserve and use'" (p. 498). These approaches whereby Indigenous emergency management is 'othered' while contemporaneously being lauded for its inherent 'wisdom', could be seen as reinstating colonial narratives of the 'local-guide' (Watson. 2017a, p. 498).

2.6.3 Dichotomisation of "sciences"

International policy documents have acknowledged the necessity for governments at local and national levels to "ensure the use of traditional, Indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment" (UNISDR, 2015, p, 15). The call for including Indigenous knowledge as "complementary to "scientific" knowledge however, positions Indigenous knowledge as a dichotomy to science, as something to be "added on". In contrast, the Eurocentric term 'scientific framework' is constructed and accepted as normative. It regulates which forms of knowledge and processes may be classified as 'science' or 'scientific'. Strategies of inclusion can further reinforce dominant norms and populations continue to determine "what can be said and how" (Ahenakew, 2016: 324).

Despite advocacy for inclusivity in international policies and the explicit endorsement of Indigenous knowledge as a valuable resource, some emergency management practitioners remain doubtful of its relevance and effectiveness. Indigenous knowledge has been referred to as "closed, parochial, unintellectual, primitive and emotional" (Dube & Munsaka, 2018: 2). Lauer (2012) also discusses the asymmetrical relationship of Indigenous knowledge and Western scientific knowledge in emergency management, stating that:

Indigenous knowledge is thought to be locally relevant, orally transmitted between generations, and encoded into cosmologies and worldview. In contrast, scientific

knowledge is understood as open, transportable, global in reach, and codified into concrete, abstract theories or models (2012, p. 183).

Bourdieu and Wacquant (1992) argue that misrecognition of regimes of truth result in failure to interrogate social divisions and relations of power. Thus, Western scientific hegemony perpetuates a misreading of Indigenous science as simply local knowledge, ignoring its unique attributes such as a sustained long history with an environment pre-dating colonisation (see Hadlos, 2022). The dichotomisation of 'sciences' has expanded into the research arena, with Indigenous cosmogenic knowledge of the world positioned as illogical compared to "rational" scientific knowledge. The positioning of Indigenous knowledges in the margins of the emergency management field, extends to oral story-telling traditions. One case study on Indigenous "legends" in the Pacific ring of fire, indicated emergency managers recognised the value of intergenerational stories about past disasters because story content had been shown to "save hundreds of lives", while contemporaneously dismissing the knowledge provided as a "bedtime story" (Meyers & Watson, 2008, p. 21).

Within the literature, a range of themes demonstrating challenges and successes within Indigenous emergency management has been explored. Examples of Indigenous emergency management knowledge and practice have been underscored by issues of exclusion, marginalisation, representation and Western scientific hegemony. Misappropriation and misrepresentation of Indigenous knowledge in emergency management research marginalises Indigenous Peoples. There are however, opportunities to de-colonise emergency management and allow for greater representation and autonomy for Indigenous Peoples. The following section synthesises the learnings from this review into a series of recommendations for emergency management.

2.7 Recommendations

Indigenous engagement in emergency management requires an all of government approach that addresses research, funding and Indigenous stakeholder engagement at

local, regional and national emergency management levels. This may require legislated government recognition of Indigenous rights in the field of emergency management as well as the establishment of collaborative governance frameworks for emergency management planning and implementation. Further work is needed in both the emergency management policy and practice spheres in to ensure Indigenous Peoples have a voice in key governance and decision-making fora. Mediums for facilitating this process, could encompass embedding Indigenous stakeholders' recommendations in key policy documents and engaging Indigenous actors in co-authoring emergency management strategies and related initiatives. Indigenous views and cultural values should be embedded in local, regional and national emergency management policies and strategies. Indigenous representatives within emergency management structures need to have a mandate from the local Indigenous community as well as the authority to operationalize Indigenous emergency response networks (Phibbs et al., 2015).

While governments may have formal agreements with Indigenous Peoples at a national level, this is not always the case at regional and local levels where there may be significant disparity for quality of relationships. Emergency management agencies should support staff development to effectively work with Indigenous communities. Often, strong relationships rely on individuals who have built these over time. If these individuals leave the organisation, relationships will likely be eroded.

There is a need to improve relationships, communication and understanding between mainstream and Indigenous emergency management structures and processes. Emergency management should respect Indigenous emergency management autonomy and facilitate Indigenous understanding of mainstream emergency response processes. This could be by providing emergency response training for Indigenous Peoples, allowing for greater access to appropriate emergency management resources. In Canada, the Emergency Management Assistance Program (EMAP), in partnership with the Assembly of First Nations, has reimbursed more than $1.35 billion CAD between 2012-2023 to First Nations for response and recovery costs. In addition to financial support, EMAP has also begun transferring services directly to First Nations through emergency management

capacity positions and the development of multilateral emergency management service agreements. The arrangement is still very "top-down" however, and we recommend that thought be given on how funding models could be re-conceptualised to provide autonomy and empowerment to Indigenous communities for the appropriation and use of resources.

In the area of research, measures need to be developed to facilitate respectful knowledge exchange and to mitigate the misuse of Indigenous knowledge. It is heartening that the number of Indigenous journals as well as Indigenous-authored books is increasing, providing safer spaces for Indigenous authors to engage in peer-review and publish work. Journals publishing emergency management research should develop strong relationships with Indigenous authors and reviewers to evaluate relevant contributions. Particularly for social science work, authors should consider promoting positionality statements to allow readers greater transparency for who is conducting Indigenous research.

Globally, research collectives are emerging in the Indigenous disaster resilience, DDR and emergency management spaces to provide more connections and shared learnings between Indigenous Peoples working in the sector. Some of these include the Indigenous Knowledge and Disaster Risk Reduction Network in the Americas, the National Indigenous Disaster Resilience programme in Australia and Te Toi Whakaruruhau o Aotearoa (The Natural Hazard Commission Matāuranga Māori Disaster Risk Reduction Centre) in Aotearoa New Zealand. We recommend pursuing more inter-group international collaboration to achieve stronger visibility, advocacy and potentially opportunity in the sector for Indigenous Peoples.

Funding for research often includes Indigenous Peoples as a "tickbox" measure, with only limited funding in larger projects. Research funders should take a careful look at finding applications to determine whether the inclusion of Indigenous Peoples and issues are tokenistic or genuine. In addition to better funding support for Indigenous researchers, more funding needs to be set aside for effective and genuine engagement with Indigenous communities. Publications by Phibbs et al. (2015) and McGee et al. (2019) appropriately

attribute authorship to Indigenous emergency management stakeholders, however, clearer attribution and citation of Indigenous authors' work in mainstream policy is needed. Aotearoa New Zealand's National Disaster Resilience Strategy (DPMC, 2019) constitutes an example of how Indigenous concepts and intellectual contributions can be referenced directly in policy (p. 21). The equitable inclusion of Indigenous stakeholders in developing research is essential. Respectful engagement of Indigenous research partners as cultural overseers can foster the co-creation of research that is culturally responsive and conducted in ethically appropriate ways. McGee et al. (2019) provide a relevant exemplar, a transparent process of cultural authorisation from Indigenous knowledge holders that prevents policy misunderstandings and issues in practice as well as active reciprocity for the Indigenous community participating in the research:

> "initial findings were sent to the Chief for her review, and she provided positive feedback. The Chief has also reviewed and approved all outputs from this research including conference presentations and manuscripts. Once the research was completed, a community booklet which presents the wildfire evacuation story of Mishkeegogamang Ojibway Nation was prepared and copies were given to the First Nation for distribution to community members." (McGee et al., 2019, p. 269)

Finally, the lack of reference to colonisation in the literature and policy reviewed is concerning. More work needs to be done in emergency management to self-reflect on how existing structures and practices are complicit in entrenching colonial practices that disempower Indigenous Peoples. This work needs to be achieved at both local and international levels if Indigenous emergency management is to flourish.

2.8 Conclusion

This rapid review explored a number of case studies regarding Indigenous emergency management from across the world. The findings of this review demonstrate a breadth of effective Indigenous mechanisms for predicting, mitigating and responding to natural hazards through observation, intergenerational knowledge and collective action. While

Indigenous emergency management practices are often efficient, low cost, effective and innovative, Indigenous communities have limited agency in setting research agendas and in developing appropriate parameters for the wider application of Indigenous disaster preparedness tools and practices. The under-representation of Indigenous communities in emergency management research has important implications for emergency service provision.

We have provided insights into a selection of literature and case studies, and through an emic, tūrangawaewae approach, have advanced a wider critique of emergency management, calling for greater equity and inclusion in the sector. More work needs to be done in both research and policy sectors globally to further de-colonise the emergency management sector, listen more effectively to the voices of Indigenous Peoples and respond to their challenges and to provide more autonomy to Indigenous communities to manage their own risks, as many have been doing for centuries.

2.9 Authors' Note

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2.13 Glossary

Māori language

Arohanui ki te tangata	love to all people
atua	Māori deities
iwi	tribal

kaitiakitanga	guardianship and responsibility to the people and land
kaumātua	elder
kaupapa	principles
Māori	Indigenous Peoples of Aotearoa New Zealand
Tangaroa	manifestation of the sea
tangihanga	funerals
Te Toi Whakaruruhau o Aotearoa	The Natural Hazard Commission Matāuranga Māori Disaster Risk Reduction Centre
tohu	sign or premonition; environmental signs
tūrangawaewae	a place where we can stand and speak from
wāhine	female

Indigenous peoples

Cham	Indigenous people of central Vietnam and Coastal Cambodia
Kāti/Ngāti Māmoe	Māori tribe of the South Island of Aotearoa New Zealand
Kāi/Ngāi Tahu	Māori tribe of the South Island of Aotearoa New Zealand
Marwaree	Indigenous People of the northwest Indian State of Rajasthan
Mishkeegogamang	an Ojibway First Nation Band in Ontario, Canada

Ngāti Mutunga	Māori tribe of the Western North Island and Wharekauri/Rekohu/Chatham Islands of Aotearoa New Zealand
Ngāti Toarangatira	Māori tribe of the lower North Island of Aotearoa New Zealand
Nicobarese	Indigenous people of the southern Nicobar Island archipelago in the east Indian Ocean
Te Ātiawa	Māori tribe of the western and lower North Island and the upper South Island of Aotearoa New Zealand
Uyghurs	Indigenous people of Northwest China
Waitaha	Māori tribe of the South Island of Aotearoa New Zealand
Warruwi	Indigenous people of the southern coast of Tasmania, Australia

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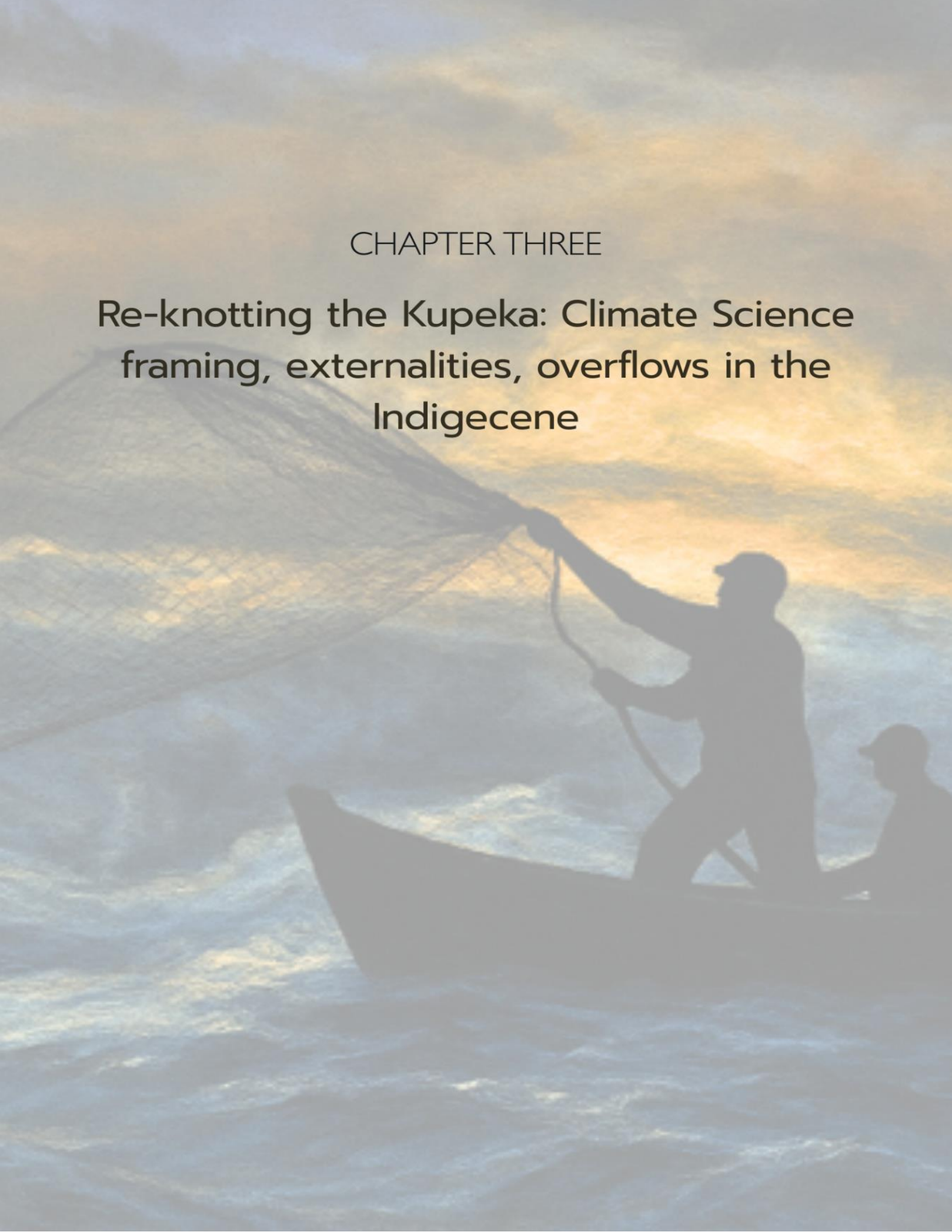
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CHAPTER THREE

Re-knotting the Kupeka: Climate Science framing, externalities, overflows in the Indigecene



Having outlined global patterns of Indigenous knowledge engagement in emergency contexts in Chapter Two, attention shifts from practical responses to the epistemic terrain of climate science in Chapter Three. The theoretical analysis focuses on the structural and conceptual boundaries that shape how Indigenous knowledge is framed within dominant climate research.

Using the kupeka (fishing net) metaphor and Callon's concepts of framing, externalities, and overflows, this article (submitted to *Kōtuitui: New Zealand Journal of Social Sciences Online* on 26th January 2026), explores how dominant scientific framings bracket Indigenous epistemologies, privileging metrics and models while sidelining relational, spiritual, and genealogical dimensions. In doing so, it critiques the selective incorporation of Indigenous concepts into technocratic adaptation strategies and social theory, exposing risks of epistemic extractivism. This transition marks a move from documenting exclusion in practice to analysing the structural and discursive boundaries that govern what counts as legitimate knowledge in climate science, setting the stage for reweaving these epistemic nets toward symmetrical and Indigenous-led methodologies.

Reference: Kaiser, L.H., Kenney, C.M, Phibbs, S.R. (2026). Re-knotting the Kupeka: Climate science framing, externalities, overflows in the Indigecene. *Kōtuitui New Zealand Journal of Social Sciences Online. (in review)*

The image depicted on the previous page is an edited excerpt of an untitled painting by Ōraka Aparima artist Emma Spall© and the author. It depicts fishermen casting out a kupeka (fishing net) into a turbulent sea.

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Student name:	Lucy Kaiser
Name and title of main supervisor:	Christine Kenney

In which chapter is the manuscript/published work?	Chapter Three

Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:[1]

Lucy Kaiser is the primary author of the journal article and is responsible for leading the design and implementation of the research, the analysis and writing the manuscript. Kenney and Phibbs have contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript

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Re-knotting the Kupeka: Climate science framing, externalities, overflows in the Indigecene

Authors

Lucy H. Kaiser, Suzanne R. Phibbs & Christine M. Kenney

Abstract

Dominant climate science paradigms often marginalise Indigenous knowledge systems, framing them as supplementary rather than sovereign. This article introduces the concept of the *Indigecene* as an analytic framework for examining how Indigenous knowledges are positioned within technocratic discourses. Drawing on Callon's concepts of framing, externalities, and overflows, and using the metaphor of a fishing net, the paper critiques the selective incorporation of Indigenous epistemologies in climate research and adaptation planning. Through engagement with Māori and global Indigenous scholarship, the analysis highlights tensions pertaining to uncertainties, temporalities, and governance, while also disclosing the risks of epistemic extractivism. The article proposes symmetrical science and the weaving of a new fishing net in the form of a kupeka- a Māori form of fishing net. Indigenous-led framings, theories and methodologies are pathways for reweaving epistemic relationships to advance climate futures grounded in Indigenous sovereignty and relational ethics.

***Keywords*:** Indigenous knowledges, climate adaptation, epistemic justice, Kaupapa Māori, framing theory, Indigecene.

3.1 Introduction

Climate change and disaster research has been dominated by technocratic paradigms that privilege quantitative metrics such as emissions inventories, probabilistic forecasting, and risk-based modelling. These framings foreground measurement and control while marginalising forms of knowledge that do not easily translate into technical indicators. Within these paradigms, Indigenous knowledges are frequently positioned as supplementary rather than sovereign, with their relational, spiritual, and place-based dimensions bracketed out of scientific legitimacy.

Recent efforts to include Indigenous perspectives mark an important shift, yet this inclusion is rarely neutral. It frequently extracts components deemed useful to mainstream climate science, for example, ecological observations or land-based practices. Simultaneously, sidelining genealogical, cosmogonic, and ethical relationships that inform knowledges and meaning within Indigenous worlds.

This article introduces the concept of the Indigecene as an analytic framework for examining how Indigenous knowledges are framed within dominant scientific discourses. The term 'the Indigecene' also refers to the Indigenous turn[5] in climate science whereby Indigenous knowledges are extracted, translated into decontextualised data points, commodified, and incorporated into Western research contemporaneously with the emergence of sovereign climate change scholarship by and for Indigenous Peoples.

Drawing on Callon's (1998) concepts of framing, externalities, and overflows, the analysis explores how climate science defines the boundaries of legitimate knowledge and how Indigenous epistemologies exceed these boundaries. The

[5] In social theory, a "turn" denotes a sustained epistemic reorientation that reshapes analytical priorities, methods, and objects of inquiry, without necessarily displacing existing hierarchies of knowledge or authority (Bachmann-Medick, 2016; Reckwitz, 2002).

metaphor of a fishing net illustrates this dynamic: Western science captures what it values (data, metrics, models) while knowledge grounded in ceremony, cosmogony, and intergenerational ethics slips through the mesh.

This article contributes to scholarship on epistemic justice and climate science in three ways. First, the analysis develops the Indigecene as a conceptual lens for examining how epistemic boundaries are constructed and maintained within climate research. Second, the discussion interrogates the selective appropriation of Indigenous concepts in social theory and adaptation planning, including Nature-Based Solutions and relational ecosystems thinking. Third, the article advances symmetrical science and Indigenous-led methodologies as approaches for transforming epistemic relationships between mainstream and Indigenous science. Together, these contributions call for a shift toward reciprocal, Indigenous-governed climate futures.

3.2 Conceptualising the Indigecene

Climate and disaster research is undergoing a significant epistemic shift, described within this work as an Indigenous turn, with Indigenous knowledge increasingly being recognised as critical for reframing dominant paradigms (Chaulk et al., 2025; Kaiser et al. 2025a). Yet this engagement is rarely disinterested, it occurs within discursive arrangements that privilege technocratic norms and marginalise relational, spiritual, and place-based dimensions central to Indigenous worldviews.

Avoiding a science/Indigenous binary is essential, as is recognising the diversity of both western climate science and Indigenous knowledges and their co-constitutive relationships. Binary opposition theory (Doja, 2008) recognises that categories of "legitimate" knowledge presuppose their silenced counterparts, forms of knowledge deemed illegitimate, subjective, or local. The dominance of the Global North in knowledge production (Collyer, 2018), together with the privileging of positivistic Western epistemic traditions over Indigenous ways of knowing (Stein et al. 2024).

This underpins an asymmetrical science. Recognising the mutual dependency between the knowledge systems is crucial for the co-construction of climate science.

Foucault's (1977) concept of regimes of truth identifies that categories of knowledge are not naturally oppositional but effects of institutionalised power. Framing operates as a technology of governance, normalising certain epistemologies while rendering others marginal or invisible. Various binaries - such as universal/particular and empirical/experiential - function as discursive boundaries that govern epistemic legitimacy, and reinforce hierarchies rooted in colonial power structures (Kibalenko-Clarysse, 2023; Parke & Hikuroa, 2024). This perspective foregrounds power and contingency, emphasising that what counts as knowledge is historically situated and negotiated (Floriani, 1993). Recognising this dynamic situates the Indigecene as an analytic for understanding how epistemic boundaries are woven and how they might be rewoven toward a more symmetrical science for climate change – one that understands the empirical nature of Indigenous experiential knowledge as well as the particularity of climate change impacts and solutions. Such reframing invites a shift from extractive engagement to relational co-production, where Indigenous epistemologies are not merely included but govern the terms of collaboration.

3.2.1 Framing, externalities and overflows

Dominant quantitative climate science framings prioritise what is deemed technically useful and exclude knowledge that does not fit technocratic norms. Within these frames, value accrues to measurable outputs (climate data, risk metrics, predictive models), while dimensions that resist quantification are bracketed out. When Indigenous knowledge is framed in this way, it is often stripped of relational ethics, spiritual obligations, and genealogical foundations (Coleman & Rosenow, 2025). Callon's 1998 concept of framing explains this

dynamic: framing "puts the outside world in brackets," (p. 249), defining what counts as legitimate knowledge while sidelining what does not conform. The othering of Indigenous approaches to climate change created by these brackets, highlights the structural constraints of positivist models.

Callon's externalities brings into focus the unaccounted consequences of such framing- erasure of cultural specificity, marginalisation of Indigenous governance, and commodification of land and relationships (Callon, 1998; Cajete, 2020). Indigenous environmental governance, grounded in reciprocity, whakapapa (genealogy), and intergenerational responsibility (Harmsworth et al., 2013; Roberts, 2013), does not align neatly with technocratic models, exposing the limitations of mainstream climate science.

Overflows, in Callon's terms, refer to elements that exceed the frame and cannot be contained by its designers (Callon, 1998, p. 248). Many Indigenous-led adaptation practices already enact what is elsewhere described as transformational change (Biesbroek et al. 2026) yet remain largely unrecognised because they exceed the epistemic frames through which adaptation is commonly defined and assessed. These Indigenous practices often emerge as overflows, challenging epistemic boundaries and demonstrating the inadequacy of dominant paradigms to engage with Indigenous ethics and futurities.

In the Indigecene, framing can be likened to a fishing net, knotted through Western epistemic traditions and institutions. This net is designed to catch only certain genera, those deemed measurable and manageable within quantitative technocratic paradigms.

Captured within the mesh are climate data, risk metrics, and mitigation models. Framing is the act of knotting the fishing net- deciding mesh size, cord strength, and boundaries of the catch. It determines what is considered legitimate knowledge and what is left out. Indigenous knowledges that do not conform, (such as regional impacts of colonisation, whakapapa, atua relationships, or ceremony) are often too

relational and context-bound and therefore slip through the net. Epistemic patterns in the framing of quantitative climate science and Indigenous knowledge are represented in the following table (see Table 5).

TABLE 5: THE FISHING NET: FRAMING, EXTERNALITIES, AND OVERFLOWS

Framing: Caught (Bracketed In)	Bracketed Out: Slips through	Externalities: Unseen impacts
Risk metrics; cost–benefit analysis	Indigenous epistemologies; whakapapa (genealogies); rakatirataka (authority)	Erasure of Indigenous governance; privileging technocratic decision-making
Uncertainty as technical variance	Indigenous cosmogonies; tikaka (cultural practices); obligations to atua (deities)	Emotional burden on knowledge holders; loss of cultural specificity
Linear futurity (scenario modelling)	Indigenous concepts of time; whakapapa; spiral temporality	Commodification of time/futures; sidelining intergenerational ethics
Instrumental stewardship (Nature-based Solutions as service)	Indigenous knowledge; kaitiakitaka (stewardship); whenua (land) as ancestor	Market-driven conservation displacing customary practices
Standardised indicators; open-data norms	Indigenous Data Sovereignty	Extraction and misappropriation of taoka (treasured) data
Participation as consultation	Indigenous governance as authority; mana motuhake (self-determination)	Procedural inclusion masking structural exclusion
Relational ecosystems as systems models	Indigenous spirituality; cosmogonies; tapu (sacredness)	Flattening of ontologies; appropriation of relational concepts

What escapes the net are the overflows: currents, seaweed, fish that dart beyond the frame. These represent Indigenous practices, cosmogonies, and futures that cannot be contained by the net. They move, adapt, and resist, challenging the boundaries of Western science. The act of fishing also produces externalities: the net may entangle

taoka (treasured) species, damage coral beds, or disrupt tides. In climate science, these externalities manifest as erasure of Indigenous governance, commodification of whenua, and emotional burdens placed on knowledge holders, impacts unseen by those who cast the net but deeply felt by those whose waters are being fished.

This metaphor underscores the need to re-knot a new indigenous fishing net: to design epistemic frameworks that sustain relationships rather than extract knowledge, and to recognise Indigenous sovereignty as central to climate adaptation.

The concept of the fishing net underpins the Indigecene scientific turn as an analytical tool that helps identify how Indigenous knowledge is bracketed, instrumentalised, and made legible to dominant systems. By recognising the processes that position indigeneity and climate change within scientific discourses, attention can be turned to what is operating outside mainstream fora: Indigenous sovereignty, epistemic justice, and climate futures.

3.3 Indigenous Discourse and Climate Change Research

Global climate science has often positioned Indigenous Peoples as vulnerable populations affected by environmental degradation (Dorji et al. 2024). This framing has overlooked the depth of Indigenous knowledge systems, which offer distinct ontological and epistemological insights into both climate change (Ramos-Castillo et al., 2017; Reyes-García et al., 2024) and adaptive capacity (Adger et al, 2007; Kaiser & Kenney, 2025).

3.3.1 Indigenous Discourses of Climate Change and Uncertainty

Indigenous climate discourses are diverse, grounded in empirical observation and intergenerational storytelling. For many communities, climate change is not a discrete phenomenon but part of ongoing cycles of transformation. Indigenous worldviews accommodate ambiguity and complexity, recognising multiple truths

within a living cosmos (Little Bear, 2005). In contrast, Western models often seek certainty through linear and empirical approaches, which can obscure metaphysical dimensions foundational to Indigenous epistemologies (Ciofalo, 2019).

Inuit cosmogonies, for example, regard change and unpredictability as expected and accepted (Bates, 2007). Cameron et al. (2015) describe challenges in translating climate change into Inuktitut. The word *sila* encompasses life, climate, and existence and is sometimes understood as the spirit of the air Qitsualik, while *silaup asijjiqpallianinga,* a term used for climate change, conveys gradual transformation. (1998).

Similar patterns appear across Indigenous languages and cosmogenies. Māori lack direct translations for 'risk' or 'hazard' (Gabrielsen, 2015). Marshallese speakers use metaphors such as "new winds," to describe climate change (Rudiak-Gould (2012). Quechua farmers interpret environmental shifts through spiritual narratives involving Pachamama and the apus; Bassari communities attribute rainfall changes to disrupted rituals. Tsimane communities in Bolivia similarly understand environmental disruption as a response to human disrespect toward nature spirits (Reyes-García et al., 2024). These examples reflect ontologies grounded in place, ancestors, and spiritual entities, offering long-term perspectives anchored in responsibility and balance.

When Indigenous cosmogonies and their associated environmental indicators are incorporated into climate modelling without cultural or ethical context, these storied foundations risk being diminished. Misinterpretation can have material consequences for communities. For example, the catastrophic destruction of Xiaolin Village in Taiwan, where more than 400 residents were killed, partly stemmed from settlement planning that disregarded Indigenous knowledge of unstable landforms (Wu, 2025). In the Pacific, substituting traditional thatch roofing with stainless-steel sheets increased cyclone-related injuries, contrary to Indigenous construction practices designed to flex with high winds (Newell, 2018). Examining the

instrumentalisation of Indigenous knowledge in climate modelling reveals imbalances in how uncertainty is conceptualised. Quantitative approaches to climate science often frame uncertainty as a technical deficit, a variance to be minimised through improved modelling and probabilistic forecasting (Callon, 1998). This positions uncertainty as a problem to be solved, reinforcing linear futurity and control. In contrast, Indigenous epistemologies frequently conceptualise uncertainty as an ontological condition rather than an error state.

Within Māori and other Indigenous cosmogonies, uncertainty is accommodated through principles such as whakapapa and kaitiakitaka, embedding decision-making in genealogical and spiritual relationships rather than predictive metrics (Roberts, 2013; Whyte, 2017). Uncertainty as a site of ethical intensification, calling forth practices of care, (consultation with elders, invocation of deities, and reaffirmation of cultural protocols), to sustain balance in times of change. Rather than closing uncertainty through control (Cameron et al., 2015), uncertainty is a generative, changeable current.

In Māori cosmology, creation unfolds through genealogical sequences - Te Kore (the realm of potential being), Te Pō (the realm of becoming), and Te Ao Mārama (the world of light) (Marsden, 1992). Te Kore, as a state of profound uncertainty, is the fertile ground from which existence emerges, a generative condition that enables transformation and continuity rather than a deficiency or flaw to be eliminated.

Additionally, Māori concepts such as tapu (sacred) and noa (profane) further illustrate this orientation: uncertainty is ritually navigated through states of restriction and release, rather than erased. Tapu marks moments of heightened significance and indeterminacy, demanding caution and collective responsibility, while noa restores equilibrium and everyday continuity (Mead, 2003). This cyclical interplay frames uncertainty as a condition to be respected and worked with rather than eliminated.

3.3.2 Ontological Divergence and Epistemic Sovereignty

Differences between Western and Indigenous conceptualisations of climate change reflect contrasting ontological premises and epistemic priorities (Nakashima et al., 2012). Western climate science relies on positivist traditions privileging measurement, prediction, and control. These concepts emerge from epistemologies that treat uncertainty as a technical challenge, risk as probability, and time as linear. Such framings can destabilise epistemic comfortability, a community's confidence in the adequacy and authority of its worldview (Battiste, 2011; de Sousa Santos, 2015).

When dominant discourses elevate metrics, models, and predictive control as the gold standard of "real" science, Indigenous empirical practices, (seasonal observation, the oral transmission of environmental histories, ancestral narratives, and environmental management), risk being reframed as anecdotal (Lancini, 2925) rather than rigorous, despite their centuries-long record of adaptive success.

Intergenerational knowledge transmission, fundamental to community resilience, becomes vulnerable when Indigenous epistemologies are delegitimised. Authority structures weaken; youth may disengage from ancestral practices perceived as unscientific (Simpson, 2014; Roberts, 2013). This dynamic can lead to epistemicide, the gradual erosion of confidence in knowledge systems that have sustained adaptation over generations

In the Indigecene, this erosion is intensified by the selective incorporation of Indigenous cosmogonies into Western modelling frameworks. When atua (deity) narratives or whakapapa-based indicators are abstracted into datasets, their relational and spiritual dimensions are stripped away. Over time, this contributes to cognitive imperialism, a pressure to validate knowledge through external, often colonial, standards (Battiste, 2011, p. xvii). Profound consequences include diminished authority of elders, weakened cultural protocols, and disrupted genealogical transmission. These practices have historically enabled Indigenous

resilience in the face of environmental variability. Philosophically, the erosion of authority in Indigenous knowledge systems raises questions about epistemic sovereignty. Can Indigenous communities remain confident in their own systems when dominant paradigms define validity through abstraction and universality?

Re-knotting a new indigenous fishing net requires restoring conditions under which Indigenous knowledge sets the terms of engagement. It also involves reframing uncertainty about climate, environmental change and future ecological conditions as something navigated through Indigenous relational ethics and cosmogenic responsibilities. When uncertainty is approached in this way, empirical observations remain embedded in place, genealogy, and cultural practice rather than being extracted into decontextualised models. This re-knotting provides the basis for examining how Indigenous temporalities and futurities offer alternative pathways for climate science – concepts explored in the following section.

3.3.3 Temporalities and Futurities: Tensions in Time

Indigenous understandings of time offer relational and cyclical perspectives that contrast sharply with the linear models underpinning climate policy and planning. Western approaches often treat the future as abstract and available for intervention, a framing that can lead to commodification and control (Adam & Groves, 2007; Urry, 2016). This orientation narrows what is considered relevant, excluding cultural and intergenerational dimensions central to Indigenous worldviews (Callon, 1998).

For many Indigenous communities, the future is not distant, but continuously present, and experienced as a spiral, where past, present, and future temporalities remain in dialogue (Stewart, 2023; Fritsch, 2024). Nabokov (2002) describes American Indian temporalities as a 'forest of time,' while Whyte (2017) explains that actions today are guided by ancestral reflection and obligations to future generations. These performances of futurity reflect non-linear concepts of time

across Indigenous worldviews and underscore the pre-eminence of intergenerationality in decision-making.

Suliman et al. (2019) note that Indigenous perspectives arise from histories and experiences distinct from those shaping mainstream climate discourse. For Indigenous scholars such as Winter (2019), Indigenous conceptions of time raise critical questions about intergenerational environmental justice, questions often externalised in mainstream climate policy, and treated as secondary or intangible, despite being central to Indigenous ethics.

Indigenous temporalities underpin adaptive strategies developed over centuries, including seasonal migration, land stewardship, and sustainable harvesting (Kenney et al., 2023). These strategies represent unacknowledged assets, or Callonian overflows from dominant economic and scientific framings. Despite their proven resilience and sustainability, they remain systematically excluded from cost-benefit analyses and risk assessments. Recognising these temporal frameworks challenges crisis-driven narratives and invites climate planning that honours intergenerational obligations rather than commodifying futures.

3.3.4 Disrupting Linear Crisis Narratives

Mainstream climate discourses often rely on crisis narratives that frame the future as a site of escalating risk (Borgen-Eide, 2024). These narratives can be paralysing, obscuring Indigenous agency and reinforcing deficit framings of Indigenous epistemologies and their capacity to shape climate futures Indigenous overflows disrupt this logic. Rather than framing climate change as an impending catastrophe, they speak of looking to the past to inform the future (Stevens, 2018). The Māori whakataukī (proverb) “kia whakatōmuri te haere whakamua” translates to "I walk backwards into the future with my eyes fixed on my past". It means that to move forward successfully, one must look back at the past to find lessons and guidance (Walker, 1996).

Indigenous climate narratives challenge the dominant framing of climate futures. Instead of supplementing existing models, they overflow them. By examining and drawing on ancestral knowledges and practices, Indigenous peoples conduct ongoing climate change adaptation, strategic relationship-building, and restoration of ecological relationships, cultural landscapes, and place-based practices. Further, Indigenous narratives reframe climate change disruptions within a genealogy of communal resilience and responsibility. Indigenous climate change adaptation approaches thus offer a temporal framework that is defined by continuity of knowledge and practices grounded in place, instead of crisis and dislocation.

3.3.5 Extracting Indigenous knowledge

Researchers working from etic (external) perspectives often engage with Indigenous knowledges without fully understanding cultural and ethical contexts. This can result in misapplication and distortion (Kaiser et al., 2025a; Kenney & Phibbs, 2021; Louis, 2007). Indigenous knowledge systems are embedded within spiritual, relational, and governance frameworks; they are not reducible to isolated data points or technical inputs (Nakashima et al., 2012).

Within the Indigecene, knowledge deemed relevant is frequently selected to serve non-Indigenous science agendas. For example, monitoring programmes that use sentinel observational data while sidelining Indigenous governance, or tokenistic involvement in green transition projects (Akame, 2025; Hernández et al., 2022; Kulkarni, 2024). This process reflects colonial extractivism, where Indigenous knowledge is valued for its utility rather than its integrity (Todd, 2016). Colonial framings reinforce power imbalances, undermine Indigenous epistemologies, and prevent Indigenous peoples from being recognised as experts of their own knowledges and practices.

International frameworks such as the Paris Agreement and UNDRIP acknowledge the importance of Indigenous knowledges. However, these recognitions often

remain procedural. Indigenous participation is typically limited to consultation, with minimal influence over policy design or scientific modelling (Nakashima et al., 2012; Kenney & Phibbs, 2021; Petzold et al., 2020). This dynamic restricts Indigenous authority and limits the transformative potential of Indigenous-led climate responses.

3.4 Stratified Voices

In global climate forums, Indigenous representation is shaped by institutional hierarchies. Individuals fluent in policy language, embedded in formal structures, or aligned with state interests are more likely to be formally recognised, and have their priorities promoted (Nakashima et al., 2012; Petzold, 2020; Whyte, 2018). In CANZUS[6] countries, this creates a stratification that privileges urban, English-speaking, and professionalised voices over grassroots, elder-led, and Indigenous communities' perspectives.

While the visibility of Indigenous knowledges in climate discourses has increased, this often leads to simplification. Diverse nations, languages, and governance systems are collapsed into a singular "Indigenous voice" (Smith, 2016; TallBear, 2013). This flattening enables institutions to claim inclusion while retaining control over which knowledge is acknowledged and under what conditions.

Indigenous climate justice requires creating spaces where Indigenous laws, governance, and epistemologies guide engagement between Indigenous communities and the institutions that shape climate research, policy, and adaptation practice. These spaces support the self-determination of Indigenous Peoples, and challenge extractive participation models (Whyte, 2018; Simpson, 2017). Within the Indigecene, the legibility of Indigenous knowledges to dominant systems such as state agencies, scientific institutions, international climate frameworks, and academic research protocols is shaped by structural power. These

[6] Canada, Australia, the United States of America

discursive tensions include the selective translation of Indigenous concepts into technocratic categories, the privileging of forms of knowledge that fit institutional norms, and the marginalisation of relational, spiritual, and place-based dimension. These dynamics are mirrored in the theoretical domain, where Indigenous concepts are increasingly invoked within Western social science. The next section of this article examines how relationality, cosmogony, and more-than-human ethics are appropriated in social theory, often without epistemological engagement with the research and political contexts from which they arise.

3.5 Theoretical Tensions and Appropriation in Social Science

The Indigenous turn in social science refers to a sustained epistemological shift toward western science's engagement with Indigenous ontologies, ethics, and governance into theory and method. Within the Indigecene, however, this engagement often occurs through selective appropriation: Western theory borrows Indigenous concepts while divorcing them from their epistemological and political contexts.

This pattern is evident in the work of influential theorists such as Bruno Latour (2005, 2017), and Donna Haraway (1991, 2016), whose writings gesture toward relational ontologies and more-than-human ethics yet frequently fail to acknowledge the Indigenous traditions from which these ideas resonate.

Latour's actor-network theory (ANT) and Gaia writings propose distributed agency across human and nonhuman actors (Latour, 2005; 2017). These ideas resemble Indigenous understandings of interconnectedness, yet remain abstract and detached from place-based ethics. Latour's networks trace associations but do not engage with obligations rooted in kinship, ceremony, and governance (Todd, 2016). His framing of Gaia echoes Indigenous cosmogonies that view Earth as ancestor, but lacks the spiritual and genealogical depth exemplified in Māori conceptions of Papatūānuku (earth mother) or Andean Pachamama (Whyte, 2017). Methodological

neutrality obscures power relations and fails to account for accountability embedded in whakapapa.

Haraway's multispecies ethics and concept of "making kin" draw on motifs found in Indigenous thought. Her use of string figures and relational metaphors references practices like na'atl'o' (a Diné string game), yet these are often presented without cultural grounding (De Line, 2018). Critics argue that Haraway's work, while innovative, risks reproducing colonial patterns by abstracting Indigenous ethics into speculative theory (Kompatsiaris, 2022; Wolfstone, 2019).

These examples illustrate how Western theory often borrows from Indigenous concepts while maintaining interpretive control. The Indigecene calls for deeper engagement with Indigenous thinkers, governance systems, and protocols, recognising Indigenous knowledges as being situated and sovereign, not as conceptual resources for universalised theory. Latour's (2010) call for symmetrical anthropology provides a starting point: treating Western and Indigenous epistemologies with equal analytical weight.

3.6 Methodological Implications – Towards a symmetrical science

Latour's (2010) call for symmetrical anthropology invites scholars to examine Western scientific practices with the same critical reflexivity applied to non-Western knowledge systems. In *On the Modern Cult of the Factish Gods* (2010), Latour critiques the "belief in naive belief" that treats others' fetishes (objects invested with mythical powers) as fabricated while assuming the autonomy of scientific facts (Latour, 2010). He introduces the concept of "factishes" to underscore that both facts and fetishes are fabricated, situated, and sustained through socio-material practices (Latour, 2010).

Adapting this principle, we propose symmetrical science: an approach that accords equal analytical and ethical weight to Western and Indigenous epistemologies. Symmetrical science entails methodological reciprocity (design beginning with mana motuhake, and Free, Prior and Informed Consent [FPIC]) and dual accountability (equivalent standards of traceability and validation for Western datasets and Indigenous indicators). It also requires attentiveness to moments when inscription systems (models, indices) appear autonomous; symmetrical science re-attaches these artefacts to the social and political relationships that confer authority (Latour, 2010). This orientation reframes integration away from extractive logics toward co-weaving: recognising factishes on both sides and establishing protocols where kaitiakitaka and instrumented monitoring are jointly governed.

The Indigecene in climate and disaster research may be identified in the adoption of Indigenous concepts within methodological frameworks that claim to be inclusive. However, these approaches can reproduce extractive logics when Indigenous knowledges are used without accountability. Academic analyses by Ratuva situate these extractive dynamics and contested narratives within broader Pacific governance and security debates (Ratuva, 2025). The role of Indigenous Peoples in the climate space is "often seen through the prisms of international instruments [providing a] protective and rather static view of Indigenousness" (Ratuva et al. 2024, p. 7).

Mainstream climate research frequently incorporates concepts such as whakapapa and kaitiakitaka as technical tools. For example, the He Tātai Whenua project translates iwi knowledge, including whakapapa, into GIS-based environmental databases. Forster (2022) raises multiple concerns about such translations over knowledge integrity when transferred into technocratic formats. Primarily, the simplification and conflation of diverse knowledges into data categories, but also the ways these representations are subsequently mobilised in planning and policy processes

Similarly, McAllister, Hikuroa, and Macinnis-Ng (2023) report that kaitiakitaka is often operationalised as an ecological indicator or resource management principle without embedding the broader Māori values of whakapapa, rakatirataka (authority), mauri (life essence), tapu, noa, and manaakitaka (hospitality) essential for its relational ethics. Such limited applications of kaitiakitaka reflect Callon's concept of bracketing, where knowledge is framed to fit institutional norms while excluding (Callon, 1998) in this instance Indigenous ethics and governance.

Chanza et al. (2024) likewise identify that Indigenous and local knowledges are frequently used to validate technical models but are rarely integrated through Indigenous-led processes. This instrumentalisation prioritises external agendas and constrains the transformative potential of symmetrical engagement, where Indigenous knowledge systems would otherwise inform decision-making on their own terms as parallel, authoritative epistemic frameworks.

3.6.1 Externalities in Climate Adaptation Planning

Methodological externalities are unintended harms. They occur when mainstream planning frameworks instil emotional, cultural, or spiritual burdens because they fail to align with Indigenous ways of knowing and decision-making. Ciocco et al. (2024) document how scenario planning with the Mountain Ute Tribe triggered emotional and spiritual burdens without offering culturally appropriate responses. Indigenous knowledges were included through interviews, yet the framing remained technical. Ceremonial restoration and youth engagement were proposed by knowledge holders but excluded from formal plans, demonstrating how extractive logics persist even under participatory labels.

Similar research dynamics have occurred in Bolivia and Mozambique. The Aymara concept of suma qamaña (living well) reflects ecological reciprocity and spiritual continuity. When researchers failed to engage with this worldview, policy interventions disrupted local resilience. In Mozambique, neglect of Amakhuwa

institutions led to development projects that ignored land tenure and cultural landscapes (Jacquinet et al., 2022).

The aforementioned examples illustrate how methodological design can produce unintended consequences when Indigenous knowledges are framed externally by state agencies, scientific institutions, and international climate frameworks. Equity requires long-term partnerships, Free, Prior and Informed Consent (FPIC), and co-designed research agendas that reflect Indigenous priorities. In Aotearoa, FPIC is founded in whakapapa, mana whenua (the right of a Māori tribe to manage a particular area of land), and tikaka (Smith et al., 2016). It involves consent that is freely given, informed, and based on adequate time and information (Gibson & Bradshaw, 2023). FPIC must also be provided by legitimate representatives, of the people affected, with any caveats or conditions stipulated by the people whose consent is given (2023), such as the option to decline participation or to edit publications.

Kaupapa Māori (Māori-centred and led) methodologies prioritise mana motuhake (self-determination) and uphold the authority of iwi (tribes) and hapū (sub-tribes) to define the terms of research. As Smith et al. (2016) note, "methodology is not neutral; it is a site of struggle over whose knowledge counts, how it is validated, and who benefits" (p. 160). FPIC supports ethical engagement, but Indigenous-led methodologies offer deeper pathways for relational and transformative research, moving beyond procedural inclusion toward epistemic justice.

3.6.2 Indigenous Data Sovereignty: Reclaiming Control in Climate Research

As climate research increasingly engages with Indigenous lands and knowledge systems, Indigenous Data Sovereignty (IDS) becomes central to ethical practice. IDS affirms the rights of Indigenous Peoples to own, control, access, and govern data related to their communities, territories, and knowledge traditions.

In climate contexts, this includes environmental monitoring, ecological indicators, and adaptation strategies. Yet, these data are often collected by external researchers and not returned to, or governed by, Indigenous communities. A case study from Nunatsiavut found that two-thirds of climate research projects failed to share results with the community, despite formal agreements (Ortenzi et al., 2025). As the authors note, "by withholding data and results from Indigenous communities, researchers and institutions obstruct Indigenous communities' rights to make data-driven, informed decisions" (p. 259).

Frameworks such as the CARE Principles (Collective Benefit, Authority to Control, Responsibility, Ethics) and OCAP® (Ownership, Control, Access, Possession) provide ethical foundations for IDS (Carroll et al., 2020; Schnarch, 2004). These principles challenge dominant norms of open data and scientific neutrality, asserting that data must be contextualised, culturally grounded, and governed by Indigenous authorities.

In Aotearoa, kaupapa Māori approaches to data sovereignty emphasise mana motuhake, whakapapa, and tikaka (cultural practices and protocols). Data are understood as relational taoka, carrying responsibilities of care and reciprocity (Kukutai & Taylor. 2016). Upholding IDS requires long-term partnerships, FPIC, and co-designed governance structures that reflect Indigenous priorities. It also calls for institutional change, recognising Indigenous communities as sovereign knowledge holders with the authority to define how their data are used and interpreted.

3.6.3 Toward Indigenous-Led Methodologies

Indigenous-led methodologies offer frameworks that centre Indigenous epistemologies, protocols, and governance. These approaches move beyond inclusion and instead embed knowledge within its cultural, spiritual, and political contexts (Kaiser et al., 2025a; Smith, 2016; Wilson, 2020). A growing body of Indigenous scholarship has developed place-based and culturally informed

methodologies for climate research that promote more symmetrical forms of science. These approaches prioritise community dialogue, relational ethics, and values grounded in Indigenous worldviews.

Two-Eyed Seeing, articulated by Mi'kmaq Elder Albert Marshall, offers an influential Indigenous-informed principle for research engagement across epistemic traditions. It encourages researchers to "see from one eye with the strengths of Indigenous ways of knowing and from the other eye with the strengths of Western ways of knowing," using both together for mutual benefit (p. 335; Bartlett et al., 2012). Rather than prescribing a specific research method, Two-Eyed Seeing provides an epistemic orientation grounded in Mi'kmaq worldview, emphasising attentiveness, balance, and respect between distinct knowledge systems. It is one of a wider range of Indigenous-informed methodological developments from across the world that seek to create space for Indigenous knowledge within research practice while remaining contextualised within particular Indigenous philosophies. As such, Two-Eyed Seeing establishes conditions for collaboration and plurality without determining how knowledge is braided, governed, or mobilised, leaving these questions to be addressed by more structurally defined or Indigenous-led methodological frameworks.

A foundational Indigenous methodological development in Aotearoa New Zealand is *He Awa Whiria* (the braided river), a framework originated by Professor Angus Macfarlane within Kaupapa Māori (Māori-centred) educational and social research (Macfarlane et al. 2015). Developed as both a metaphor and methodological guide, He Awa Whiria conceptualises knowledge production as the deliberate braiding of distinct epistemic streams, most notably mātauraka Māori and Western disciplinary knowledge. Since its inception, He Awa Whiria has been taken up across research, evaluation, policy, and practice, including in mixed-methods and state-led evaluation contexts, where it has been used to support bicultural research design and interpretation (Cram et al., 2018; Martel et al., 2021).

While Macfarlane's braided river framework was developed to support constructive engagement and knowledge blending across Māori and Western epistemic traditions, *Te Kahu Huruhuru o Kohikohi* (Kaiser et al. 2025b) shifts the methodological centre of gravity decisively toward Māori authority. Developed within Kaupapa Māori and grounded in Kāi Tahu contexts, the methodology positions whakapapa, tikaka, and intergenerational responsibility as the starting points for research design, decision-making, and accountability. Using the metaphor of an ancestral feathered cloak, Te Kahu Huruhuru o Kohikohi emphasises the careful gathering, placement, and care of diverse knowledges, ensuring that research agendas, methods, and interpretations are woven under Indigenous governance rather than braided into pre-existing technocratic frames. In doing so, it responds directly to the limitations of interface methodologies by relocating epistemic authority, research purpose, and benefit within Māori communities, offering a decolonising and climate-specific methodological pathway aligned with Indigenous sovereignty and long-term relational obligations.

These diverse Indigenous methodological approaches demonstrate some examples of pursuing symmetrical science models in which analytic and ethical weight is shared across epistemic systems. The methodologies discussed provide interpretivist alternatives to positivist paradigms, and support transformative, community-led climate futures. Researchers working within these frameworks are expected to reflect on their positionality and the power dynamics embedded in research processes. These patterns of representation do not remain confined to discourses but equally shape the design and delivery of climate interventions. The next section of this article examines how theoretical framings and methodological choices materialise in practice. The discussion explores Nature-Based Solutions and relational ecosystems thinking as sites where Indigenous concepts are operationalised, often with unintended consequences.

3.7 Deploying Theory into Practice in the Indigecene

The previous sections examined how Indigenous knowledges are framed within methodologies. In this section ways in which theoretical and ethical frameworks are applied in climate adaptation and mitigation, are explored. Two prominent approaches, Nature-Based Solutions (NbS) and relational ecosystems thinking (RES), illustrate how Indigenous concepts are often operationalised without cultural or governance contexts.

Land-based and biodiversity-focused climate mitigation strategies are widely promoted as sustainable and inclusive (Hirata et al. 2024; Nunez et al. 2020). These approaches frequently invoke Indigenous principles such as kinship, stewardship, and intergenerational responsibility. Yet, when translated into technocratic or market-driven models, these strategies often lose their ethical foundations, generating significant externalities, such as market-based constraints on customary land practices, or technocratic criteria that privilege scientific over Indigenous knowledge. Common impacts include land dispossession, weakening of customary governance, ecosystem degradation, and disruption of cultural landscapes (Kaiser et al., 2026a). These outcomes draw attention to how interventions framed as ecological progress can undermine Indigenous authority and relationships pertaining to place.

3.7.1 Nature-Based Solutions

Nature-Based Solutions (NbS) are promoted as climate strategies that “work with nature” to deliver co-benefits for biodiversity and human well-being (Reed et al., 2022, p. 515). While NbS approaches often draw on Indigenous stewardship practices, they are frequently implemented through market-based instruments such as carbon offsets, biodiversity credits, and afforestation schemes. This translation into technocratic frameworks strips Indigenous practices of their cultural and governance foundations, reducing relational ethics to transactional metrics.

NbS projects have generated significant externalities. In Kenya and India, afforestation and carbon offset programmes have restricted access to customary lands and disrupted subsistence practices. In Canada, conservation corridors improved carbon metrics but imposed governance structures that marginalised Indigenous decision-making (Vogel et al., 2022). Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiatives in Latin America have led to resource conflicts and reduced livelihood security, as global mitigation targets override local priorities.

These outcomes reflect a deeper issue: Indigenous ecological knowledges are often celebrated rhetorically but excluded from carbon credit decision-making. Concepts such as biocultural stewardship and intergenerational responsibility are reframed as technical interventions, severed from their cultural and spiritual contexts. A just approach to NbS requires Indigenous-led governance, embedded FPIC, and recognition of Indigenous law as a foundational principle guiding climate adaptation. Yet when Indigenous principles are reframed as technical interventions, their relational dimensions are lost, revealing the reductionist tendencies of mainstream NbS models.

3.7.2 Relational Ecosystems Thinking

Relational ecosystems thinking has gained traction as a corrective to such reductionism in climate science. It emphasises interdependence among species, systems, and processes, an orientation that appears aligned with Indigenous worldviews. Yet in practice, relationality is often abstracted into theoretical models without engaging Indigenous ethics or governance (Reed et al., 2022; Reed et al., 2024).

Projects adopting relational frameworks have produced unintended consequences. Ecosystem-based adaptation strategies such as wetland restoration and afforestation have displaced small-scale farmers and disrupted cultural heritage sites (Cusens et

al., 2024). Participatory adaptation initiatives have reinforced existing hierarchies where Indigenous voices are sidelined (Parsons et al., 2025). Agroecological interventions have introduced new dependencies on external inputs and markets, increasing water demand and creating resource conflicts (Gonda et al. 2023). Cross-sectoral programmes have also encountered governance disputes and transaction costs. Although conservation efforts and renewable energy developments have improved emissions profiles, access to customary lands has frequently been restricted (Osborne et al. 2024) These detrimental impacts demonstrate that relational language does not guarantee relational practice. Without Indigenous leadership and structural reform, relational frameworks risk reproducing colonial dynamics under the guise of ecological progress.

A genuinely relational approach must centre Indigenous governance, embed cultural protocols in climate mitigation practices, and support community-defined climate change priorities. This requires moving beyond rhetorical inclusion toward structural transformation where relational ethics are operationalised through Indigenous-led decision-making and accountability (Cusens et al. 2024; Reed et al., 2022).

3.8 Transformative Practice: Indigenous Leadership in Adaptation and Mitigation

Indigenous-led climate initiatives provide compelling evidence that adaptation and mitigation can be designed around relational ethics and Indigenous governance rather than technocratic metrics. Read together, these interventions foreground Indigenous authority, values, and sovereignty as co-constitutive of climate action.

As an exemplar, government-to-government agreements in British Columbia embed Coastal First Nations' stewardship into conservation finance. The approach safeguards around 85% of the 6.4-million-hectare Great Bear Rainforest and supports guardianship, monitoring, and community programmes through

Indigenous-led carbon projects (Coastal First Nations, n.d.; Province of British Columbia, 2024). Fiscal instruments are re-purposed to uphold Indigenous authority, reframing finance as a vehicle for sovereignty rather than as an external constraint.

Fire management in northern Australia similarly illustrates the co-weaving of Indigenous practice and instrumented monitoring. The revitalisation of cultural burning ("right-way fire") has reduced late-season wildfire extent and associated greenhouse-gas emissions, with Indigenous Australian Carbon Credit Unit (ACCU) projects comprising most registered savanna fire management areas since 2012 (Clean Energy Regulator, 2025; World Wildlife Fund–Australia, 2025). These programmes pair geospatial analytics and ranger networks with intergenerational fire knowledge, demonstrating that mitigation gains emerge when technical systems are accountable to Indigenous governance rather than absorbing Indigenous practices as mere token artefacts.

A similar pattern occurs in energy transitions. Climate mitigation succeeds when infrastructure and technologies are aligned with Indigenous governance rather than merely incorporating Indigenous knowledge as an add-on. The Wataynikaneyap transmission system (51% owned by 24 First Nations) connects remote communities to Ontario's electricity grid via roughly 1,700–1,800 km of lines and 22 substations, displacing costly diesel and enabling long-term energy resilience through Indigenous infrastructure ownership (Electricity Canada, 2024; FortisOntario, n.d.). Ownership and grid access operate here as both climate policy and as sovereignty practice, consolidating decision rights in the everyday technical regimes that shape energy futures.

Biocultural restoration at Te Waihora / Lake Ellesmere in Aotearoa New Zealand further evidences how co-governance translates relational ethics into measurable outcomes. Under a voluntary iwi–Crown partnership led by Kāi Tahu (the Māori tribe of the South Island of Aotearoa New Zealand), the Whakaora Te Waihora

programme has delivered a wide range of restoration initiatives. These include large-scale wetland construction (e.g., Whakaora Te Ahuriri), extensive native planting, real-time monitoring, and co-managed stream restoration. Together, these efforts advance mauri, water quality, and mahika kai (customary food-gathering practices) alongside conventional ecological indicators (Te Waihora Co-Governance Group, n.d.; Environment Canterbury, n.d.). In Alaska, the tribe-led relocation from Newtok to Mertarvik, initiated in response to permafrost thaw and erosion, demonstrates adaptation under Indigenous authority amid fragmented funding and coordination architectures. The tribe's relocation highlights both the necessity of Indigenous control over relocation design and the systemic barriers that persist in implementation (Alaska Public Media, 2025; U.S. Climate Resilience Toolkit, n.d.). The aforementioned exemplars clarify that when governance sits with Indigenous institutions and in co-governance arrangements, adaptation is framed around obligations to land and future generations as much as around exposure and risk. The externalities of technocratic planning (displacement, loss of tenure, epistemic extractivism) can be anticipated and mitigated. Scaling analyses reinforce these observations.

Canadian investments in Indigenous Guardians and Indigenous Protected and Conserved Areas (IPCAs) have supported Indigenous-led monitoring, conservation, and climate initiatives across hundreds of projects. Recent research shows that well-resourced Indigenous-led Nature-based Solutions (NbS) can match—or even surpass—conventional parks in carbon storage and biodiversity outcomes (Government of Canada, n.d.; Alejo, Reed, & Matthews, 2025).

Biocultural food systems provide complementary evidence. In Hawai‘i, the restoration of loko i‘a (traditional fishponds) has strengthened resilience and local food security. Modelling and field data indicate that fish populations within restored loko i‘a are more robust to warming than those in adjacent estuaries, largely due to freshwater inputs and stewardship practices embedded in Indigenous governance (University of Hawai‘i/Hawai‘i Institute of Marine Biology, 2025). These findings

challenge the presumption that efficiency resides in centralised, metric-first interventions (Harvard Project on Indigenous Governance and Development, n.d.). Instead, research demonstrates that Indigenous-led governance consistently outperforms external decision-making structures across natural resource management and conservation contexts.

Jurisprudential innovations underscore the governance dimension. The legal personhood of Te Urewera (a national park in Aotearoa New Zealand) embeds Tūhoe (a North Island iwi) stewardship responsibilities in land management through relational law, reframing environmental governance away from asset management toward obligations arising from whakapapa and more-than-human ethics (Kauffman, 2020). Although not a climate programme per se, its architecture provides a template for adaptive stewardship consistent with Indigenous temporalities, clarifying how legal recognition can institutionalise relational accountability in practice.

Taken together, these initiatives show that when Indigenous governance structures lead, climate interventions move beyond procedural inclusion toward transformative practice. Reciprocity, intergenerational responsibility, and data sovereignty come to the foreground. Recognition of Indigenous indicators alongside instrumented monitoring resists colonial framings while meeting ecological objectives. Evidence from British Columbia, northern Australia, and Aotearoa New Zealand demonstrates that these interventions operationalise reciprocity and intergenerational responsibility (Coastal First Nations, n.d.; Clean Energy Regulator, 2025; Te Waihora Co-Governance Group, n.d.). Scaled programmes in Canada and Hawai‘i also show comparable gains in biodiversity and resilience (Alejo et al., 2025; University of Hawai‘i/Hawai‘i Institute of Marine Biology, 2025).

The dynamics of representation explored in the previous sections identify how Indigenous knowledges are selectively included within climate discourses, often through institutional filters that privilege certain voices and epistemic forms. These

patterns of stratification reflect broader structural tendencies within climate science to extract, simplify, and instrumentalise Indigenous perspectives. As the Indigecene indicates, such engagement is rarely neutral. It is shaped by power, framings, and the boundaries of what dominant climate science systems are willing to recognise. The concluding section reflects on what it means to reweave the fishing net, to move beyond extraction and toward a climate research paradigm led by Indigenous communities.

3.9 Conclusion

Ka Pu te Ruha – Ka Hao te Rakatahi

When the old net is cast aside, the new net goes fishing.

This whakataukī signals an epistemological shift in climate and disaster research. This article has developed the Indigecene as an analytic for understanding the Indigenous turn in climate and disaster research. Drawing on Callon's concepts of framing, externalities, and overflows, the analysis has shown how dominant climate science engages Indigenous knowledge through technocratic frames that privilege measurability, prediction, and abstraction. These framings delimit epistemic legitimacy and produce externalities, including the marginalisation of Indigenous governance, the commodification of whenua, and the extraction of knowledge from its relational, spiritual, and genealogical contexts.

Dominant climate science operates like a standardised net. Framing determines the mesh through which knowledge is captured, rendering some forms of Indigenous knowledge legible while allowing others to slip through or be selectively abstracted. Indigenous practices that exceed these frames persist as overflows, indicating the limits of prevailing epistemic arrangements and the continued presence of Indigenous-led approaches that are poorly accommodated within mainstream climate science.

The kupeka is introduced here as a response to these conditions. A kupeka is a form of traditional Māori fishing net constructed from hand-twisted fibres and assembled through careful knotting. Its mesh size, length, structure, and timing vary according to place, species, season, and purpose. Kupeka are designed to be cast, set, and lifted in relation to tides and currents, requiring judgment about when to fish and when not to. The construction and use of the kupeka are inseparable from ecological

knowledge, ethical restraint, and responsibility for the waters being worked. Its mesh adapts to the currents it encounters, allowing for movement, variation, and responsiveness. A kupeka woven in this way reconfigures science and research as symmetrical and relational practices. Knowledge is cultivated through connection, inquiry is shaped by responsibility, and adaptation is guided by the values of Indigenous communities.

The practical implications are clear. Climate research requires co-design under Indigenous authority, governance structures that uphold Indigenous Data Sovereignty, and evaluation practices that recognise epistemic and social externalities. Together, these commitments articulate a form of climate science capable of moving beyond the extractive dynamics of the Indigecene. Re-knotting the kupeka provides a way to respond to the Indigenous turn. by reshaping climate science itself, rather than continuing to absorb Indigenous knowledges into existing technocratic frames.

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3.12 Ethical considerations

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application SOB 21/17. We have obtained written informed consent to participate and publish from all participants who took part in this research.

3.13 Declaration of conflicting interest:

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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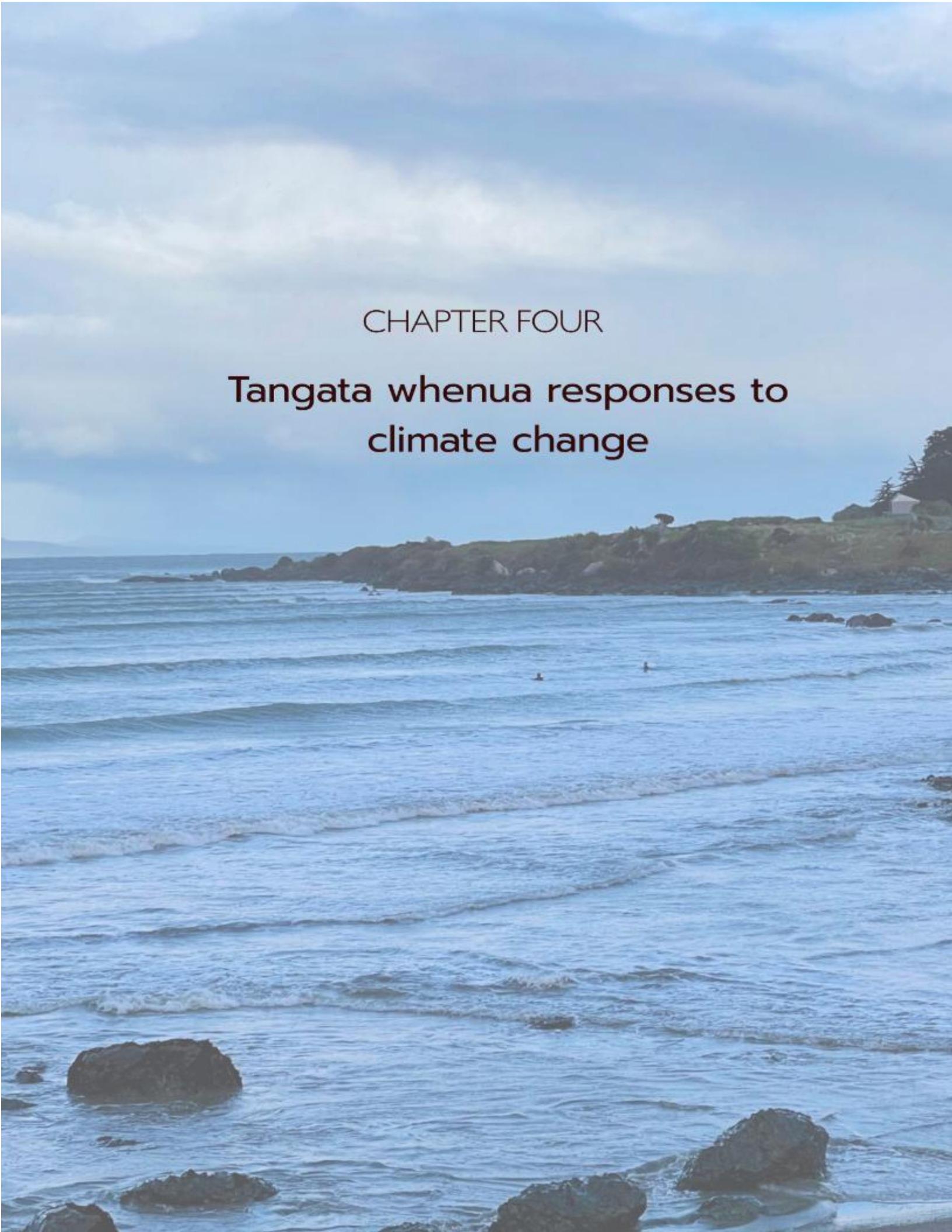
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CHAPTER FOUR

Tangata whenua responses to climate change

Chapter Three identified how dominant climate science delimits legitimacy through framing, externalities, and overflows, developed via the fishing net/ kupeka metaphor to show the selective capture of mātauraka within technocratic nets and the bracketing out of its relational, spiritual, and governance dimensions. It has also elaborated the *Indigecene* as an analytic, naming both the Indigenous "turn" and the risks of epistemic extractivism, and called for the advancement of symmetrical science and Indigenous-led methodologies to re-knot epistemic relations.

Chapter Four shifts focus to an Aotearoa New Zealand–specific context for climate change policy and practice. Published as a book Chapter in *Tūrangaranga: Rights, Responsibilities and Global Citizenship in Aotearoa New Zealand* (2022), it narrows the broader critiques developed in earlier Chapters to examine Takata/Tangata Whenua responses to climate change. The Chapter traverses literature on Indigenous Peoples' engagements with climate impacts and analyses the key legislation and policy frameworks that shape climate change responses in Aotearoa New Zealand.

Reference: Kaiser, L. H., & Kenney, C. M. (2022). Tangata whenua responses to climate change. In S. McLennan, M. Forster, R. Hazou, D. Littlewood, & C. Neill (Eds.), *Tū Rangaranga: Rights, responsibilities and global citizenship in Aotearoa New Zealand* (pp. 141– 159). Massey University Press.

The image on the preceding page (figure 10) is a photograph by the author, depicting surfers in Aparima (Riverton) on a cold winter's day.

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In which chapter is the manuscript/published work?	Chapter Four

Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:[1]

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Tangata Whenua Responses to Climate Change

Authors

Lucy H. Kaiser & Christine M. Kenney

4.1 Introduction

Māori have a long history of successfully preparing for, responding to and recovering from periods of adversity caused by natural hazard events. Yet, iwi, hapū and other Māori communities in Aotearoa have been identified as being most at risk from the impacts of climate change, because of their significant reliance on the environment as a cultural, social and economic resource (Ministry for the Environment, 2017). Moreover, tangata whenua who are already experiencing the impacts of climate change, particularly coastal communities (Manning et al., 2015), are vulnerable to ongoing environmental stressors (King et al., 2010).

Coastal inundation and sea level rise are impacting wāhi tapu (sacred places), urupā (burial grounds), marae and mahika kai (food-gathering sites). This has ramifications for important cultural, spiritual and social practices, as well as biodiversity and waiora (health and wellbeing) (Angeloni, 2021; Carter, 2018; Rowe, 2020). Events such as the 2020 flooding in Southland and the 2019 wildfires in the Nelson Tasman District indicate that the impacts of climate change are not limited to coastal areas (Environment Southland, 2021; Strand, 2019). Given that the scale and severity of such events are expected to increase (Lawrence et al., 2019) along with the diversity of impacts, it is timely to consider how tangata whenua are actively responding to climate change. Māori responses to climate change are grounded in te ao Māori (Māori world views). Their approaches harness mātauranga (Māori knowledge), kaupapa (values) and tikanga (practice) to support Māori rights and responsibilities in the context of climate change. Iwi and hapū are providing significant leadership in environmental management, disaster management and

nation-state level responses to the impacts of climate change. This chapter provides an overview of this political context.

4.2 Indigenous peoples and climate change

For many Indigenous peoples, climate change is exacerbating pre-existing challenges to culture and livelihoods. The impacts of colonisation, including loss of ngā ipukarea (ancestral homelands) and forced relocation (Roosvall & Tegelberg, 2013), are undermining the sovereignty of many Indigenous peoples. The erosion of Indigenous bodies of knowledge and natural resources has also exacerbated trauma associated with dispossession of land and culture (Pearce et al., 2015). Health and wellbeing outcomes are compromised for Indigenous communities, who experience high levels of job insecurity, poverty and environmental degradation (Reading & Wien, 2009). The impacts of climate change amplify existing stresses and threaten food security, access to housing and infrastructure and to opportunities for sustainable development. Indigenous people, therefore, are disproportionately affected by the impacts of climate change (Abate & Kronk, 2013; Green & Raygorodetsky, 2010). This raises issues of fairness and justice, given that the contribution of Indigenous communities to greenhouse gas (GHG) emissions is relatively low.

Yet, Indigenous peoples have been referred to as the 'advance guard' of climate change. They observe climate and environmental change first-hand and are using their traditional knowledge and survival skills — the heart of their cultural resilience — to trial adaptive responses to these changes as they occur (Galloway-McLean, 2017). Significantly, Indigenous and Māori scholars (including Awatere & Harmsworth 2014; Kenney & Phibbs, 2021; King et al., 2008; Langton et al., 2012; Saunders, 2017; Whyte, 2017; and Wildcat, 2013) are creating a body of research literature that presents Indigenous and Māori perspectives, aspirations and responses regarding climate change. However, uptake of Indigenous knowledges

into mainstream climate change management practices and science has been slow, partly due to the hegemony of Western scientific discourses, generalised scepticism and cultural appropriation (Gilchrist, 2010; Huntington, 2011; Leigh Thorpe, 2000; O'Gorman et al., 2016; Pierotti & Wildcat, 2000). The latter issue is exemplified in the frequent cases of Indigenous perspectives and/or approaches to addressing climate change being presented through the lens of non-Indigenous researchers (Veland et al., 2013). Within these outsider-led research contexts, Indigenous peoples are often relegated to data points or 'local guides' instead of the primary authors and experts (Watson, 2017), while Indigenous knowledge assets are captured and rebranded for 'etic' or non-Indigenous consumers.

Discourses in Indigenous communities globally have, therefore, focused on how to reclaim or protect culture, the environment, traditional knowledges and political agendas through mitigative and adaptive responses to climate change. Indigenous peoples are utilising a range of local, regional, national and global initiatives to effectively navigate the uncertainties and impacts of climate change to better reduce risks and maintain resilient collective memories and cultures. Indigenous sovereignty remains at the forefront of climate change discussions between Indigenous collectives. For example, the International Indigenous Peoples' Forum on Climate Change (IIPFCC) was established in 2008 as a caucus for collective representation and agreement between Indigenous peoples negotiating in the United Nations Framework Convention on Climate Change (UNFCCC). The forum asserts that 'indigenous peoples' knowledge and strategies to sustain their environment should be respected and taken into account when we develop national and international approaches to climate change mitigation and adaptation' (WCIP, 2014, cited in IIPFCC, n.d., para. 9).

The wider involvement of Indigenous peoples and communities in climate change adaptation planning and response implementation has been advocated (UNISDR, 2015). Yet, UN recommendations have been variably integrated into climate-related risk mitigation policies and practices such as the 2015 Paris

Agreement (Howitt et al., 2011; UN, 2015). There are ongoing tensions around recognition of Indigenous perspectives and stakeholders in government and local authority-led initiatives (Kenney & Phibbs, 2021). This is mirrored in Aotearoa, where differing policy, legislative and strategic approaches to mitigating climate change impacts have been implemented by the government, local authorities and Māori communities, highlighting issues pertaining to sovereignty, equity and collaboration.

4.3 Governing Climate Change in Aotearoa

In Aotearoa, climate change response and management are the responsibility of government and local authorities, in partnership with iwi, hapū and other Māori collectives. This partnership is a reflection of te Tiriti o Waitangi provisions (previously discussed in Te Take) recognising kaitiaki responsibilities of tangata whenua to care and look after the environment and natural resources (Joseph et al., 2018). Tangata whenua interests, therefore, are a fundamental attribute of Aotearoa's climate change framework, although it is unclear whether these provisions are sufficient for realising Māori goals and expectations.

Aotearoa's climate change framework includes several Acts of Parliament, policy statements, plans, reports and strategies. Several are explored here with a commentary on their capacity to realise Māori priorities and interests.

4.3.1 Resource Management Act 1991

The Resource Management Act (RMA) 1991 promotes the sustainable management of natural and physical resources. There are several provisions that support Māori rights and responsibilities regarding resource management, including provisions for the practice of kaitiakitanga. In theory, this creates opportunities for Māori to contribute to decision making and shape resource management policy and practice. The reality, however, is that fully realising Māori expectations has proven to

be a challenge. It is hoped that revisions to the Act will address some of these issues. Early drafts indicate these provisions will be retained and strengthened.

There are also provisions within the Act to manage 'significant risks from natural hazards' (Section 6(h)) and to manage 'the effects of climate change' (Section 7(j)), although there is some contention as to whether 'natural hazards' is a broad enough term to encompass the impact of climate change (Kelman, 2017).

Despite these limitations, climate change responses as positioned within the Act require tangata whenua involvement. This is reaffirmed by national policies governing the management of coastal environments, such as the New Zealand Coastal Policy Statement.

4.3.2 New Zealand Coastal Policy Statement 2010

National Policy Statements (NPS) are legislative tools that can support government-led climate change mitigation and policy activities. The 1994 iteration of the New Zealand Coastal Policy Statement (NZCPS) was the first national-level tool that required local government to recognise rising sea levels (Rouse et al., 2017). The NZCPS (updated in 2010) outlines a risk-based approach to the management of coastal hazards such as flooding and water management, as well as specific considerations of the effects of climate change. Policy 24 requires that areas at high risk of being affected by coastal hazards (including sea-level rise and climate change) are identified and assessed, taking into account national guidance and best available information on the effects of climate change (Department of Conservation (DOC), 2010, Policy 24). The statement also updates policy on how planning and decision making should recognise Māori values in relation to the coast, and the relationships Māori have with certain coastal places and resources (DOC, 2010, Policy 2). This includes Māori interests in protecting special sites (such as wāhi tapu), using resources and developing places, for example, gathering kaimoana (seafood), and developing papakāinga (housing developments on Māori

land) and marae. A 2017 review by the Department of Conservation found that in several cases iwi were able to use policies in the NZCPS to support their aspirations in planning processes. However, tangata whenua also reported that financial constraints limited iwi involvement in decision making, particularly 'non-settled' iwi who struggle to bear the costs of engaging with councils and applicants (Department of Conservation, 2017, p. 25).

It must be noted that while the RMA and the NZCPS provide tools for governing resource management and land use, they are not specifically targeted towards, or adequate for, responding to climate change. The Climate Change Response Act (2002) was created to address this statutory shortfall.

4.3.4 Climate Change Response Act 2002

Aotearoa's approach to addressing climate change is governed by the Climate Change Response Act 2002. This established a legal framework to ratify the Kyoto Protocol and to meet regulatory obligations under the UNFCCC. Its purpose was to develop and implement '(i) clear and stable climate change policies that contribute to the global effort under the Paris Agreement to limit global temperature increases to 1.5 degrees Celsius above pre-industrial levels; and (ii) allow Aotearoa to prepare for, and adapt to, the effects of climate change' (Climate Change Response Act, 2002, Section 3(aa)). It also provides for the New Zealand Emissions Trading Scheme (ETS) (Section 3(b)). While Māori businesses have participated in the ETS scheme, Māori landowners have faced significant difficulties, particularly negotiating the forestry components of the ETS (Johnstone, 2013), price fluctuations, access to finance and insurance issues (Mercer, 2021).

In 2017, the Labour-led Government announced that climate change would be a key priority over its first three-year term. Key initiatives included proposing a Zero Carbon Act, creating an independent climate change committee and bringing

agricultural emissions into a carbon pricing scheme (Kitchin, 2017). The Climate Change Response (Zero Carbon) Amendment Act of 2019 (CCRZCAA) provides a legal and regulatory framework for meeting Aotearoa's target of net zero emissions of carbon dioxide and nitrous dioxide by 2050. Two actions stemming from this Act are the development of a National Climate Change Risk Assessment with specific risks identified as relevant to Māori (released 2020) and a National Adaptation Plan (in development in 2021). Criticism about the lack of inclusion of Māori voices in the legislation emerged following the consultation process for the CCRZCAA, as, out of 96 iwi entities nationally, only four were directly consulted. Further criticism was levelled at the wording included within amendments to the Act. Particular mention was made of the Act's failure to give appropriate and substantive weight to Māori voices, as well as the absence of both a mechanism for enabling tikanga Māori to inform issues and outcomes, and processes for tangata whenua to exercise kaitiakitanga or stewardship over the environment (Kelly, 2020).

4.3.5 Other legislation

Several other pieces of legislation are relevant to the climate change arena, including the Local Government Act (LGA) 2002, the Civil Defence and Emergency Management Act (CDEMA) 2002 and the Building Act 2004. These three pieces of legislation draw on holistic wellbeing and resilience frameworks and promote sustainable management and development approaches (Saunders et. al., 2020). Many of the climate adaptation measures that would be necessary to actively protect tangata whenua interests are the responsibility of, and managed by, the government, as well as subject to the regulations of local government authorities. However, there is no explicit recognition of, or provision for, Māori to take the lead in responding to climate change within the language of these three Acts. It is, therefore, unsurprising that none of these pieces of legislation refer to Māori

climate change aspirations or are informed by specific Māori perspectives. Moreover, the CDEMA does not include any reference to Māori or Māori interests.

4.3.6 Emergency management declarations

In Aotearoa, climate change emergencies have been declared by local governments as a means of communicating the urgency of the ecological crisis, and in an attempt to spur meaningful responses and mitigation actions (Farrell et al., 2019). A 2021 study by Nissen & Cretney in Canterbury identified stakeholder concerns that little engagement had occurred with mana whenua in the lead- up to Environment Canterbury declaring a climate emergency. This is cause for concern, as emergency legislative tools have previously been used in the oppression of Indigenous and minority communities, and emergency approaches have the potential to amplify existing inequities (Bargh & Hall, 2019; Phibbs et al., 2015; Phibbs et al., 2018; Whyte, 2017).

Although Aotearoa has integrated climate change management into policy and legislation over the past few decades (Carter, 2018), it is argued that the country lacks a strong climate change framework, employs inadequate measures and lacks ambition in comparison with targets set by other developed nations (Climate Action Tracker, 2015). Māori agree, advocating for stronger inclusion in central and local government-led climate change planning and decision making (MFE, 2007; Ngāi Tahu ki Murihiku, 2008). This would prioritise partnership with tangata whenua (Kaiser et al., 2020) and more effective integration of mātauranga Māori and Māori perspectives into policy and planning processes to ensure meaningful commitment to Māori rights and responsibilities (Harmsworth & Awatere, 2014). Indigenous planning would, therefore, challenge 'Western' forms of planning that have 'been complicit in the colonial project, a weapon brandished to erase/eradicate Indigenous peoples' by prioritising 'internal community setting[s] that it can largely control, circumscribe, and define, [to challenge] an external political and planning environment' (Matunga, 2013, p. 5). Indigenous planning can influence the reform of

national climate change policies (Kaiser & Saunders, 2021), and tangata whenua are implementing a range of responses.

4.4 Tangata Whenua Responses to Climate Change

Climate change related disasters are a particular concern for iwi and hapū (Kenney & Phibbs, 2021; Saunders & Kaiser, 2019). Through enacting their role as kaitiaki, iwi and hapū are often among the first responders to climate change issues. Recent Māori responses to catastrophic events have included the Ngāti Awa Volunteer Army actions following the 2017 Edgecumbe flooding event (SunLive, 2017), and the Te Arawa iwi response to the erosion of an ūrupa at Ōkurei Point in Maketū during 2019 (Neilson, 2019). The impacts of these sudden-onset events were mitigated by the ability of Māori communities to respond rapidly and effectively, due in part to strong social ties and whakapapa connections in the region. Another critical aspect is knowledge of the environment, with intergenerational mātauranga Māori *and* Western scientific information related to environmental changes informing Māori responses to climate change (King et al., 2008).

Climate change response actions (i.e. policies, planning, legislation, activism and tikanga-centred environmental management practices) are being asserted at marae, whānau, hapū and iwi levels. These actions are underpinned by Māori frameworks, values and priorities. This includes the use of cultural mechanisms such as rāhui (temporary restriction of access to protect the health and wellbeing of people and the environment). Rāhui have been used to allow the mauri (life essence of a resource) to replenish (Maxwell & Penetito, 2007) and could be used as a tool for mitigating the impacts of climate change on biodiversity.

Other prominent tools include iwi/hapū management plans (IHMPs) and iwi and hapū-led climate change-specific plans and strategies.

AHO 9.1: Bring in the Army!

Māori, like many Indigenous peoples, are not sitting around waiting for climate change to decimate their lands. They are stepping up and using their gifts, talents and community power to respond to climate change events. In 2017, the small Bay of Plenty town of Edgecumbe experienced severe flooding when the local river broke its stop banks. Many homes were totally flooded, and devastation ensued. Ngāti Awa community leaders collaborated to form NAVA — 'Ngāti Awa Volunteer Army'. Te Teko Hauora manager, and deputy chair of the Mataatua District Māori Council at the time, Winifred Geddes, took on the Māori emergency manager's role, established a Māori emergency response centre at Ruaihona marae, and coordinated around 1500 volunteers. Four surrounding marae Kokohinau, Rautahi, Tūteao and Uiraroa collaborated with Ruaihona to serve over 10,000 meals, hold three tangihanga and provide shelter for those in need. NAVA volunteers also led the clean-up operation and cleared flooded homes, businesses and other properties of silt in only 11 days.

Māori community-led emergency management responses can be effective throughout Aotearoa. The iwi model used in Edgecumbe, the Ngāti Hau response to the 2015 Whanganui floods and other iwi responses to climate change-related disasters are informing the National Emergency Management Agency's new approach to managing the impacts of climate change.



FIGURE 11: NAVA IS AN IWI-LED VOLUNTEER ARMY FORMED IN RESPONSE TO THE SEVERE FLOODING IN EDGECUMBE IN 2017. CREDIT: W. GEDDES

4.4.2 Iwi/Hapū Management Plans (IHMPs)

IHMPs are a key RMA mechanism that iwi and hapū can deploy to embed their planning and resource management priorities into regional plans of territorial authorities. These plans are developed and approved by collectives representing iwi or hapū and address matters of tribal resource management significance within a specific region (Saunders, 2017). IHMPs typically address issues, objectives, tasks, actions and indicators of environmental health (Nelson & Tipa, 2012). The plans both incorporate and draw on mātauranga Māori and Western scientific evidence to inform key priorities and actions. Crown Research Institutes and science organisations are partnering with Māori to provide climate change data that can inform IHMPs and Māori-led environmental management initiatives.

Climate change issues and priorities are increasingly being addressed within IHMPs (Kaiser & Saunders, 2021) and in climate change strategies developed by tangata whenua. In an analysis of North Island IHMPs, 29 out of 93 total plans mention climate change explicitly, with extreme weather events and rising sea level the most

frequently anticipated impacts (Saunders, 2017). Other impacts focused on effects on biodiversity (Hauraki Māori Trust Board, 2004), infrastructure (Ngāti Rangiwewehi, 2012), transportation (Ngā Hapū o te Wahapū o te Hokianga nui a Kupe, 2008), health (Ngāti Hine, 2008) and whānau wellbeing (Passl, 2004).

Te Tangi a Tauira 2008, an IHMP developed by the four Murihiku (Southland-based) Papatipu Rūnanga of Ngāi Tahu, has a section explicitly dedicated to climate change issues. Key concerns include discharging of GHG emissions into the environment, exposure to noxious and toxic substances, and the impact of deforestation on carbon dioxide levels. This IHMP also sets out recommended policies and practices for addressing iwi concerns: active engagement with local, iwi and national initiatives; supporting Māori ownership of climate change issues; advancing climate change research on seafood impacts; and supporting sustainable energy systems.

While climate change is generally embedded throughout most IHMPs as one of several different priorities for iwi and hapū, some iwi and hapū are also developing targeted strategies, including stand-alone plans for responding to climate change.

4.4.3 Iwi-led climate change strategies

Government policies and legislation pertaining to climate change have historically been reactive and only minimally responsive or inclusive to the needs and priorities of iwi. As iwi are already experiencing the impacts of climate change, some are choosing to develop their own climate change strategies rather than wait to be included in national, regional and local government responses. Iwi-led climate change strategies have a dual function: as focal documents for iwi, hapū and whānau issues, priorities and aspirations; as well as being public-facing documents. These strategies are underpinned by Māori frameworks, values and priorities. A prominent iwi-led strategy called *Te Tāhū o te Whāriki* has recently been released by Te

Runanga o Ngāi Tahu (2019). A summary of the main points of strategy is included in Table 1, page 152–153.

Te Tāhū o te Whāriki (Te Rūnanga o Ngāi Tahu, 2019) articulates collective issues, concerns and approaches for responding to climate change. It represents a philosophical departure from Western and quantitative approaches to measuring an understanding the impacts of climate change. The strategy is informed by mātauranga Māori and Western European science to articulate some of the physical impacts of climate change, but is framed within Ngāi Tahu values and priorities. Echoing the calls of Māori scientists, economists and planners (Harmsworth & Awatere, 2014; Matunga, 2013; Nelson & Tipa, 2012), the strategy highlights the need for impactful information to be grounded in te ao Māori, as well as strong community involvement, which will ensure approaches remain locally and culturally relevant. Resourcing implementation of these strategies is an ongoing concern. Iwi and hapū have a range of competing priorities; organisational capacity is often stretched, and funding for implementing climate change mitigation and adaptation projects limited. Another strategy deployed by Māori is partnering with government entities and businesses to develop culturally grounded science and technology approaches that effectively address climate change impacts. Ngāi Tahu, for example, is partnering with the National Institute of Water and Atmospheric Research (NIWA) to develop initiatives that promote climate change resilience. Tribal actions include using mātauranga Māori as the basis for cultural GIS mapping and core-sampling in areas of previous coastal inundation. These areas will likely be impacted by climate change-induced sea-level rise in the future, and the current initiatives are designed to identify, and, in due course, help communicate hazard risks (Te Rūnanga o Ngāi Tahu, 2019). Te Whānau-ā-Apanui and Ngāti Porou, iwi that are situated on the East Coast lands of the North Island, constitute further exemplars, as they have successfully lobbied the government to fund their $34 million Raukūmara Pae Maunga Restoration Project. This project will restore the native forest in their regions and mitigate impacts of climate change by providing a carbon sink.

Māori are also embracing historical, activist and creative approaches for addressing climate change. For example, continuing the tradition of Tahupōtiki Wiremu Rātana petitioning King George V and the League of Nations, rangatahi (youth) from Te Ara Whatu, Aotearoa's first Indigenous youth delegation to the United Nations, attended the COP25 talks in Madrid in 2019 to advocate for climate justice and Indigenous sovereignty (Huffadine, 2019). Another example is Māori- led climate change activism that draws on a range of art forms, including film, photography, dance and the visual arts (Tyson, 2020). Then there are mainstream avenues such as the Waitangi Tribunal claims process, where Māori can lobby the Crown to address breaches of te Tiriti o Waitangi that relate to climate change.

Table 6: Summary of key points of Te Tāhū o te Whāriki (Te Rūnanga o Ngāi Tahu, 2019)

WHAKATAUKĪ Mō tātou, ā, mō kā uri ā muri ake nei — For us and our children after us.	
PURPOSE To create Ngāi Tahu responses to the risks and opportunities presented by climate change, referencing the entire tribal structure, so that iwi, hapū and whānau aspirations can be met in a changing world.	
NGĀI TAHU VISION	
Te kaitiakitanga me te tāhuhu Organisational development and governance	Te Rūnanga o Ngāi Tahu will take appropriate action to adapt all areas of tribal interests and activity to withstand the compounding effects of our changing climate, to ensure Ngāi Tahu activities are aligned to the best projected climate change outcomes, and to make the most of opportunities, so that Ngāi Tahu whānui have every chance to thrive even in the most extreme scenarios.
Tō tātou Ngāi Tahutanga Culture and identity	We will face the challenges of a changing climate in our takiwā/area with the courage, resilience, and wisdom of our tūpuna/ancestors, strengthened by all that makes us Ngāi Tahu, as we create a cultural legacy for those to come who must live in a changed world.
Te ao tūroa Environment	We will manage tribal resources wisely, continuing to protect wāhi tapu, mahinga kai, and other taonga tuku iho (treasures) handed down, where possible, focusing on strategic restoration activities, while actively investing in places and species of likely future abundance.

Ko ngā whakapāpātanga **Tribal communications**	Ngāi Tahu whānui are well informed about all aspects of climate change relevant to their interests and wellbeing. They know how the tribe as a whole is responding to the risks, challenges, and opportunities, and can act with confidence within their whānau and hapū.
Te whakaariki Influence	Te Rūnanga o Ngāi Tahu and Papatipū Rūnanga are embedded within key climate change response structures and programmes, working with central and local governments and others. These programmes support desired outcomes for Ngāi Tahu whānui as a result of tribal influence and leadership.
Te whakatipu Growing the future	Papatipū Rūnanga has the resources and information necessary to generate and implement marae and community-centred climate change response strategies that are designed to meet the needs of whānau and hapū, aligned with tribal direction.
Whānau Family	Whānau needs and aspirations are central to tribal climate change response, with tribal resources targeted towards addressing fundamental challenges to kāinga (settlements) within the takiwā, maximising opportunities for whānau, and assisting whānau facing climate change impacts in other parts of the country and the world.
Mātauranga Knowledge	Tribal investment in the future, focused on education and training supports Ngāi Tahu whānui to generate and take up opportunities related to climate change response.
Te pūtea Investment planning	The economic base of Te Rūnanga o Ngāi Tahu is built on leading, climate-responsible, innovative and adaptive businesses and partnerships, meeting the needs and aspirations of Ngāi Tahu whānui while applying Ngāi Tahu values to address the business risks, challenges and opportunities associated with climate change.



FIGURE 12: STILL FROM THE FILM TŪĀTEA, BY LOUISE POTIKI BRYANT, FEATURING DANCER BIANCA HYSLOP, WITH MUSIC BY PADDY FRAE AND TAONGA PUORO BY HOROMONA HORO. COURTESY OF LOUISE POTIKI BRYANT/

In 2019, a group of Māori and Pasifika artists came together to curate the Mana Moana Project. Mana Moana is a digital interactive experience consisting of multimedia, immersive imagery that was shown in Wellington Harbour on a background of moving water. The central theme is how climate change is affecting the ocean, and how this has devastating implications for islands in the Pacific, including Aotearoa. The project release was timed to coincide with Matariki, which is traditionally a time for renewal for Māori.

4.5 Conclusion

Climate change research and policy sectors are beginning to acknowledge the value of Indigenous knowledges for informing adaptive planning and mitigation practices (Whyte, 2017). Yet, globally, policy issues persist relating to government and/or institutional

recognition of Indigenous autonomy and rights to sovereignty (Ramos-Castillo et al., 2017).

Within an Aotearoa context, climate change is a high priority for tangata whenua, and a range of actions and mechanisms are being implemented to advance tangata whenua interests, rights and responsibilities. For example, climate change adaptation and mitigation recommendations are being integrated into planning documents such as IHMPs, and some iwi and hapū are releasing climate change strategies that articulate locale-specific priorities and objectives. Yet, there are concerns that these efforts could be derailed by a planning sector that has a long history of ignoring Māori values, priorities, strategies and aspirations (Carter, 2018; Matunga, 2017) and by persistent challenges related to integrating Māori climate change knowledges, world views and approaches with mainstream Aotearoa strategies for mitigation and adaptation (MFE, 2007). A concern is that this political setting could ignore or under-utilise Māori resources that facilitate community resilience to climate change. Enhanced engagement with Māori communities and resources is, therefore, essential, particularly recognition of the right and responsibility of tangata whenua to practise kaitiakitanga when responding to climate change. A comprehensive and effective adaptation response to climate change, therefore, requires substantive provisions for tangata whenua climate change aspirations, knowledges and responses.

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4.7 Chapter Addendum: New research, policy and legislation 2022-2025

This addendum details significant research, policy shifts, legislative developments, and iwi-led adaptation plans that have emerged in Aotearoa New Zealand since the 2021 publication of this chapter. The period 2022–2024 has been marked by the launch of formal national adaptation strategies, profound legislative changes concerning the Resource Management Act (RMA), and the real-world validation of Māori resilience and governance during severe weather events, all framed by the accelerating impacts of climate change.

I. NATIONAL ADAPTATION AND POLICY INTEGRATION

There have been several transitions in overarching climate change adaptation plans and frameworks since this chapter was published. The Ministry for the Environment published Aotearoa New Zealand's first National Adaptation Plan (NAP) in August 2022, which explicitly acknowledges the need for the Crown to work in partnership with Māori to support Māori-led adaptation options (Ministry for the Environment (MfE), 2022a).

A core feature of this plan is the introduction of the Rauora Framework[7] as an Indigenous worldview of climate change, intended to guide partnership and action (MfE, 2022b). Key actions within the NAP included the formal establishment of a Māori Climate Platform to develop a national Māori climate strategy, and commitments to assess socio-economic and climate vulnerability for Māori and the exposure of taonga/cultural assets to climate change (MfE, 2022b). Following this, the subsequent Health National Adaptation Plan 2024–2027 further prioritised partnering with iwi, hapū, and hapori Māori (communities) to strengthen climate adaptation leadership across the health system (Ministry of Health, 2024).

[7] A summary of the Rauora Framework is available here: https://environment.govt.nz/assets/publications/Exploring-an-indigenous-worldview-framework-for-the-national-climate-change-adaptation-plan.pdf

However, independent monitoring indicates that the principle of rangatirataka (Māori self-determination) remains critical to the success of these policies. The Climate Change Commission's 2024 assessment emphasised that effective adaptation requires that iwi/Māori retain rakatirataka and adapt their communities in a way consistent with their tikaka (customs) and whakaaro tau (priorities) (Climate Change Commission, 2024).

Following a change in government in October 2023, a new National Adaptation Framework was released in October 2025, signalling a shift in the Crown's overarching approach to climate change adaptation. Positioned as a long-term, strategic system for preparing Aotearoa for escalating climate risks, the Framework centres on four pillars: risk and response information sharing, roles and responsibilities, investment in risk reduction, and cost-sharing before and after extreme events (Ministry for the Environment, 2025; Beehive, 2025a). These pillars are operationalised through 16 initial actions, which bring together new and existing work on adaptation, resource management, local government reform, and emergency management. A prominent component of the new Framework is the development of New Zealand's first national flood map, aimed at consolidating national and regional hazard data to enable clearer public understanding of flood exposure and to support decision-making around land use, insurance, and long-term investment (Beehive, 2025a; Ministry for the Environment, 2025).

However, unlike the 2022 National Adaptation Plan, which explicitly affirmed Māori–Crown partnership obligations and introduced the Rauora Framework, the 2025 National Adaptation Framework has been criticised for providing limited detail on how Treaty principles or inequities faced by Māori will be addressed within adaptation planning (New Zealand Planning Institute (NZPI), 2025). Early analysis from planning practitioners highlights that, although the Framework proposes mandatory adaptation plans for high-risk locations and links these to the reformed spatial planning system, it offers little clarity on Māori governance roles, co-decision pathways, or how mana whenua values will guide prioritisation (NZPI, 2025). The Framework also places responsibility for adaptation planning on local government but defers decisions about how adaptation will be funded;

an issue with significant implications for Māori communities, who face disproportionate exposure to climate hazards and have limited access to adaptation finance.

Expert commentary has similarly observed that while the Framework strengthens data and information systems, it risks entrenching a top-down orientation unless it is matched by resourcing for community-driven, place-based adaptation and clear mechanisms for incorporating iwi, hapū and whānau aspirations (Science Media Centre, 2025). These critiques underscore the ongoing importance of rakatirataka, utu, tikaka and whakapapa-grounded governance articulated by the Climate Change Commission in 2024. As Māori continue to advocate for adaptive approaches grounded in their own priorities, knowledge systems, and relational obligations, the evolution of national frameworks will have significant implications for how these aspirations are supported, constrained or reshaped.

II. LEGISLATIVE AND REGULATORY CHANGE

The regulatory environment underpinning environmental management underwent significant flux, directly impacting Māori authority over environmental resources. Recent efforts to repeal and replace the Resource Management Act 1991 initially culminated in the passing of two replacement statutes, enacted in October 2023: the Natural and Built Environment Act 2023 and the Spatial Planning Act 2023 (New Zealand Parliament, 2023a; New Zealand Parliament, 2023b). These new acts had been intended to provide a more effective role for Māori in the planning process (MfE, 2022b).

A subsequent change in government in October 2023 saw both of these replacement acts repealed in December 2023 (New Zealand Parliament, 2023c). The new administration signalled a return to a replacement process based on the enjoyment of property rights (MfE, 2024). A key policy signal of this new direction was the proposal to amend the RMA to remove the requirement for resource consent applicants to demonstrate their activities follow the Te Mana o te Wai hierarchy of obligations, outlined in the National Policy Statement for Freshwater Management (NPS-FM) (MfE, 2024). This proposed shift represents a move away from prioritising the health of the water body (waiora) above all

other uses, which has significant implications for Māori environmental authority and the protection of freshwater taonga. Furthermore, scholarly work continues to examine the role of mātauraka Māori in the broader climate context, arguing that successful adaptation for Indigenous Peoples requires the recognition of their rights to self-determination, the prioritisation of Indigenous knowledge, and addressing the broader agenda of decolonisation (Taiapa et al., 2024).

The Planning Bill (235-1) and the Natural Environment Bill (234-1)

The Planning Bill (235-1) and the Natural Environment Bill (234-1), (introduced December 2025), re-configure Aotearoa New Zealand's planning architecture by consolidating natural-hazard and climate decision-making within a standardised, directive system, which has been referred to as a "funnel" approach (see figure 14 below):

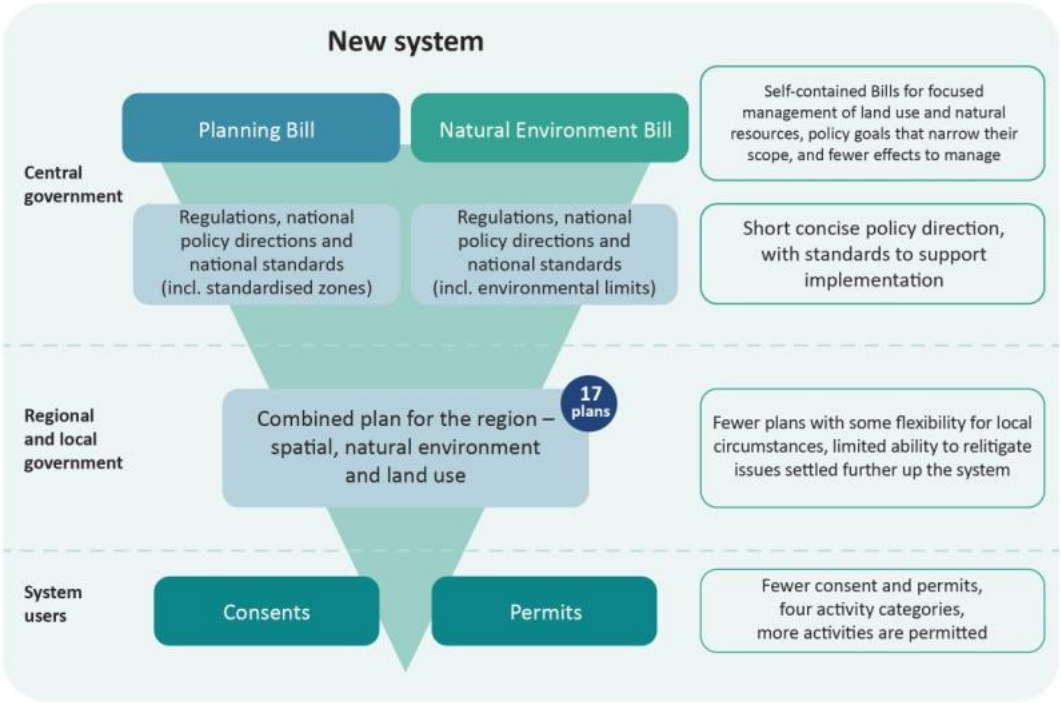


FIGURE 13: THE FUNNEL APPROACH OF THE NEW PLANNING SYSTEM, CREDIT: MFE 2025 HTTPS://ENVIRONMENT.GOVT.NZ/PUBLICATIONS/BETTER-PLANNING-FOR-A-BETTER-NEW-ZEALAND/#FEWER-AND-QUICKER-CONSENTS-AND-PERMITS

The funnel approach makes the system "more directive from the top, ensuring consistency across the country, and allowing local communities to focus on applying that

approach in their area"[8]. While this framing emphasises efficiency and coherence, it can also be interpreted as constraining the scope for locally specific solutions, and for iwi and hapū to exercise tino rakatirataka. For Māori communities, whose relationships to land and resources are inherently local, relational, and historically contingent, a strongly top-down planning architecture risks marginalising forms of engagement that do not easily align with standardised planning templates or nationally defined risk thresholds. There may be further implications for Māori communities as consultation is limited as only those effected or have a nationally significant reason, may be consulted. While this approach is intended to streamline decision-making, it may narrow the range of Māori voices able to participate meaningfully in plan development, particularly where whakapapa-based relationships to place, mātauraka Māori, or cumulative impacts are not readily captured within conventional definitions of "affected parties".

Under the Planning Bill, each region is required to prepare a single combined plan in a standardised format, published through a national e-planning portal. Regional Spatial Plans must identify constraints on land use and development arising from natural hazards, with plan provisions relating to natural hazards taking immediate legal effect upon notification. In parallel, consenting authorities are authorised to refuse or impose conditions on (i) resource consents where a significant risk from natural hazards is identified and (ii) land-use permits on the same ground, with a corresponding duty on territorial authorities to regulate and manage natural-hazard effects in land-use settings. The Planning Bill also provides for Emergency Response Regulations to enable expedited measures in response and early recovery. Complementarily, the Natural Environment Bill imposes explicit obligations on regional councils to regulate and manage natural-hazard risks as they relate to natural resources and incorporates a precautionary principle where information is uncertain or inadequate; it likewise enables Emergency Response Regulations to facilitate response and recovery.

[8] MFE provide an explanation of the new Planning Bill 235-1 and the Natural Environment Bill 234-1 here: https://environment.govt.nz/publications/better-planning-for-a-better-new-zealand/#fewer-and-quicker-consents-and-permits

Iwi and Hapū Management Plans and Mana Whakahono ā Rohe agreements under the 2025 reform proposals

A further feature of the current reform package is the absence of explicit statutory recognition for iwi and hapū management plans (IHMPs) within the new planning architecture. While the Planning Bill (235–1) requires local authorities to prepare and change their plans "in accordance with … any applicable iwi participation legislation" and any existing or initiated Mana Whakahono ā Rohe agreements, it does not replicate the Resource Management Act's direct requirement to "take into account" IHMPs in plan-making. Nor does the Natural Environment Bill (234–1) provide an alternative vehicle that restores that effect. In practical terms, the proposed system elevates instruments expressly named in the Bills, (notably Mana Whakahono ā Rohe), but leaves IHMPs without a clear operative hook, risking a default to discretionary or consultative status in regional combined plans unless councils and mana whenua secure bespoke provisions through other mechanisms.

Against this backdrop, Mana Whakahono ā Rohe assumes heightened importance. These are statutory relationship agreements between iwi or hapū and councils. They set out agreed processes for engagement across planning and resource management activities, including information-sharing, participation in consents and monitoring, and arrangements for climate adaptation, natural hazards and recovery. Mana Whakahono ā Rohe were introduced to the RMA in 2017 with the intent of stabilising how iwi and hapū exercise their role in council decision-making and to give practical expression to Te Tiriti-anchored participation. Yet, as Kenney (2022) highlights, iwi and hapū do not uniformly accept the Mana Whakahono ā Rohe framework; challenges regarding accountability, uneven engagement practices, and variable regional uptake signal that it is an inconsistent foundation for securing durable Māori participation. Current reform settings indicate that Mana Whakahono ā Rohe arrangements will be carried forward where agreements already exist or are initiated before the new legislation takes effect,

creating a time-limited window for iwi and hapū to initiate or advance negotiations so that agreed processes endure through the transition.

In this context, councils and mana whenua may need to: (i) translate priority IHMP provisions into plan text via co-drafting processes under the Planning Bill's plan-making framework, and (ii) institutionalise linkages through Mana Whakahono ā Rohe (or parallel governance charters) so that IHMP frameworks continue to guide consenting, monitoring and adaptation practice. Action-research and sector programmes have produced practical resources for initiation and drafting, including overviews of initiation-to-implementation, themed information sheets (climate change, natural hazards, emergency management), guidance for iwi/hapū and councils, and scoping/drafting tools (Papa Pounamu, 2026). These resources are designed for flexible, locally grounded use so that agreements can reflect tikaka, whakapapa relationships and governance aspirations.

An illustrative exemplar is the Poutini Ngāi Tahu–West Coast Regional Council Mana Whakahono ā Rohe, signed 22 October 2020 at Arahura Marae, which demonstrates how such agreements can shape regional plan-making and formalise processes that centre mana whenua in decision-making (NZPI, 2023; West Coast Regional Council (WCRC), 2025). Public registers and commentary note the agreement and its influence on regional planning processes, providing a precedent for durable, Tiriti-consistent engagement during institutional change.

Read together, the removal of an explicit statutory hook for IHMPs and the carry-forward of initiated Mana Whakahono ā Rohe signal a shift in the legal mechanics of Māori participation: the relationship instrument is strengthened by name, while the planning document's status must be secured by translation into plan provisions and by embedding through formal agreements.

Emergency Management Bill No. 2

In the emergency management domain, the Emergency Management Bill (No 2) 236-1 (2025) replaces the Civil Defence Emergency Management Act 2002 and introduces a revised governance and planning framework. At the regional tier, Emergency Management Committees (EMCs) become the primary decision-making bodies. EMCs are required to engage and involve representatives of iwi and Māori in the development of regional emergency management plans. They are also required to appoint one or more members of their Co-ordinating Executive Groups (CEGs) with knowledge of local Māori interests and values, and to identify disproportionately affected communities and engage with their representatives during plan development. Nationally, the Director-General of the National Emergency Management Agency (NEMA) must seek advice from iwi and Māori when developing the national emergency management plan, and new national direction tools (rules and plan standards) and compliance orders are introduced to lift minimum practice. While these measures strengthen procedural inclusion and planning-stage visibility of Māori interests, the Bill does not mandate mana whenua seats with decision-making powers on EMCs nor provide a dedicated resourcing mechanism for iwi participation across the 4Rs (Reduction, Readiness, Response, Recovery). A review of Māori-led submissions on the legislative refresh indicated broad support for legislating mana whenua representation in decision-making structures, legislating for mana whenua engagement in the development of Group/Committee plans. Submissions also recommended central government funding of iwi participation (rather than reliance on local rates or settlement pūtea (financial redress), and explicit consideration of taonga Māori across the 4Rs elements that are only partially reflected in the current Bill settings.

Three cross-cutting cautions emerge for Takata Whenua in light of proposed legislative changes. First, while the Natural Environment Bill references precaution in conditions of uncertainty, the Planning Bill's consent-tier tests do not consistently mirror a precautionary posture. Currently, Māori values are absent from definitions of "significant risk" rendering Māori practices and knowledge (such as tohu (environmental indicators),

maramataka (seasonal calendars), and pūrākau) irrelevant to determinations in hearings. Second, the national e-planning portal and standardised plan data heighten the salience of Indigenous Data Sovereignty. Cultural spatial layers and indicators should carry Māori governance conditions (authority to control, reuse permissions, and cultural-safety metadata) to avoid extractive reuse and epistemic misrepresentation. A third caution specific to the emergency management reform, is that the Bill's engagement-focused provisions, in the absence of mandated mana whenua seats and dedicated resourcing, risk entrenching unfunded participation and perpetuating the gap between recognised contribution and actual authority.

In aggregate, these reforms converge climate adaptation and risk reduction in law, legitimising hazard-responsive land-use regulation, proactive biocultural protection, and, where deemed necessary, relocation. This trajectory is reinforced by the National Policy Statement on Natural Hazards (NPS-NH), which came into effect under the Resource Management Act in January 2026 and embeds precautionary, future-oriented hazard management within statutory planning instruments. However, despite the obligation under s 8 RMA to take into account the principles of Te Tiriti o Waitangi, the NPS-NH has been developed with limited Māori representation and without explicit mechanisms to give effect to rangatiratanga in hazard governance. There is a material risk that these deficiencies will be carried over into National Direction under the Planning Act, given the government's stated intention to consolidate and streamline planning instruments.

Taken together, the Planning Bill, the Natural Environment Bill, and the NPS-NH expand the legal mandate for adaptation action while simultaneously weakening Treaty-anchored guarantees of Māori authority over how risks to whenua, taonga, and kāinga are defined and managed. This intensifies the imperative, developed throughout this thesis, to embed whakapapa-based governance, Kaupapa Māori indicators, and mokopuna-centred criteria directly into spatial planning and emergency management instruments, rather than relying on consultative obligations that fall short of Treaty consistency. Without such structural embedding, climate resilience may be secured procedurally, while rangatiratanga is eroded in practice.

The trajectories of legislative reforms also highlight the inherently political nature of climate governance in Aotearoa, where shifts in government produce markedly different approaches to environmental management, Treaty recognition, and the role of Māori in decision-making. As climate policy oscillates between centralisation and localisation, and between rights-based and market-oriented frameworks, the stability of outcomes for iwi and hapū is correspondingly uneven. In contrast to these cyclical political shifts, mana whenua presence, whakapapa responsibilities, and long-term environmental stewardship endure across generations. This divergence reinforces the necessity of embedding mana whenua authority and tikaka-anchored processes within planning and hazard governance systems so that Māori climate futures are not contingent on short-term political change.

Cyclone Gabrielle and Emergency Management Resilience

The catastrophic impact of Cyclone Gabrielle in February 2023, a manifestation of increased climate severity, provided a severe stress test of national and local emergency management systems, revealing both systemic failures and the crucial resilience of Māori communities (Bush International Consulting, 2024; Kaiser & Kenney, 2025b). A 2024 Government Inquiry into the Response to the North Island Severe Weather Events (NISWE) was produced (New Zealand Government, 2024). Among its key recommendations was the need to empower iwi Māori who have the 'capacity, capability, and desire to contribute to emergency management' (p.23). Māori communities in regions such as Te Tai Tokerau and Ikaroa-Rāwhiti were disproportionately affected, suffering extensive damage to culture, whenua (land), and urupā (Te Puni Kōkiri, 2023). This outcome affirmed analyses that Māori communities face greater climate risks due to pre-existing socio-economic and geographical vulnerabilities (Te Puni Kōkiri, 2023).

Research presented to the Waitangi Tribunal's Climate Change Inquiry documented that official emergency responses systemically failed, forcing Hauraki Māori communities to activate their own emergency centres and resource hubs (Moyle, 2025; Moyle et al., 2025). This institutional failure is further evidenced by studies detailing the perspectives of both Māori and non-Māori emergency managers (Kaiser & Kenney, 2025b). In examining

catastrophic hazard events, these studies highlight that despite national directives to partner with Māori, a lack of equitable guidance at local and regional levels hinders the formalisation and recognition of iwi and hapū capacity in readiness, response, and recovery (Kaiser & Kenney, 2025b). Critically, the institutional failures documented during this climate event underscore the systematic neglect of mātauraka Māori and intergenerational knowledge that could have significantly enhanced climate resilience (Moyle et al., 2025; Taiapa et al., 2024).

III. IWI, HAPŪ, AND MARAE-LED ADAPTATION PLANS

In response to both national policy efforts and the increasing impacts of climate change, the period since 2022 has seen a surge in formally developed iwi and hapū specific adaptation strategies, demonstrating self-determined action and the implementation of Rangatiratanga (self-determination). These plans shift from general advocacy to place-based, operational strategies.

The Ngāti Rārua Climate Strategy (Ngāti Rārua, 2025) exemplifies this trend, articulating a vision for the iwi to be strong in identity and leadership, able to protect and enhance their taonga (treasures) through climate change impacts. Grounded in the kaupapa (principle) of Kia Pai Te Noho (to live well), the strategy focuses on practical, real-world actions to ensure independence in water, kai (food), and liveable environments for whānau and marae through to the end of the century (Ngāti Rārua, 2025).

Similarly, the Maketū Iwi Collective developed its own climate plan in 2022, building on pre-existing efforts by iwi such as Ngaa Rauru Kiitahi (2021) and Te Rūnanga o Ngāi Tahu (2018) (Deep South Challenge, 2023). These strategies are typically collective responses that leverage mātauraka Māori to focus on enhancing oraka takata me oraka whenua (wellbeing of people and land), often focusing on direct actions such as restoring wetlands, establishing local food resources, and managing coastal erosion at marae sites (Deep South Challenge, 2023). The development of highly localised kāika (village) plans, such as the one being developed by the Rereatukahia Marae Komiti for Ngāi

Tamawhariua, further highlights that effective climate adaptation is being driven at the hapū and marae level (Deep South Challenge, 2023).

IV. CONCLUSION

Taken together, the developments outlined in this addendum demonstrate that the period 2022–2025 has been one of profound transition in Aotearoa's climate governance landscape, legislatively, institutionally, and politically. National adaptation policy has expanded in scope while simultaneously narrowing in its commitment to Māori authority. Resource management reform has oscillated dramatically, reshaping the statutory architecture through which mana whenua seek to exercise kaitiakitaka and rakatirataka. Further, successive extreme weather events, most notably Cyclone Gabrielle, have exposed the consequences of these structural arrangements in real time. Across the domains of climate adaptation planning, environmental and resource management legislation, and disaster risk governance, the same tension reoccurs: Māori are expected to absorb disproportionate climate risk while operating within institutional arrangements that only partially uphold their authority and participation.

Despite these constraints, iwi, hapū and marae-led planning over this period has advanced rapidly, offering some of the most sophisticated and place-based climate adaptation occurring in the country. Strategies developed by iwi such as Ngāti Rārua, localised kāika adaptation initiatives, and marae-centred resilience planning exemplify Indigenous governance in action.

The juxtaposition between iwi-led innovation and the volatility of Crown policy reveals the fundamentally political nature of climate adaptation for Māori. As legislative frameworks shift with changes in government, the stability of outcomes for iwi and hapū, remains precarious. Yet mana whenua responsibilities: to whenua, wai, whānau, and future generations endure across political cycles. These enduring obligations stand in stark contrast to the short-termism of state reform and underscore the central argument of this thesis: that effective and just climate adaptation in Aotearoa must be grounded in

whakapapa-based governance, resourced Māori leadership, and frameworks that respect Māori authority not as an optional enhancement but as a constitutional foundation.

In this light, the reforms of 2022–2025 highlight the ongoing need for adaptation systems that are structurally capable of supporting Indigenous futures on Indigenous terms. As the following chapters show, Māori communities are already articulating and enacting these futures, through narratives, strategies, practices, and governance models that exceed the limits of current statutory arrangements. The challenge facing Aotearoa is whether national systems will evolve to meet them.

CHAPTER FIVE

Te Kahu Huruhuru o Kohikohi: weaving a kaupapa Māori methodology for climate change research

Chapter Four examined how Takata Whenua are responding to climate change through iwi and hapū-led strategies, policy engagement, and culturally grounded practices, showcasing the proactive and systemic nature of Māori adaptation. Chapter Five turns to the methodological foundations that enable such work. This article introduces *Te Kahu Huruhuru o Kohikohi*- a kaupapa Māori methodology developed for this study. The research design weaves together whakapapa, mātauraka Māori, and qualitative inquiry to create an ethical and culturally responsive approach to bricolage research. Moving from documenting Indigenous practice to articulating Indigenous research design, this transition underscores the need for methodologies that not only describe Māori climate responses but are themselves expressions of tino rakatirataka. This paper was published in MAI Journal as part of a special issue on indigenous climate change issues.

Reference: Kaiser, L. H., Kenney, C. M., Phibbs, S. R., Saunders, W. S., & Becker, J. S. Te Kahu Huruhuru o Kohikohi. MAI, 102.
https://www.journal.mai.ac.nz/10.20507/MAIJournal.2025.14.1.9

The image on the preceding page (figure 14) depicts a photo taken by the author. It depicts an up-close perspective of a kahu huruhuru that belonged to the authors' tūpuna (ancestors). It is currently stored at Te Hikoi Museum, Aparima/Riverton.

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STATEMENT OF CONTRIBUTION
DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the student and the student's main supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the student's contribution as indicated below in the Statement of Originality.

Student name:	Lucy Kaiser
Name and title of main supervisor:	Christine Kenney
In which chapter is the manuscript/published work?	Chapter Five

Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:[1]

Lucy Kaiser is the primary author of the journal article and is responsible for leading the design and implementation of the research, the analysis and writing the manuscript. Kenney, Phibbs, Saunders and Becker have contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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Te Kahu Huruhuru o Kohikohi: weaving a kaupapa Māori methodology for climate change research

Authors

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Abstract

This paper introduces Te Kahu Huruhuru o Kohikohi, a kaupapa Māori methodology developed to address the need for Indigenous perspectives in climate change research. Climate change policy has traditionally relied on quantitative methods, often neglecting Māori worldviews and holistic environmental understandings. In Aotearoa New Zealand, Māori values, knowledge, and practices are often overlooked in climate planning, despite their role as kaitiaki (guardians) of the land. This methodology bridges Māori ways of knowing with Western research, drawing on whakapapa (genealogy) and incorporating kaupapa Māori and bricolage to create an adaptable, multi-perspective approach. The kahu huruhuru (feathered cloak) metaphor represents the diverse experiences of Kāi Tahu ki Murihiku and other Māori communities in responding to climate change. By honouring Māori epistemologies and engaging in community dialogue, the methodology offers a decolonising approach for climate change adaptation, combining Western and Indigenous perspectives for meaningful solutions.

Keywords: bricoleur; kaupapa Māori; methodology; climate change; indigenous

5.1 Introduction

There is a call within global climate change research, policy and planning literature for stronger inclusion of Indigenous communities' experiences and responses to climate change (Kenney & Phibbs, 2021). In Aotearoa New Zealand, this includes approaches that recognise the intergenerational, cultural and locale-specific nature of mātauraka Māori

(Māori knowledge) and tikaka (practices) (Kaiser & Kenney, 2022). Key international plans, policies and agreements such as The Paris Agreement and the 2020-2030 United Nations Secretariat Climate Action Plan, address Indigenous Peoples as generic, providing one size fits all frameworks and principles. In Aotearoa New Zealand, national plans, polices and legislation (e.g., the Zero Carbon Act, First National Adaptation Plan), are built from a top-down approach. Often policy consultation with Māori happens late in the drafting process, if it occurs at all (Carter, 2018; Kenney & Phibbs, 2021; Matunga, 2013) and te ao Māori (Māori worldviews) are flattened into simplified and generic narratives. In response, Indigenous Peoples are increasingly developing climate change plans and strategies for governments to consider (Kaiser and Kenney, 2022). Yet, research that applies Indigenous methodologies to exploring Indigenous Peoples views, experiences and responses regarding climate change, is limited (Awatere et al., 2021; Smith & Sharp, 2012). Research on climate change impacts has largely been quantitative in nature, a format that Takata Whenua (Indigenous peoples) have highlighted as generic and ill-fitting for the diverse and holistic world views within Te Ao Māori (the Māori world) (King et al., 2010). Bespoke work by, and for Indigenous Peoples, that is culturally and locale-specific is required to understand the diverse experiences and approaches for responding to climate change.

5.2 Background- Indigenous Responses to Climate Change

Government and institutional recognition of Indigenous autonomy and rights to sovereignty over traditional lands and tribal environments, remains highly problematic within global, national and local policy spheres (Ramos-Castillo et al., 2017). While this relationship is enshrined in Aotearoa New Zealand under Te Tiriti o Waitangi, the foundational treaty between the British Crown and Māori), claims have been lodged regarding breaches of Te Tiriti in relation to climate change issues (Iorns, 2020). The history of Treaty breaches suggests that further legislated recognition of the kaitiakitaka (guardianship) of Takata Whenua in responding to climate change within their takiwā, is urgently required.

Research, policy and planning literature indicates that climate change is a high priority issue for iwi and hapū across Aotearoa New Zealand and that a range of actions and mechanisms are being utilised by Māori when responding to climate change impacts (Kaiser & Kenney, 2022). Additionally, climate change issues and related mitigation measures are increasingly being considered in planning documents, and iwi (tribes) and hapū (sub-tribes) are beginning to release their own culture-led climate change strategies, which articulate Māori concerns, priorities as well as adaptation and mitigation measures for their whānau (e.g., Ngāi Tahu, 2019; Te Urunga o Kea: Te Arawa Climate Change Working Group, 2021). However, there continue to be issues with the Aotearoa New Zealand government and local bodies not taking Māori values, priorities, strategies and aspirations in to account when developing climate change related policies and plans. The Resource Management Act 1991 is an exemplar of legislation that showcases this disregard. The Act states that developers when preparing plans and policy statements, and considering resource consents, must take into account any relevant planning document recognised by a hapū or iwi authority (e.g. s61(2A)(a); s66(2A)(a); s74(2A), s104(1)(c)). Yet, a 2019 study into the use of Iwi and Hapū Management Plans (IHMPs) found that some councils had little to no awareness of the existence of these documents, despite the stipulations in the Act (Saunders & Kaiser, 2019).

There are also challenges for the Aotearoa New Zealand government as well as local and regional councils in giving effect to Te Ao Māori knowledge, worldviews and practices within climate change mitigation and adaptation (MFE, 2007). The marginalisation of Māori mātauraka, rakatirataka (self-determination) and tikaka has contributed to significant Māori- resources being under-utilised (Awatere et al. 2013). Hudson and Hughes (2007) research on the 2004 Rangitikei flooding event in the Manawatū region found that iwi and marae (communal meeting houses) are well-positioned to respond to major disasters due to inherent cultural attributes. Values such as manaakitaka (generosity, hospitality), and cultural infrastructure which encompasses sleeping spaces as well as commercial kitchens, usefully support large groups of people during disasters. A 2024 Government Inquiry into the Response to the North Island Severe Weather Events

of February 2023 (NISWE) acknowledged the important role of iwi and hapū in the disaster readiness, response and recovery system. Yet, the key role that iwi and hapū have in climate change adaptation activities is not clearly articulated in government response policies and practices, and Māori climate change interventions remain discrete and operational exemplars are limited to a few natural hazard events.

In accordance with the principles of Te Tiriti o Waitangi, Iwi and Hapū are to be treated as partners with the Crown government of Aotearoa New Zealand. but this statutory relationship has been ignored in the development of key climate change legislation and plans. A 2024 study by Parsons and Crease analysed the submissions of iwi and hapū representative bodies for the Zero Carbon Act 2019 (ZCA). Their research concluded that iwi and hapū were relegated to advisory or stakeholder roles in the submission process, contrary to their status as Te Tiriti o Waitangi partners. They argue that the Aotearoa New Zealand government "remains willing to acknowledge Māori identities and cultural values but unwilling to explicitly acknowledge Māori [rakatirataka] in the ZCA and other legislation" (p. 10). They further state that government recognition that "Māori retain their [rakatirataka] would raise important legal and political questions about the fundamental nature of settler colonial sovereignty in Aotearoa" (p. 10).

In 2022, the Aotearoa New Zealand government published its first National Adaptation Plan for climate change, and Rauora, a parallel Māori-centred framework for climate change adaptation was also released. Rauora articulates that "the Government will develop adaptation responses in partnership with Māori – including elevating te ao Māori and mātauranga Māori in the adaptation process – and empower Māori in planning for Māori, by Māori" (Ministry for the Environment, 2022, p. 28-30). Examples of Takata Whenua experiences of climate change within the plan are drawn primarily from iwi and hapū residing in the North Island of Aotearoa with only a single mention of South Island-based iwi or hapū (Ngāi Tahu). How this framework will be put into practice as well as the plan's relevancy to different iwi and hapū groups across Aotearoa New Zealand may be contested. Tribal differences throughout New Zealand, suggest it is not possible to develop a singular theoretical framework for understanding Takata Whenua views and

responses to climate change. The significant gap within the literature on Takata Whenua-led climate change responses is the result of limited government interest in and targeted funding available for research on this topic. However, there is a desire within te Ao Māori for research conducted with whānau, hapū and iwi across various takiwā that will contribute to developing scholarship on the impacts of and implications of climate change for Māori. The original research discussed in this article contributes to addressing that knowledge gap. A Māori-centred theoretical and methodological framework for investigating climate change issues, developed during doctoral research is presented and discussed in this article. The methodology is underscored by kaupapa Māori theory and a bricolage of qualitative kaupapa Māori methodologies and methods. It showcases a new framework for the interpretation, analysis and dissemination of culturally and locationally-based Māori knowledge.

5.3 Whakapapa Theoretical Framing

To understand how Māori communities conceptualise and respond to the challenges of climate change, the concept of whakapapa must be elucidated. Skerrett describes whakapapa, breaking it down into its core elements, whaka (to make) and papa (layers of land):

> " Both those phenomena occur when our tohunga, (experts) versed in whakapapa, recite whakapapa. They whakapapa back to the land and then beyond, to the outer (or inner) layers, histories, knowledges, to the core of creation, te ira, te kore (the void) (Skerrett, 2003, p. 74).

Māori scholars have used the concept of whakapapa with Western philosophies and epistemologies to create blended theoretical frameworks. For example, the layering of whakapapa is reflected in Kenney's (2009) use of whakapapa with Foucault's genealogy of knowledge. Knowledge is inscribed through layer upon layer of genealogical interpretation (Foucault, 1977). Roberts (2013) articulates a blended ontological and epistemological framework using whakapapa, mātauraka and wānaka (workshops) as a

body of knowledge used in conjunction with Western zoological and botanical science. Roberts envisions whakapapa as "the repository of information about the world. Names provide additional information, and when organised (classified) into lineages vertically and horizontally, the narrative(s) then add 'flesh' (knowledge) to the 'bones' of this skeletal framework." (Roberts, 2013, p. 107). Ngawhare (2019) articulates a different metaphorical framing of whakapapa as "windows" where information and practices flows in multiple directions. She determines it is "potentially the tikaka [cultural practice] that restores tapu [sacred] and noa [profane], an extension of balance in how one perceives knowledge, time, and location through their connection to pūrākau [cultural stories] tūpuna [ancestors], and whenua [land]" (Ngahere, 2019. P. 19).

An additional consideration for the use of whakapapa in theoretical framing is the concept of time. Challenging the linear notion of time used in Western discourse creates the opportunity for Indigenous researchers to account "for multiple ways of conceptualising time across culture" in order to "create more culturally specific ontologies" (Reid et al. 2020, p. 2336). The challenges of, and responses to, climate change occur across multiple temporalities. These are formed by knowledge inherited from ancestors, enabled through temporally responsive strategies of kaitiakitaka for future descendants.

At the heart of whakapapa is intergenerational storytelling. Climate change research is largely dominated by quantitative research and modelling. Yet, storytelling is central to understanding the impacts on people and communities. Analysing Indigenous climate change stories and gaining understanding about effective indigenous approaches to managing the climate change are best achieved using qualitative research methodologies, which are most appropriate for in-depth examination of culture-based narratives. Indigenous researchers commonly apply qualitative analytical methods to participants' interview talk because they generate contextually nuanced and accurate perceptions of Indigenous knowledges and the value of traditional knowledges in everyday life.

5.4 Qualitative kaupapa Māori methodology

Denzin and Lincoln (2011) describe qualitative research as a creative, interpretive and political process where researchers "create narratives, braided compositions woven into and through field experiences" (2011, p. 22). Nash et al. (2005) describe qualitative methodologies as multi-method approaches for studying social settings in order to make sense of them and the meanings that people ascribe to things. Qualitative research seeks to "empower individuals to share their stories, hear their voices and minimise the power relationships that often exist between a researcher and the participants in a study" (Creswell & Poth, 2016, p. 45). Moreover, qualitative methodological approaches generally focus on details, narratives, discourses and dialogue to be interpreted (Nash et al., 2005).

Historically, climate change research has drawn heavily on quantitative models and data to determine impacts and projections. Scientists are however, increasingly recognising the importance of storytelling and narratives for climate change evidence and communication (Moezzi et al. 2017). For Māori communities, intergenerational storytelling is a key component of ontological and epistemological understandings of the world and particularly Te Ao Māori. This is underscored by tikaka and pūrākau. To understand the impacts of climate change and Māori-led responses, effective research needs to privilege both storytelling and kaupapa Māori (Māori-centred) ways of knowing.

Kaupapa Māori theories and methodologies provide space for Māori voices and perspectives, methodologies, and analyses, whereby Māori realities are seen as authentic (Smith, 1997, Cram et al. 2006). This means working outside the binary opposition of Māori and Pākehā and centering Te Ao Māori conceptualisations of the world (Pihama, 1993, Royal, 2012). Utilising a Kaupapa Māori perspective requires the consideration of "fundamental ethics of traditional Māori society" which are derived from core beliefs (that which is tika [true]), that emphasise "connection with the spiritual realm, the sacredness and vitality of all things, and the significance of reciprocity in human relations" (Henry & Pene, 2001: 23). Kaupapa Māori methods of research advocate that the self is placed

centrally within the research (Pihama, 2001). Smith (2013) expands on this notion stating that Māori have been positioned as the "Other" or have been represented or excluded from various accounts: "Indigenous peoples want to tell our own stories, write our own versions in our own ways, for our own purposes" (2013, p. 28). One such consideration is that until the mid-18th century, Māori society was an oral culture and that:

> "the telling of tales, the singing of songs, the reciting of genealogy and proverb are still today the main forms of transmitting the people's history. New events become part of the tradition. New waiata [songs] are composed to tell history, and old ones adapted. Tradition is not static. There is a constant dialogue between past and the present, and the patterns of thought are still primarily those of an oral culture" (Binney & Chaplin, 1990, p. 28)

Underlining a Te Ao Māori philosophical approach to understanding and interpreting reality is the notion of whakapapa providing a framework for social relations, relationships to the environment and protocols governing knowledge creation and transferal (Bishop, 1999; Graham, 2007). Iwi, hapū and whānau have developed many unique methodologies that are responsive to the priorities being investigated. Haami (2017), puts forward a Ngāti Ruaka (tribe based in the southeast of the North Island of Aotearoa New Zealand) methodology for preserving taonga (treasured items) and waiata (songs). Cleaver (2020) also articulates a wāhine Kāi Tahu (Kāi Tahu women)-specific methodology for informing social work research. These diverse Māori methodologies reflect the broader kaupapa Māori philosophy, which is grounded in a distinctly Māori epistemological framework.

As kaupapa Māori methodologies are deeply rooted in whakapapa and tikaka, they stand in contrast to Western philosophical approaches to knowledge. As Nepe (1991) describes:

> "Māori knowledge is not to be confused with Pākehā knowledge or general knowledge that has been translated into Māori. Māori knowledge has its origin in a metaphysical base that is distinctly Māori. Kaupapa Māori is esoteric and tūturu

> [permanent] Māori. It is knowledge that validates a Māori world view and is not only Māori owned but also Māori controlled" (p. 17).

While the philosophies should not be confused, there are avenues of alignment to help understand the multicultural reality some researchers operate within (Bishop, 2005; Cram et al. 2006; MacFarlane & MacFarlane, 2018), particularly when exploring social science theory in bricolage with Kaupapa Māori theory.

5.4.1 Indigenous Bricoleurs

For the purposes of this research, a modified bricolage methodology has been developed through weaving together elements of qualitative and Kaupapa Māori methodologies, and the new methodological framework has been piloted/trialled during this research. Denzin and Lincoln (1999) conceptualised bricolage qualitative inquiry as a critical, multi-perspectival, multi-theoretical and multi-methodological approach to inquiry. The authors point to the French etymological foundation of bricolage referring to a craftsperson (a bricoleur) as a "maker of quilts" who "uses the aesthetic and material tools of his or her craft, developing whatever strategies, methods, and empirical materials are at hand" (p. 4). The anthropological root of bricolage points to ad hoc, improvised or made-up structures to explain the world (Hawkes, 1977). Clarke explored bricolage as a form of fashion discourse, reassembling meanings and signs and in doing so, constructing different messages (Clarke, 1976). Hebdige (1979) built on Clarke's concept of bricolage as a discursive form of meaning making, framing his research on subcultures as bricoleurs who juxtapose two apparently incompatible realities, creating an "explosive junction" (p. 361). An interpretive bricolage researcher is one who "understands that research is an interactive process, shaped by his or her own personal history, biography, gender, social class, race and ethnicity, and by those of the people in the setting" (Denzin and Lincoln, 2000, p. 6). Kincheloe (2005) advocates that the multidisciplinary nature of bricolage requires "a new level of research consciousness" (p. 316) requiring the researcher to have

familiarity with multiple methods but is also cognisant of how the bricolage is influenced by his or her perspective, social location and personal history.

Bricolage research is a political act deliberatively constructed in response to "the history of research that has often demeaned Indigenous knowledge, history and experiences" (Lee, 2009, p.7). A recognition that "for indigenous researchers to participate in the research academy not only requires a return to our own epistemological frameworks, but the reworking of existing conventional research practices" (2009, p. 7). A bricolage approach that embraces "webs of relationships" and a focus on processes, interconnections and associations acts as an appropriate framework for weaving together kaupapa/Māori-centred and social science research. Adapting the Lévi-Strauss (1966) concept of the "bricoleur" to describe the qualitative researcher, Lee (2009) proposes an "Indigenous bricoleur" with a focus on Māori weaving instead of Denzin and Lincoln's aforementioned French quilts. European theorists ascribe elements of amateur hobbyist notions to their conceptualisation of bricoleur. In many Indigenous cultures globally, weaving is considered a sacred art conducted by skilled practitioners. This Indigenous bricoleur draws on decolonising methodologies (Smith, 2021), kaupapa Māori theory and methods and other qualitative narrative inquiry techniques. Lee uses pūrākau as a bricolage methodology to examine ako (pedagogy) in the Aotearoa New Zealand education systems. Lee argues that an Indigenous bricolage methodology is not only useful but necessary for an Indigenous researcher:

> "in response to the history of research that has often demeaned Indigenous knowledge, history and experiences, to participate in the research academy not only requires a return to our own epistemological frameworks, but the reworking of existing conventional research practices" (Lee, 2009, p. 7).

Using a culturally bound methodology to examine the impacts and responses to climate change is necessary to give appropriate visibility to the complex challenges of responding to climate change from a specific tūrakawaewae (a place of belonging where Māori with

ancestral links to the locale can stand and speak). For the purposes of this research, the lead author has woven a metaphorical kahu huruhuru (feathered cloak).

5.4.2 Whatu: Weaving the foundation of the cloak

Whatu is a name given to the art of finger weft-twining weaving in Māori culture. Traditionally, artists use muka, a silky fibre made from processing harakeke (flax) materials (Tamarapa, 2019) for the foundation of woven items. Muka is seen by some weavers as "a concrete way to represent wairua, or life force, but also as powerfully symbolic of the unseen- the spiritual element, that, to Māori, permeates all aspects of life (Tamarapa, 2019, p. 34). Woven items included practical everyday objects such as kete (baskets), fishing nets, mats and clothing (Tamarapa, 2019). Kahu huruhuru, made from harakeke and, most commonly, the feathers of birds, involves the intricate handweaving (whatu) of aho (vertical strands) and whenu (horizontal strands) of flax and feathers. It is only when all interconnecting parts come together and the here (cord) of the garment/kākahu is tied that a korowai (cloak) is complete and can be worn by the individual (Te Kanawa, 2006).

Tamarapa (2019) describes kākahu as repositories of knowledge. Examiners of a kākahu can glean information about the purpose of the cloak (shelter and warmth, status, spiritual and physical protection), the resources available at the time of the weaving through materials used and stories and designs specific to iwi and hapū that are woven into the cloaks. They are imbued with the mana (prestige) of the whānau, hapū and iwi of the wearer. In contemporary Māori life, kākahu continue to play key roles adorning wearers at important events such as weddings, graduations and other ceremonies. They are also used at funerals, draped over the coffins of the recently deceased to smooth the passage between life stages (Hemare, 2005).

Weaving as an artform is primarily associated with wāhine (women) as the traditional experts. Smith (2019) constructed a kāhuku (another term used for kākahu) methodology (whatuora) and embodied practice of weaving to explore stories of Māori wāhine. "Each

cloak has been carefully crafted and is imbued with story. It speaks of those things – good and bad, that surround us, and form and inform who we are and how we "see" the world we live in" (Smith, 2019, p. 7). A kahu huruhuru exists as a taonga in multiple temporalities. From the gathering of materials and weaving of the garment, through the adorning of ancestors to the careful preservation for future descendants, each adding to the narrative of the item.

To engage in the practice of weaving, artists often used karakia (incantation) and other cultural practices to enter an optimum state of being (te whare pora) to receive knowledge. "It was believed that the karakia endowed the student with a receptive mind and retentive memory. They would become possessed with quick understanding and a thirst for deeper knowledge. Initiated weavers became dedicated to the pursuit of a complete knowledge of weaving, including spiritual concepts" (Te Papa, n.d.). The authors draw upon a metaphorical te whare pora (the house of weaving) to create an appropriate and ethical framework for conducting the kahu huruhuru research.

For the purposes of this research, te whare pora is drawn upon as a purely metaphorical concept to describe the preparation and readiness for data collection in the research. Qualitative research involving methods such as interviewing, wānanga (workshops) and other kōrero methods often require ethical approval. To conduct this research in a culturally safe manner, the lead author drew upon Kennedy and Cram's (2010) work to construct a kaupapa Māori ethical framework, illustrated by principles of: aroha ki te takata (respect the people you are working with), whakawhanaukataka (build relationships), whakaoraka kōrero (listen first, speak later), kia tūpato (be cautious), manaaki ki takata (be generous in sharing with people), and kia mahaki (be humble).

5.5 Te kohikohi i kā hou: Data Collection

Kohikohi means "bringing together" in Te Reo Māori while kā hou refers to the feathers of birds. For Smith's 2019 research, she interpreted feathers as:

> "the feathers of our parents, our grandparents, our tūpuna [ancestors]. These feathers tell us who we are, where we are from, where we belong, all of which help us to be well and live well in this world. These storied feathers connect us to our past and project aspirations of our future" (Smith, 2019, p. 6).

For the purposes of our kahu huruhuru model, kā hou are also the data or artefacts woven into the kahu huruhuru. These include Mātauraka Māori, kōrero (interviews), pūrākau, waiata, wānaka (workshops), hikoi (journey), western planning and policy, scientific models, data, and emergency management practices. Kōrero and narratives from interviewees are woven into the kahu huruhuru creating an overarching pattern but each participant's story also exists as a separate and unique narrative of personal truth. Therefore the various commentaries reflect the different realities of participants as well as the collective nature of Māori whānau, rūnaka and iwi narratives. The use of interviews in this research aligns with a broader Māori storytelling tradition, where knowledge is transmitted through narratives that hold both individual and collective significance. One such form of narrative is pūrākau, which encapsulates Māori philosophies, worldviews, and cultural teachings.

Pūrākau, a traditional form of Māori narrative, contains philosophical thought, epistemological constructs, cultural codes, and worldviews that are fundamental to our identity as Māori. These oral narratives that should not only be protected but also understood as a pedagogical-based anthology of literature that are still relevant today (Lee, 2009). Murihiku-based pūrākau explore our strong links with Takaroa (deity associate with the sea) and Te Ara a Kiwa (the Foveaux Strait). These pūrākau demonstrate our strong relationship with the moana culturally and influence participants' views of climate change. While pūrākau offer rich insights into Māori relationships with the environment and perceptions of climate change, other forms of documentation also serve as valuable sources of knowledge. Written records, policy documents, and archival materials provide additional layers of context, complementing oral traditions in understanding and addressing contemporary challenges.

Documents are an important component of the research, including both mainstream and Indigenous policy, planning and strategy documents. In Indigenous cultures, narrative is a means of codifying knowledge and facilitating the process of knowing (Archibald, 2008). According to Ware et al. (2017), "indigenous narratives explain their origins; locate them physically, socially, environmentally, culturally and spiritually; and often transcend time and space" (p. 46). Māori researchers have drawn on narrative analysis for kōrero, pūrākau and other oral forms of communication (Erueti, 2015; Hollis-English, 2012; Lee, 2005, 2009; Ruwhiu, 2008). Written plans and documents are also narratives, transmitting and reifying culture, history and values (Ware et al. 2017). Policies and plans represent a collective process of meaning-making and prioritisation. IHMPs and district plans inform us of the values and priorities of the communities they represent. These tools are therefore, rich for understanding collective identity, history and decision-making (Saunders, 2017). Analysing and comparing non-Indigenous policies and plans alongside Indigenous documents and kōrero can assist in highlighting useful Indigenous planning narratives and discourses that may be hidden from wider perusal. Indigenous planning theory frames the narrative analysis of these documents. Indigenous planning theory not only provides a framework for analysing policy and strategy documents but also highlights the narratives that shape community priorities and decision-making. To gain a fuller picture of climate change responses, these narratives must be examined in conjunction with other knowledge sources, including scientific data and models.

Scientific data and models are also ngā hou to be woven into the kahu huruhuru. Data tools and models, such as the NZ SeaRise programme, provide locationally specific combinations of sea level rise and tectonic displacement data for the public. However, quantitative or numerical scientific information often uses complex language or lacks important context, which may render meaning and understanding inaccessible, even irrelevant to some members of the public. Drawing on climate change models and data, along with other forms of ngā hou, can help build a more coherent and contextualised narrative of climate change risk and response. Scientific data offers precise measurements and projections, but without cultural context, it risks being disconnected from the lived

experiences of communities. By weaving together multiple strands of knowledge—scientific, policy-based, and Indigenous—a more holistic and meaningful understanding of climate change risks and responses can emerge.

5.6 Whatu Kākahu: Data Analysis

There is a deeply embedded tradition of passing down Mātauraka Māori and tikaka through kōrero kanohi ki te kanohi (face to face conversations) and these attributes are intertwined with whakapapa and identity. It is therefore important to reject notions of hui (meetings) and interview narratives as discrete forms of data separate to the participants that can be "cut up" and assembled (Somers, 1997). The aforementioned data collection/ methods underpin an approach to narrative analysis that draws on de-colonising paradigms, respects narratives in their entirety, and disrupts the potential power imbalance of the "I" researcher and the "they" researched. Instead, researchers and participants collaboratively construct narratives as a "we", respecting the mana of participants. This is particularly important when discussing potentially traumatic topics of climate change impacts that may emerge during the research.

The data collected for this research includes interview and hui 'talk' or, kōrero, documents, images and pūrākau. While the forms of these data are varied, they may all be understood as different forms of narratives. According to Elliott (2005), narratives have an important social dimension and are told in a specific social context for a particular purpose. Somers (1997) describes narratives as constellations of relationships, embedded in time and space and constituted by causal emplotment (the assemblage of elements in a story). She explores four categories of narratives that frame the social world and our social identities (1997) : ontological narratives (personal narratives), public narratives (attached to cultural and institutional formations), conceptual narratives (social science theory) and meta narratives (master narratives such as climate change, colonisation and neoliberalism) (Phibbs, 2008). The context and purpose of narratives is particularly important for understanding how stories are constructed and how they operate at different levels.

No narrative exists independent of others, they are co-constitutive and relational, transcending defined fields (Somers, 1994). As such, a nested analysis approach has been taken during this research to address the different levels of narratives and the intersections between ontological and whānau narratives, public and Māori narratives, conceptual narratives and meta narratives. The nested narrative approach is useful for exploring the socio-political context of climate change broadly as it remains a contentious issue in ontological and public spaces in contrast to the science sector where climate change is readily acknowledged as a critical reality. The whatu kākahu approach (outlined above) for analysis uses a narrative analysis framework to explore the inter-relations, influence and expressions of the hou (feathers) of nested narratives (Gergen & Gergen, 1988) and their potential tensions at intersections with identity within the data.

5.7 Te Kahu Huruhuru o Kohikohi: The cloak of Kohikohi

As previously referenced, Kohikohi means "bringing together", it is also the name of the lead author's tupuna (ancestor) who inspired the kahu huruhuru methodology. The cloak pictured below (figure 1, figure 2) belonged to Kohikohi, and was donated to Te Hikoi Museum by Ulva Belsham (QSO) in 1990. Whatu techniques for this kākahu utilise a candlewick kaupapa (foundation) and embrace traditional materials such as harakeke as well as feathers from bantams and roosters that were likely brought over by the colonial whalers who settled in the Oraka-Aparima area. The kahu huruhuru is woven using many different patterns, textures and colours as well as inherited knowledge which combine to produce a beautiful and protective cloak passed down through whakapapa.





FIGURE 15: LEAD AUTHOR WITH THE KAHU HURUHURU, TE HĪKOI MUSEUM (JULY 2021) CREDIT: CHRISTINE KENNEY

FIGURE 16: TUPUNA (ANCESTOR) LOUISA JOSS WEARING THE CLOAK (NO DATE)

The kākahu bricolage methodology (outlined below in figure 3) combines Te Ao Māori and Western knowledge and practices to build patterns and meaning. It is woven using a kaupapa Māori qualitative methodology as the muka thread, with whakapapa binding together the elements. It is adorned with colourful nga hou, kōrero, mātauraka Māori, tikaka Māori, pūrākau and hikoi representing intergenerational narratives of whānau experiences with climate change. Other forms of narratives and data in the form of Māori and non-Māori planning and policy documents and climate change research and practices provide complementary and contrasting ngā hou feathers.



FIGURE 17: TE KAHU HURUHURU O KOHIKOHI METHODOLOGY

Ultimately, Te Kahu Huruhuru o Kohikohi is the methodological framework to develop an intergenerational locationally, culturally and temporally relevant kahu huruhuru resource to serve whānau adapting and responding to climate change impacts. While the physical Te Kahu Huruhuru is currently in storage at a museum to be carefully preserved as a taonga for future generations, it is the author's intention for the Te Kahu Huruhuru o Kohikohi methodology and accompanying academic research to be actively used, for whatever purposes current and future generations deem to be important.

5.8 Tying off the strands: Conclusion and recommendations

This methodology in many ways is a response to calls for greater inclusion of Indigenous voices in the climate change research, policy and practice arenas. It is imperative that Indigenous voices can be heard in order to respond effectively to the challenges of climate change. Yet, there is significant diversity in the autonomy, contexts and experiences of Indigenous Peoples and in the ways, they respond to current extreme weather-related events and plan for a future, increasingly challenged by climate change. Research

methodologies used by Indigenous academics when working with their communities, should also be diverse, and reflect local priorities, knowledges and cultural adaptation practices of these groups. Te Kahu Huruhuru o Kohikohi is one such methodology, uniquely developed during and for this particular study and for the individuals, whānau, rūnaka and Iwi members who participated in the research.

Te Kahu Huruhuru o Kohikohi weaves together an innovative methodological framework underpinned by localised rūnaka and whānau knowledges that responds to the urgent call for increased inclusion of Indigenous agency and voices in climate change research. Throughout this project, the diversity of Indigenous experiences is emphasised, challenging the "one-size-fits-all" frameworks often presented in global and national climate change policies. This methodology underscores the importance of a kaupapa Māori perspective, where Māori realities, values, and worldviews are seen as central to both research and the practice of climate change adaptation.

One of the most significant contributions of Te Kahu Huruhuru o Kohikohi is its focus on the bricolage approach, combining elements of qualitative, kaupapa Māori, and Western methodologies. This approach allows for a flexible and adaptive research process that respects the mana (authority and prestige) of the participants while recognising the complexity of the issue at hand. Climate change, with its global scope and local impacts, requires a framework that can account for multiple-layered temporalities and ontologies. Te Kahu Huruhuru o Kohikohi achieves this through its focus on whakapapa (genealogy). By framing knowledge in this genealogical context, the research can highlight the intergenerational storytelling and responsibilities that are central to Māori communities' responses to climate change.

The importance of storytelling cannot be overstated. As the paper highlights, much of the mainstream climate change research is rooted in quantitative models, and often ignores the rich, narratives that voice Indigenous peoples' lived experiences. For Māori, these stories are not just data points; they are the foundation of ontological and epistemological understandings of the world. Through the integration of pūrākau, wānanga, and hui, Te

Kahu Huruhuru o Kohikohi enables a deep engagement with Māori knowledge systems, ensuring that research on climate change reflects the lived realities and cultural practices of the communities involved.

The methodology also addresses gaps in current climate change policy and planning, particularly the tendency to overlook the specific needs and values of Māori communities. In doing so, it provides a framework for policy makers to engage meaningfully with Māori-led strategies for climate resilience and adaptation. By centering Māori voices and honouring local experiences, this methodology not only enriches climate change research but also serves as a methodological model for other Indigenous communities in Aotearoa and globally.

In conclusion, Te Kahu Huruhuru o Kohikohi offers a transformative and culturally grounded approach to climate change research. The narratives and information collected through this research stand as a record of participants' experiences and mātauraka, and their hopes for the future in adapting and responding to climate change. Te Kahu Huruhuru also provides a rich resource for planning responses to climate change, through determining what the priorities and risks are for Māori, as well as identifying what Takata Whenua value and what needs to be preserved for future generations. This methodology will continue as a resource for Southern whānau, rūnaka hapū, and iwi as they navigate the ongoing impacts of climate change and work towards a sustainable future for their communities and future generations. More broadly, this korowai stands as a testament to the resilience of Māori knowledge systems and the necessity of Indigenous-led research in addressing one of the most pressing global challenges of the current era.

5.9 Glossary

aho	vertical strands in weaving
ako	pedagogy
aroha ki te takata	respect the people you are working with
hapū	Māori subtribe
harakeke	flax
here	cord
hikoi	journey
hou	feathers
hui	meeting
iwi	Māori tribe
kahu huruhuru	feathered cloak
Kāi Tahu	an iwi or tribe based in the South Island of Aotearoa New Zealand, otherwise known as Ngāi Tahu
kaitiaki	guardian or steward
kaitiakitaka	guardianship or stewardship
kākahu	garment
kanohi ki te kanohi	face to face
karakia	incantation
kaupapa	foundation
Kaupapa Māori	Māori values or foundation
kete	baskets

kia mahaki	be humble
kia tūpato	be cautious
kohikohi	coming together
kōrero	interviews or discussion
korowai	cloak
mana	prestige, authority
manaaki ki takata	be generous in sharing with people
manaakitaka	generosity or hospitality
marae	communal meeting house
mātauraka, mātauranga	knowledge
moana	sea, ocean
muka	a silky fibre made from processing harakeke materials
Murihiku	southern South Island, Southland
ngā hou	feathers or data
Ngāti Ruaka	tribe based in the southeast of the North Island of Aotearoa New Zealand
noa	profane
Pākehā	New Zealander of European descent
pūrākau	intergenerational stories
rakatirataka	self-determination
rūnaka	regional iwi governance bodies
Takaroa	deity associated with the sea

Takata Whenua	Indigenous peoples of Aotearoa New Zealand
Takiwā	region
taonga	treasured items
tapu	sacred
Te Ara a Kiwa	Foveaux Strait
te ao Māori	the Māori world or Māori worldviews
te reo Māori	the Māori language
te Tiriti o Waitangi	the Treaty of Waitangi
te Whare Pora	the house of weaving
tika	true
tikaka, tikanga	cultural practices
tupuna	ancestor
tūpuna	ancestors
tūrakawaewae	a place of belonging where Māori with ancestral links to the locale can stand and speak
tūturu	permanent
wāhine	women
waiata	song or songs
wairua	lifeforce
wānaka, wānanga	workshops
wānakahikoi	journey while collectively learning
whakaoraka kōrero	listen first, speak later

whakapapa	genealogy
whakawhanaukataka	build relationships
whānau	families
whatu	handweaving
whatuora	methodology
whenu	horizontal strands in weaving
whenua	land

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5.11 Chapter Addendum: Supplementary Section on Methods

This addendum provides a concise bridge between the published methodology article Te Kahu Huruhuru o Kohikohi and the operational detail of how the doctoral research enacted that methodology in practice. It outlines the specific methods, procedures, ethical commitments, and analytic decisions used in the study, demonstrating how the theoretical and kaupapa Māori principles articulated in the published work were realised through whakapapa-based recruitment, kanohi-ki-te-kanohi engagement, narrative-centred data collection, and reflexive, decolonising analysis. In doing so, the addendum positions the methods within the wider architecture of the thesis and clarifies how methodological choices align with the cultural, relational, and ethical foundations of Kaupapa Māori qualitative research. A timeline for PhD activities is included below (figure 18). Two events not noted in the below timeline, (but contextually relevant), were the rolling covid-19 lockdowns and restrictions that limited kanohi ki te kanohi engagement and secondly, parental leave for the duration of 2023 which also limited opportunities for engagement.

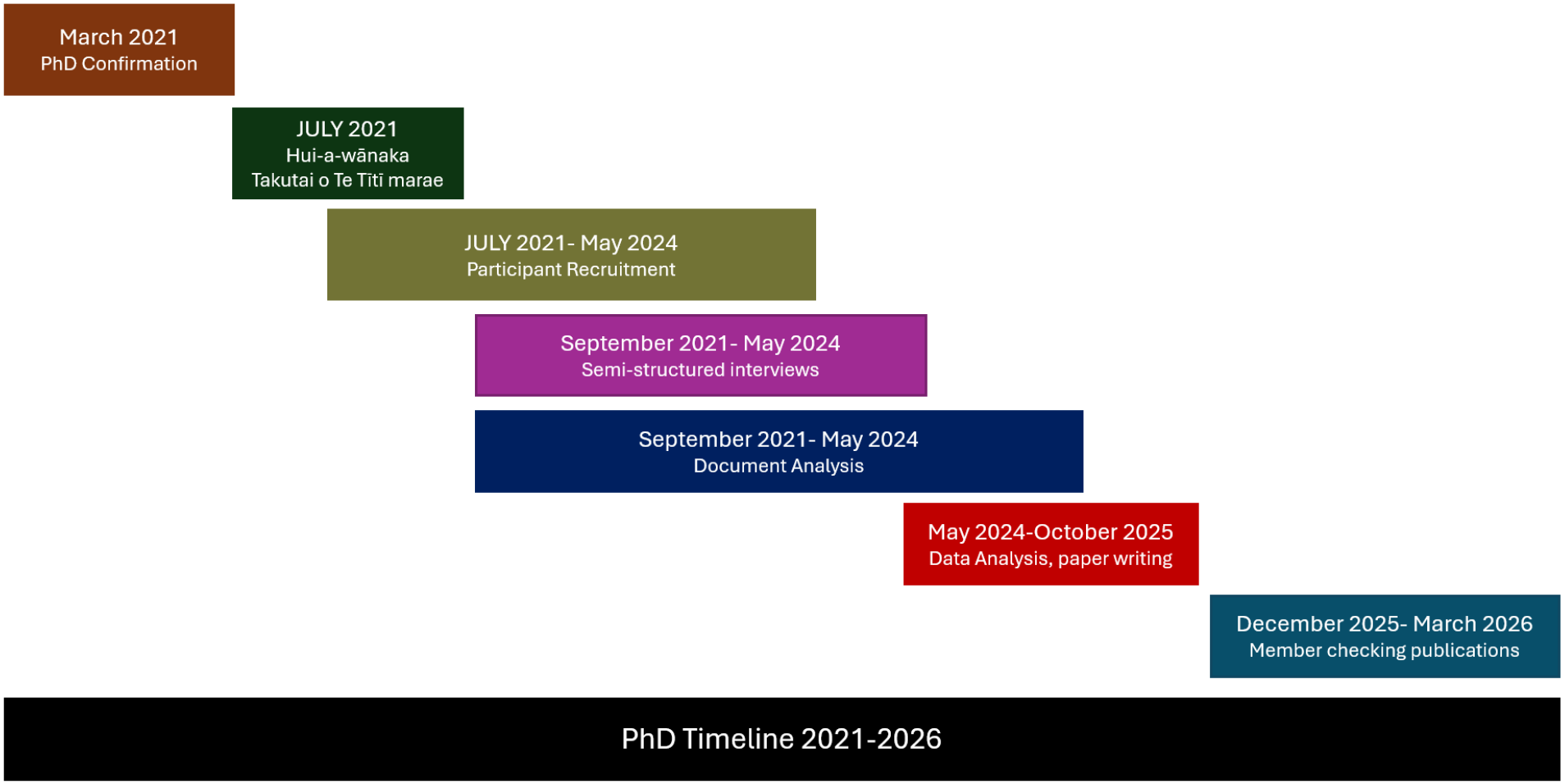


FIGURE 18: TIMELINE OF MAIN PHD ACTIVITIES 2021-2026

I. Recruitment of participants

Walker et al. (2006) and Moyle (2014) explored a tuakana/teina (older sibling/younger sibling) approach to participants. Under this paradigm, the researcher is teina (a learner) while participants are tuakana, gifting knowledge and stories. This project adopted that relational ethic, requiring methods that are ethical, respectful, reflexive, critical and grounded in humility (Moyle, 2004). The inquiry methods used here, and the stance taken by the researcher, were designed to uphold that relationship.

Participant profile and rationale

Participants in this research were purposively identified based on whakapapa relationships, positional responsibilities, and lived experience relevant to the research aims. In keeping with a tuakana–teina ethic (Moyle, 2014, Walker et al. 2006), participants were regarded as tuakana (holders and protectors of knowledge, mentor). while the researcher entered as *teina* (learner, mentee). This relational paradigm required a profile of participants who could speak authentically to whenua-anchored, intergenerational, and governance-related dimensions of the inquiry.

The participant cohort therefore included:

- Kaumātua, recognised knowledge holders with lived experience of environmental change, governance histories, and iwi–Crown relationships.
- Rakatira (respected leaders), Iwi and rūnaka leaders, involved in strategic decision-making, resource management, planning, and climate adaptation.
- Practitioners in planning, policy, environmental science, and emergency management, whose expertise intersects with mana whenua authority, statutory frameworks, and climate-related risks.

- Community members actively involved in marae-based, environmental, hazard response or resilience practice, reflecting grounded, practice-based knowledge essential to the research.

This profile ensured the inquiry could draw on the depth and breadth of mātauraka, governance experience, place-based knowledge, and practical adaptation expertise necessary for exploring mana whenua aspirations across climate, environmental, and emergency management settings. Rakatahi (youth), were nominated, to reflect emerging leadership, continuity of tikaka, and intergenerational perspectives on climate adaptation, environmental management, and resilience, however, were unable to be directly interviewed before the conclusion of this project.

The profile was finalised through kōrero with key mana whenua stakeholders, who advised on appropriate representation, the inclusion of specific knowledge holders, and the ethical parameters for approaching them. This iterative, collective shaping of the participant cohort upheld tikaka, reciprocity, and the principle of kanohi ki te kanohi (face to face).

Recruitment process

Participant recruitment took place in the second year of the doctorate. Many mana whenua stakeholders were already in relationship with the researcher through whakapapa, existing kaupapa, or whanaungatanga networks. A respected iwi rakatira (leader) facilitated early introductions and supported the identification of appropriate participants, including kaumātua, whose voices were important to the kaupapa and who held authority to speak for their communities.

For participants engaged in environmental planning, resource management, climate adaptation, and policy development, prior relationships meant that relevant contacts were already established with individuals active at local, regional, and iwi levels. Recruitment was therefore relational, iterative, and responsive rather than mechanistic. Negotiation occurred continually, across interview timing, koha (gift or contribution),

modalities of participation (kanohi ki te kanohi, online), and transcript approval procedures.

Where appropriate, rūnaka, iwi and hapū leaders received initial kōrero/panui (written notice) outlining the kaupapa, followed by distribution of formal information sheets and consent forms. At least one week's notice was provided prior to interviews. Information sheets and consent forms were provided kanohi ki te kanohi, ensuring clarity and upholding tikaka around informed consent.

Participation was voluntary at all stages, with full rights to withdraw or to revoke permission to publish specific kōrero. Trust was cultivated through ongoing communication, transparency, and adherence to tikaka. Following initial hui, interviews were held with takata whenua who either self-selected or were nominated by their communities as appropriate voices for this kaupapa. Written informed consent was obtained and re-discussed immediately prior to each interview or hui.

Relational sufficiency and information power

In keeping with kaupapa Māori methodological principles, the study was guided by the concept of relational sufficiency, supported by the qualitative principle of information power. Within a kaupapa framework, relational sufficiency reflects the extent to which participants' kōrero, positional authority, whakapapa connections, and experiences collectively provide the depth, diversity, and integrity required to address the aims of the research (Smith, 1996).

Information power indicates that when a study has a clearly focused aim, recruits participants with high contextual and cultural specificity, and fosters strong dialogic engagement, fewer participants are required to generate robust insights; the sufficiency of the cohort depends on the study aim, sample specificity, use of theory, quality of dialogue, and analytic strategy (Malterud et al., 2016). In this project, participants contributed deep place-based knowledge, governance experience, and mātauraka that

were directly relevant to the inquiry. Kōrero was shaped through sustained relationships and whakapapa, enhancing information power in this doctoral research.

Consequently, the participant cohort was intentionally small, purposefully selected, and relationally anchored. This approach aligns with interpretive, kaupapa Māori research traditions in which the quality, integrity, and relational richness of kōrero take precedence over numerical scale (Cram, 2009; Smith, 2016). The resulting body of knowledge reflects the reciprocal, trust-based relationships that enabled it to be offered, interpreted, and held with care.

II. Data collection

Data collection gathered the stories and views of Kāi Tahu ki Murihiku whānau using semi-structured interviews, hui, hui ā wānaka, hikoi (walking the land), and document analysis. From a Māori perspective, these methods support relational, place-based, and tikaka-grounded knowledge generation; wānaka and hui reflect collective modes of kōrero and whakawhanauktaka (relationship building), while semi-structured interviews allow participants to guide emphasis and depth in ways consistent with manaakitaka (hospitality) and participant authority (McCarty et al., 2025; Pihama et al., 2019). Hīkoi were included because walking the land both alone and with participants surfaces situated, embodied forms of mātauraka tied to whenua and whakapapa that static interview settings cannot fully access (Brown, 2012; Simmonds, 2024). Document analysis complemented oral and experiential methods by acknowledging that Māori knowledge is distributed across multiple forms, including iwi-generated and archival materials, consistent with kaupapa Māori methodology (Haitana et al., 2020).

Whenever possible, data collection occurred kanohi ki te kanohi (face to face), on whenua, research and aligning with tikaka/kawa in marae-based engagements. Where needed during COVID-19 restrictions, interviews were conducted online with attention to maintaining whakawhanaukataka and cultural safety in digital contexts (Jones et al., 2006; O'Carroll, 2013). Hui were conducted under the tikaka and kawa of mana whenua

and of the marae wharenui (scared ancestral house of a marae complex), reflecting established guidance on tikaka-anchored qualitative processes (Tipene-Matua et al., 2009).

With participant agreement, data also included pūrākau and other forms of knowledge, because Māori expertise is often expressed through narrative and intergenerational storytelling rather than solely explicit responses to direct questioning. Recognising these forms maintains the integrity of Māori epistemologies in their fullness, rather than constraining knowledge to Western interview conventions (Lee, 2009). Culturally sensitive material (personal experiences, whakapapa, historical trauma, cultural knowledge) was handled with particular care under mutually agreed conditions.

Topics for both the interviews and the broader research were first scoped at an initial Hui ā Wānaka introducing the project, then evolved iteratively through subsequent hui as participants raised new priorities such as the intersection of Māori entrepreneurship and the climate change adaptation strategy which was not originally a topic but was raised repeatedly in the interviews. This approach is consistent with both Māori-centred design and national ethics guidance to ensure cultural rigour and participant-driven relevance (Pihama et al., 2019; National Ethics Advisory Committee, 2019). Interviewees were invited to review and amend transcripts (member checking) to support accuracy and participant authority over their kōrero (McKim, 2023). An ethics-approved interview guide supported, but did not constrain, the conversational flow.

Taken together, these procedures generated a multi-modal and reflexive body of kōrero and information across hui, hui ā wānanga, interviews (including online during COVID-19), hīkoi, and document materials. The kaupapa Māori design decisions above, included participant-led topic evolution, kanohi ki te kanohi, online adaptations and member checking. These design decisions provided a coherent platform for a narrative–thematic analysis, preserving story integrity and centring participant mana and meaning (O'Carroll, 2013; Pihama et al., 2019).

III. Analysis: Kaupapa Māori Narrative–Thematic Approach

Analysis of participants' kōrero (talk) followed a kaupapa Māori narrative–thematic approach consistent with *Te Kahu Huruhuru o Kohikohi*. All uiui, hui, kōrero, documents, waiata, pūrākau and hikoi were treated as interrelated narrative forms embedded in whakapapa, place and relational contexts. Drawing on Somers (1994, 1997), narratives were understood as relational constellations embedded in time and space, constituted by causal emplotment, and articulated across meta, conceptual, public, and ontological narratives.

Because Māori narratives are grounded in relationality and whakapapa, the integrity of whole narratives was preserved. Rather than "cutting up" kōrero into decontextualised units, analysis retained the cohesion of stories and addressed power dynamics within research by collaboratively constructing narratives. Especially where discussions traversed climate-related trauma and loss. Draft articles using participant contributions were returned (with pseudonyms) for comment to ensure comfort and accuracy of representation. Only the lead researcher handled raw recordings and full transcripts; supervisors/co-authors viewed anonymised excerpts within draft manuscripts, further protecting confidentiality.

In this study, colonisation and climate change operated as meta-narratives shaping the conditions under which environmental disruption was interpreted. Mātauraka Māori and Western ecological science acted as conceptual narratives offering complementary interpretive resources. Policy settings and community discourses constituted public narratives, while participants' reflections on species decline, disrupted practices, intergenerational responsibilities and emotional landscapes formed the ontological narratives of participants' experiences. Building on the embedded narrative approach of Gergen & Gergen (1988) and Phibbs (2008), the analytic workflow involved: immersion in each participant's story; reflexive memoing attending to whakapapa ties: cultural signals and temporalities; development of within-case narrative summaries that preserved story

integrity; and cross-case patterning. The aim of the analysis process was to identify shared strands without fragmenting kōrero into decontextualised codes.

Four interwoven strands (ecological changes, disrupted practices, displacement challenges, and emotional landscapes) emerged from inductive analysis and were explored in a standalone article detailing climate change impacts on Kāi Tahu ki Murihiku whānau (Chapter Six). These four strands were woven together with mātauraka Māori, scientific understandings, and policy analysis to produce a consolidated narrative of Kāi Tahu ki Murihiku climate change experiences.

Separate narratives emerged, particularly the dimensions of intergenerational climate adaptation among Kāi Tahu ki Murihiku whānau, which are presented in Chapter Seven. The diverse dimensions included: whakapapa-based adaptive infrastructure; kaitikaitaka, ahi kā (continuous occupation) and utu (balance) as climate adaptation; kotahitaka (unity) and strategic relationships; and visioning mokopuna futures. The narrative approach to analysis was inspired by Somers (1994) and Gergen & Gergen (1988). The approach aligned with the kaupapa Māori bricolage that has framed the thesis and the researcher's insider positionality (Kāi Tahu, Kāti Māmoe, Waitaha).

Trustworthiness and Credibility of Data Analysis

Credibility refers to confidence in the "truth value" of the findings, i.e., that interpretations faithfully represent participants' experiences and are produced through transparent, defensible procedures. In qualitative inquiry, credibility sits within the wider framework of trustworthiness alongside transferability, dependability, and confirmability (Lincoln & Guba, 1985). Techniques commonly used to evidence credibility include triangulation, member checking, peer debriefing, and maintaining an audit trail of analytic decisions (Lincoln & Guba, 1985; Nowell et al., 2017).

Multiple forms of triangulation underpinned the analysis. Investigator triangulation occurred through ongoing supervisory critique and debriefing; supervisory feedback was used to question assumptions, probe negative cases, and test the coherence of within-case

and cross-case interpretations (procedures recognised in the credibility canon) (Lincoln & Guba, 1985; Spall, 1998). Participant triangulation was achieved by inviting participants to review their interview transcripts (member checking) and by circulating manuscripts to all participants, including those not directly quoted, so that collective whakaaro (thinking) informing the synthesis could be affirmed or corrected. This extended participant validation is a recommended strategy for establishing credibility (Lincoln & Guba, 1985; McKim, 2023). Several examples of participant feedback on draft versions of the manuscripts contained in Chapter Six and Chapter Seven are included below:

> "tino kino te pai to mahi (your work is excellent)" – Tāiko
>
> "Both articles were very informative. I was heartened to read how much the broader whānau knew and articulated the evidence of growing environmental changes caused by climate change and options provided to address climate adaptation. Equally, I was saddened but not surprised by the depth of feeling around loss in relation to the gathering of kai e.g. gathering kai, tītī islands. Thank you for the opportunity to review the articles and well done!" – Pōpokotea
>
> I have just read the article, very impressive… great to see the amount of participation you had, awesome!" – Kererū

Third, data triangulation was embedded in the design, with convergence and divergence examined across hui, hui ā wānanga, interviews (including online during COVID-19), hīkoi, and documentary sources; triangulation across sources is a recognised approach to testing the robustness of interpretations (Guion et al., 2011).

External scholarly review provides an additional credibility check. In this project, draft Chapters Two, Four, and Five underwent full peer review and were published prior to submission of this doctoral thesis. Chapters three, six and seven are currently in review at their respective journals. The methodological design *Te Kahu Huruhuru o Kohikohi* was presented both to participants and at disciplinary conferences where it was favourably received. These external appraisals functioned as forms of peer debriefing and referential

adequacy, providing independent tests of argument coherence and methodological fit consistent with credibility practices (Lincoln & Guba, 1985; Nowell et al., 2017).

An auditable trail documented immersion, reflexive memos (attending to whakapapa ties, cultural signals, and temporalities), within-case narrative summaries preserving story integrity, and cross-case patterning procedures. The maintenance of a clear decision trail is recommended for demonstrating the precision and exhaustiveness of analysis and for enabling readers to appraise credibility (Nowell et al., 2017).

The trustworthiness and credibility procedures above were enacted alongside Māori ethical principles (tika, pono), with manuscript-level review by participants used to ensure accuracy of representation and cultural safety. This is consistent with credibility strategies such as member checking and peer debriefing (Lincoln & Guba, 1985; Spall, 1998). An ethical framework was established for this research (detailed in the following section). This kaupapa Māori-specific ethical frameworks aimed to embed tika (appropriate process) and pono (honesty, transparency) in analysis and dissemination, and uphold the mana of participants while meeting external expectations for cultural rigour in studies involving Māori (National Ethics Advisory Committee, 2019).

IV. Ethical considerations

This research was designed by and for Māori, addressed Māori concerns, and was implemented by a Māori researcher (with the guidance of Senior Māori academics) and conducted in accordance with Māori cultural values and ethical research practices (Smith, 2013). As this research was conducted through an Aotearoa New Zealand University, Te Tiriti o Waitangi provided an ethical basis for conducting the research and adhering to principles of partnership, protection, participation and tino rakatirataka. Smith (1990) initially identified six principles or elements of Kaupapa Māori within the context of educational intervention (Kura Kaupapa Māori) and research. These elements and principles were later expanded by other Kaupapa Māori theorists such as Smith (1997),

Pihama (2001), Bishop (2005) and Pohatu (2005). After the initial establishing hui in March 2021, an ethical framework to guide the research was determined, including:

Aroha ki te takata (respect for the people you are working with)

Participants brought diverse worldviews and experiences as well as different strengths and vulnerabilities to the research. No matter their background, anyone who contributed to the research was respected and treated with fairness and respect, and their right to privacy and anonymity was secured.

Kanohi ki te kanohi (face-to-face meetings)

Whenever possible, meetings were face-to-face with participants. This was an important component of building relationships in Māori society. While Covid-19 brought challenges in terms of the ability to conduct everything face-to-face, it led to a proliferation of online "zui" (hui conducted through online video software). While in-person face-to-face was preferred, Zoom and other software were incorporated into the project for more informal meetings based on the preference of participants and in response to national and regional Covid-19 lockdowns that occurred.

Titiro whakaoraka kōrero (listen first, speak later)

Related to the tuakana/teina framing, interactions with participants were conducted with patience and humility. Storytelling was an important component of Māori knowledge and relationship building, and as such, it was important to give participants space to share their own narratives. It was also the responsibility of the researcher to ensure that no one voice dominated a group dynamic and that quieter participants were given space to share their experiences.

Kia tūpato (Be cautious)

Mutual agreement on the principles of the research as well as how the research will be conducted was needed. Research information sheets and participant consent forms (included in the appendix) were shared, explaining the parameters of the research and my responsibilities as a researcher were shared with all participants to affirm consent.

Manaaki ki te takata (Be generous in sharing with people)

The comfort and wellbeing of the participants was a central concern when carrying out this research. Kai (food) was offered to participants where possible. Participants received a $50 koha to thank them for their participation. Local tikaka and kawa of the rūnaka and marae were respected and privilege.

V. Use of Te Reo Māori Language in the Research

Interviews for this project were bilingual but conducted predominantly in English, and the Participant Information Sheets and Consent Forms were also provided in English. This reflected the linguistic realities within Kāi Tahu and wider Māori communities, where Te Reo Māori was actively suppressed for generations, resulting in widespread language loss, varying levels of fluency, and, for some, ongoing feelings of whakamā (cultural shame) (Smith, 1989). As a researcher who is not a fluent speaker, it was important not to create pressure or exclusion for participants who also hold diverse relationships to Te Reo Māori.

Even with English as the primary working language, Te Reo Māori remained integral to the kaupapa. Te Reo Māori was used for tikaka-based concepts, key terms, place names, whakataukī, and whenever participants chose to express ideas or emotions in their own reo (language). Participants could move fluidly between languages, and their reo use was retained in the transcripts and analysis where it carried cultural or conceptual meaning that could not be fully rendered in translation. Where clarification was required, translations were offered carefully so as not to dilute nuance.

This approach balanced cultural safety, accessibility, and decolonising intent: acknowledging historical trauma associated with language loss while actively upholding and normalising Te Reo Māori within the research environment (Cram, 2009). It also recognised the significant intergenerational revitalisation currently strengthening reo use across Kāi Tahu communities. Accordingly, the project aimed to create a space where reo Māori was welcomed, respected, and protected, without imposing expectations on participants' fluency or comfort.

VI. Indigenous Data Sovereignty (IDS)

Data storage, access, return and any potential reuse were governed by CARE Principles (Collective Benefit, Authority to Control, Responsibility, Ethics) and, where applicable, OCAP® (Ownership, Control, Access, Possession) (Carroll et al., 2020; Schnarch, 2004), ensuring mana whenua authority over sensitive knowledge and clarity of rights/benefits. Where open-data conventions intersect with IDS, the stance was to be FAIR and CARE, prioritising people and purpose-oriented stewardship of taoka.

VII. Researcher reflexivity: ethical considerations of an emic stance

As an emic (insider) researcher, reflexivity is both a methodological and ethical consideration. This is because whakapapa-based relationships can affect recruitment, consent, data generation, interpretation, and dissemination (Hudson et al. 2017; Mikahaere-Hall, 2017). Ethical reflexivity in this study addressed three recurrent challenges: role conflict and expectations, relational power and confidentiality, and interpretive bias. Potential role conflicts (e.g., expectations of advocacy, obligations to whānau, institutional roles) were managed through upfront whakapapa declarations, explicit role-boundary setting at the start of each engagement, and continuous clarification of the research scope as distinct from rūnaka or whānau governance

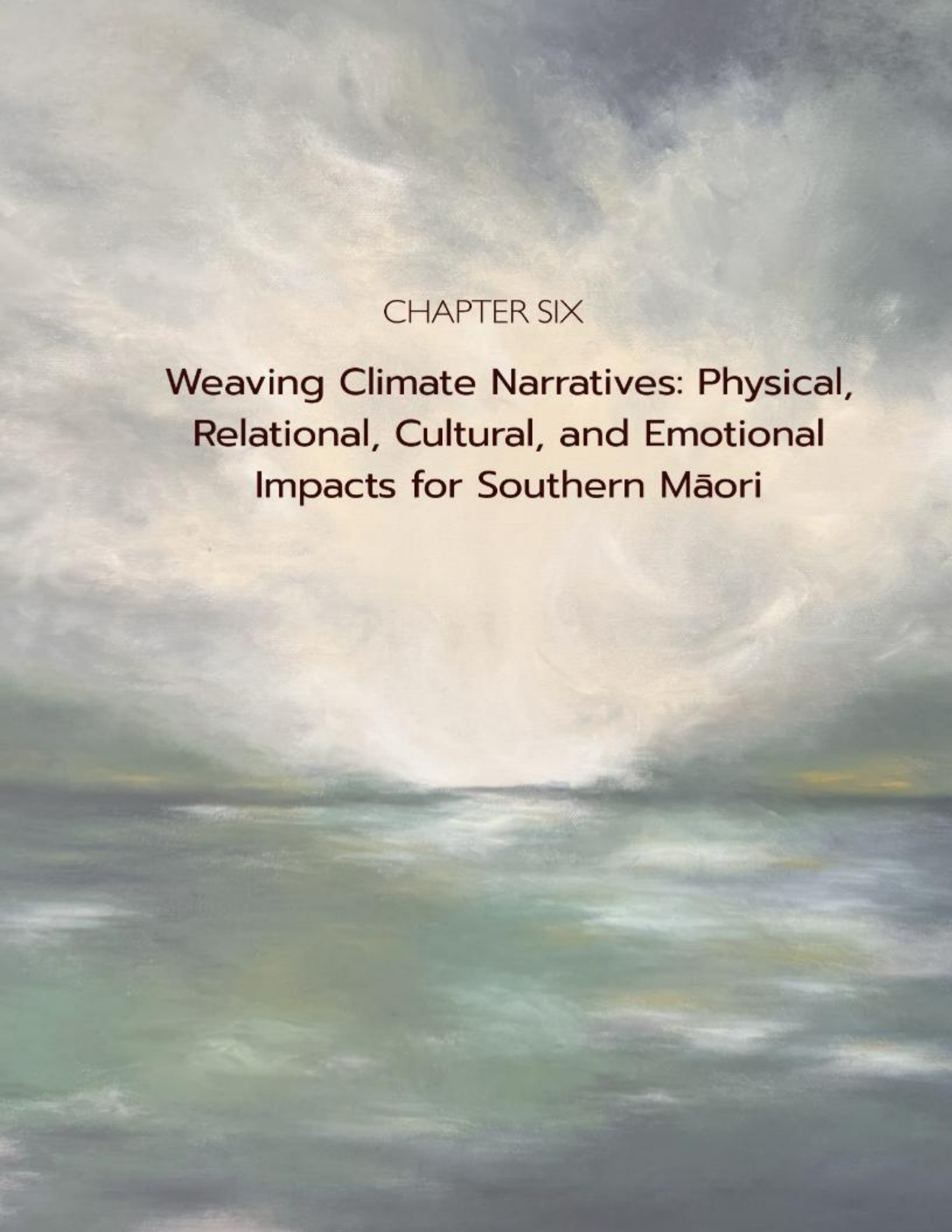
processes. This practice aligns with Indigenous scholarship that requires positionality to be declared and scrutinised throughout the inquiry (Manganda, 2021).

To mitigate relational power and protect confidentiality in small, closely connected communities, consent was treated as a continuing process (not a one-off event), with opportunities to pause, withdraw, or revise contributions. Anonymisation strategies avoided identifiable combinations of place, event, and role; and only the lead researcher accessed raw audio/full transcripts while supervisors viewed anonymised excerpts. This is consistent with national expectations for integrity and cultural rigour in research involving Māori (National Ethics Advisory Committee, 2019).

To address interpretive bias associated with insider knowledge, the study embedded structured reflexive memoing (tracking assumptions and decision points), supervisory peer-debriefing (testing rival explanations), and participant validation. These procedures operationalise reflexivity as an ongoing ethical duty and contribute to analytic credibility and transparency recommended for qualitative research (Nowell et al., 2017).

VIII. Concluding remarks

This addendum translates *Te Kahu Huruhuru o Kohikohi* from conceptual kōrero into research practice, showing how recruitment, data collection, analysis, and ethics were enacted in ways that uphold whakapapa, tikaka, and participants' mana. It clarifies the decision trail that underpins the findings, making the study's rigour and Indigenous governance arrangements visible without fragmenting kōrero or compromising cultural integrity. With these methods and safeguards outlined, the thesis now moves to the substantive doctoral research findings and discussions in Chapter Six and Chapter Seven, in which, the interwoven strands of Kāi Tahu ki Murihiku experiences and responses to climate change developed through this kaupapa Māori narrative inquiry, are presented.



CHAPTER SIX

Weaving Climate Narratives: Physical, Relational, Cultural, and Emotional Impacts for Southern Māori

In Chapter Five, the methodological foundation for this doctoral research was woven through *Te Kahu Huruhuru o Kohikohi*. In Chapter six, the focus now turns to the feathers that adorn this cloak, the narratives of Kāi Tahu ki Murihiku whānau. Chapter six begins to explore what these strands hold: stories of climate change as experienced in place, through whakapapa, and across generations. Moving from the theoretical and methodological to the empirical and relational, Chapter Six examines how environmental disruptions are interpreted through pūrākau, maramataka, and everyday practices, revealing the physical, cultural, and emotional impacts of a changing climate. In doing so, it demonstrates how the cloak of methodology becomes a vessel for voices, carrying narratives that speak to resilience, grief, and adaptation in the face of uncertainty. This article is currently in review for *AlterNative* journal.

Reference: Kaiser, L.H., Kenney, C.M., Phibbs, S.R., Saunders, W.S.A, Becker, J.S. (2026) Weaving Climate Narratives: Physical, Relational, Cultural, and Emotional Impacts for Southern Māori. *AlterNative: An International Journal of Indigenous Peoples (in review)*

The image used on the preceding page (figure 19) is an excerpt of an untitled painting, used with permission, from Ōraka Aparima artist Emma Spall©. The author offers an interpretation for the painting, in the context of this thesis: the intersecting domains of fraternal atua (deities) Tāwhiri-mātea (deity of weather), Takaroa (the sea) and Tāne (the forest and land).

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TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the student and the student's main supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the student's contribution as indicated below in the Statement of Originality.

Student name:	Lucy Kaiser
Name and title of main supervisor:	Christine Kenney
In which chapter is the manuscript/published work?	Chapter Six

Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:[1]

Lucy Kaiser is the primary author of the journal article and is responsible for leading the design and implementation of the research, the analysis and writing the manuscript. Kenney, Phibbs, Saunders and Becker have contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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Weaving Climate Narratives: Physical, Relational, Cultural, and Emotional Impacts for Southern Māori

Authors

Lucy H. Kaiser* Christine M. Kenney; Suzanne R. Phibbs; Wendy S. Saunders; Julia S. Becker.

Abstract

This article explores the climate change impacts experienced by Kāi Tahu ki Murihiku whānau (Māori tribe with ancestral roots to Southland, New Zealand) through a Kaupapa Māori (Māori philosophy) narrative analysis of twenty in-depth interviews with mana whenua (tribal members), rūnaka (tribal council) leaders, environmental practitioners, and knowledge holders. Framed by the whakataukī (proverb) *he tai timu, he tai pari* (the ebbing tide, the incoming tide), the research highlights how climate-linked ecological disruption is reshaping cultural practices, emotional landscapes, and the transmission of mātauraka Māori[9] (Māori knowledge). Drawing on Somers' (1994) and Gergen and Gergen's (1998) narrative analysis approaches, the study identifies four interwoven strands of climate change impacts: physical, relational, cultural, and emotional, each embedded within the broader meta-narrative of colonisation.

Interview participants described intensifying storms, drought, coastal erosion, and species migration as expressions of imbalance between atua (deities) and their domains. These changes were interpreted through pūrākau (intergenerational stories), whakapapa (ancestry), and empirical observation, revealing a convergence between mātauraka Māori and Western science. Relational impacts included disruptions to kinship with non-human relatives, ecological imbalance, and challenges to intergenerational knowledge

[9] This article uses the Southern Kāi Tahu dialect of Te Reo Māori, an official language of Aotearoa New Zealand.

transmission. Cultural impacts were observed in the erosion of urupā (burial grounds), shifts in mahika kai (customary food gathering places and practices), and the adaptation of tikaka (cultural practices) in response to environmental change. Emotional responses ranged from grief and fear to resilient hope, grounded in whakapapa and historical resilience.

The findings underscore the need for climate adaptation strategies that are culturally grounded, relationally attuned, and emotionally intelligent. As the domains of Tāwhirimātea, Takaroa, and Tāne (fraternal deities) shift, Murihiku whānau are navigating climate change through a framework of intergenerational care, ancestral knowledge, and adaptive identity.

***Keywords*:** Kaupapa Māori; Climate change impacts; Whakapapa; Mātauranga Māori; Indigenous adaptation

6.1 Introduction

Indigenous peoples globally are experiencing intensification of climate change-related impacts and risks to their environments, health, culture, and livelihoods (Cretney, 2020; Jones 2019). Knowledge and practices of Indigenous Peoples are increasingly being drawn on by etic 'outsider' researchers and policymakers for disaster risk reduction and climate change adaptation (Kaiser et al. 2025a; Kenney & Phibbs, 2021). Yet the framing of indigenous narratives and experiences within mainstream science and policy often misunderstand the diversity of Indigenous peoples, the locally and culturally bound context of their deep place-based knowledge systems, and the critical contributions they have to offer for understanding and adapting to the impacts of climate change (Kenney & Phibbs, 2022, Phibbs et al. 2022).

This article investigates how Kāi Tahu ki Murihiku (the Southern-most Māori people in Aotearoa New Zealand) whānau (families) are experiencing and interpreting climate-linked ecological and cultural changes. Kāi Tahu ki Murihiku refers to the southernmost tribal group of the iwi (tribe) Kāi Tahu (otherwise known as Ngāi Tahu). Murihiku refers to the region of Southland in Aotearoa New Zealand. Southland has a diverse geography and climate, spanning mountains, forests, plains, coastal areas and islands. It includes important mahika kai, waka (traditional voyaging canoe) landing places, and pā sites (fortified villages).

Kāi Tahu ki Murihiku whānau have whakapapa to four papatipu rūnaka (local tribal councils): Waihōpai, Awarua, Hokonui, and Ōraka-Aparima. These rūnaka are active in environmental guardianship (kaitiakitaka), language revitalisation, education, health services, and economic development within their rohe (region). This article primarily focuses on the climate change impacts that are being experienced by whānau with whakapapa ties to Ōraka-Aparima rūnaka, whose marae, Takutai o te Tītī, is in Ōraka (Colac Bay).

The perspectives and experiences of twenty participants including rūnaka (local iwi-based councils) leaders, kaumātua (elders), environmental practitioners, and knowledge holders are explored using a bricolage methodology and narrative analysis (Kaiser et al. 2025b) approach that centres whānau voices and relational worldviews. Analysis of participants' narratives has identified how climate change is reshaping cultural practices, emotional landscapes, and the transmission of mātauraka Māori within and between generations. Framed by the whakataukī *he tai timu, he tai pari* (the ebbing tide, the incoming tide), this research acknowledges both the losses and the adaptive capacities of whānau in the face of environmental change.

Two approaches were used to analyse the narrative data. Firstly, Somers' (1994) narrative as ontology framework, which recognises that identities and social realities are dynamically co-constructed through intersecting stories, social networks and time. Somers identifies four interrelated narrative types: ontological narratives (personal and familial stories), public narratives (linked to institutions and communities), conceptual narratives (theoretical and disciplinary frameworks), and meta-narratives (overarching stories such as colonisation and climate change). Secondly, Gergen and Gergen's (1988) approach to nested narratives (stories embedded within other stories) provides a structure for examining how whānau kōrero (family stories), and experiences of climate change, are embedded in wider social, cultural, and historical contexts. The article shows how climate change reshapes not only ecosystems but also cultural practices, emotional worlds, and the transmission of mātauraka Māori. The analysis approach highlights the roles of whakapapa-based knowledge, relational identity, and intergenerational care in framing the experiences and strategies of adaptation in Murihiku.

6.2 Background

Climate change presents a profound challenge to ecological, cultural, and relational systems across Aotearoa, with Southland (Murihiku) experiencing visible and compounding effects. Regional projections indicate that Southland will become significantly warmer, with temperatures rising between 0.5°C and 3°C by 2090, alongside

increased rainfall variability, more frequent droughts, and sea-level rise of up to 0.9 metres (Zammit et al. 2018). These changes are expected to intensify extreme weather events, disrupt hydrological cycles, and accelerate coastal erosion, placing pressure on infrastructure, ecosystems, and cultural sites.

For Māori communities, climate change impacts are being felt through disruptions to whakapapa (ancestral)-based relationships with whenua (land), wai (water), manu (birds), and atua (deities) (King et al. 2010, MacIntosh, 2025; Taiapa et al. 2024). Māori are disproportionately affected due to existing socio-economic inequities, colonisation, geographic exposure, and deep spiritual and cultural connections to land and water (Ratima et al. 2019; Phibbs et al. 2022). Rising seas, warmer temperatures, drought, and ecological degradation threaten marae (community meeting houses and spaces), urupā (burial grounds), wāhi tapu (sacred sites), and mahika kai (customary food gathering places and practices), undermining cultural continuity and intergenerational knowledge transmission (Bailey-Winiata, 2024; Hamilton et al. 2025; Richardson et al. 2025).

6.3 Methods

This research is grounded in Kaupapa Māori methodology, privileging Māori ways of knowing, being, and doing (Smith, 2019). At its core is whakapapa as ontology and method, structuring relationships between people, places, species, and knowledge systems. Whakapapa enables the weaving together of diverse knowledge strands into a coherent, relational narrative (Roberts et al., 2004).

Drawing on Te Kahu Huruhuru o Kohikohi methodology (Kaiser et al. 2025b), this study uses bricolage to combine different conceptual narratives and data sources. Firstly, uiui (interviews) capture participants' experiences, observations, and intergenerational knowledges of climate change, disruption, and adaptation. Secondly, western scientific literature, particularly ecological, climatological, and adaptation science findings relevant to the Murihiku region, are drawn on to situate participant observations within broader empirical patterns. Finally, policy and legislative documents, including national climate

adaptation frameworks, managed retreat proposals, and iwi management plans, provide further context for interviews, enabling analysis of alignment or tension between participants' realities and policy discourses.

This integrated approach to contextualised analysis recognises that mātauraka Māori (Māori knowledge) is a form of empirical science, grounded in observation and affirmed across generations. Linking whānau kōrero (family conversations) with mātauraka Māori, Western scientific findings and policy contexts produces a coherent narrative analysis that identifies structural drivers of climate injustice, disjuncture between policy intent and lived realities and culturally grounded solutions for climate adaptation and governance.

6.3.1 Narrative thematic analysis

The data collected for this research included uiui and hui (meetings) 'talk' or, kōrero, documents as well as hīkoi (journeys). While the forms of these data are varied, they may all be understood as different forms of narratives. According to Elliott (2005), narratives have an important social dimension and are told in a specific social context for a particular purpose. Somers (1997) describes narratives as above all, constellations of relationships, embedded in time and space and constituted by causal emplotment (1997) across discursive fields. She explores four categories of narratives that frame the social world and our social identities – ontological, public, conceptual, and meta- narratives. In this study, climate change and colonisation are positioned as meta-narratives that shape the conditions under which whānau experience and interpret environmental disruption. Mātauraka Māori and Western science are engaged as conceptual narratives that offer complementary ways of understanding ecological changes. Public narratives include policy frameworks, scientific modelling, and community-level discourses. Ontological narratives emerge through participants' reflections on species decline, disrupted practices, and emotional responses to loss and adaptation.

Narratives do not exist independently, they are co-constitutive and relational, transcending defined fields (Somers, 1994). Social, cultural, familial, emotional, locational and temporal contexts are critical for understanding how narratives are constructed and how they operate at different local and global scales.

As Somers' (1994) and Phibbs (2008) note, narrative analysis involves attention to the way that kōrero is embedded in relational networks that are simultaneously personal, local and global. Personal narratives of ecological changes and their associated cultural impacts, for example, are also constructed in relation to broader social configurations that transcend Murihiku such as colonisation, climate change, whakapapa and mātauraka Māori that enable a wider socio-political dynamic to narrative analysis to be introduced. This embedded narrative approach (Gergen & Gergen, 1988) facilitates an exploration of the relationship between the broad sweep of history, experiences of climate change impacts, and their connection to cultural identity.

Te Kahu Huruhuru o Kohikohi methodology guided the methods of data collection and analysis (Kaiser et al. 2025). Interviews with 20 Māori leaders, practitioners, and knowledge holders were analysed using narrative analysis (Somers, 1994). Coding centred participants' meanings while identifying structural patterns across: ecological changes; disrupted practices; displacement challenges; and emotional landscapes. Themes were then interwoven with mātauraka Māori, Western scientific findings and policy analysis to construct a woven narrative of Kāi Tahu ki Murihiku climate change experiences and knowledge.

Each participant was assigned a pseudonym, based on native species with whakapapa to Kāi Tahu. While not all participants appear in this manuscript, each kōrero shaped the thematic analysis and narrative interpretations presented.

TABLE 7: PSEUDONYMS AND ATTRIBUTES OF PARTICIPANTS

Rūnaka General Manager	Kahu (Harrier)
Rūnaka Representative	Toroa (Royal Albatross)
Rūnaka Committee Member	Toutouwai (South Island Robin)
Rūnaka Committee Member	Pīwauwau (Rock Wren)
Kaumatua	Tāiko (Petral)
Kaumatua	Tītī (Muttonbird, Sooty Shearwater)
Kaumatua	Kākāpō (Ground Parrot)
Kaumatua	Kākāriki (Parakeet)
Kaumatua	Tīeke (Saddleback)
Rūnaka member	Kuaka (bar-tailed godwit)
Rūnaka member	Kererū (Wood Pigeon)
Te Ao Mārama Inc kaimahi	Mohua (Yellowhead)
Te Ao Mārama Inc kaimahi	Korimako (Bellbird)
Te Ao Mārama Inc kaimahi	Tītipounamu (Rifleman)
Te Ao Mārama Inc kaimahi	Tokoeka (Southern Brown Kiwi)
Retired Iwi Kaiwhakahaere	Tohorā (Southern Right Whale)
Current Iwi Kaiwhakahaere	Kōtuku (White Heron)
Iwi Emergency Management Specialist	Pōpokotea (White Head)
Iwi Emergency Management Specialist	Hoiho (Yellow-eyed Penguin)
Iwi Environmental Policy Specialist	Pūkeko (swamphen)

The lead author is Māori (Kāi Tahu, Kāti Māmoe, Waitaha) with whakapapa ties to the region, approaching this mahi as an insider (emic) researcher with responsibilities to whānau, whenua, and mātauraka.

6.4 Findings

Four interconnected themes emerged, represented as horizontal strands (aho) in a woven kahu huruhuru (feathered) cloak. Each demonstrate distinct yet interrelated dimensions of climate change impacts experienced by participants: physical impacts, relational impacts, cultural impacts and emotional impacts. Weaving these themes together is a vertical strand (whenu) of collective identity. Kōrero from participants (represented in this article as native birds) adorn the cloak as individual hou (feathers). Informing these themes are locale-specific mātauraka, western scientific findings and modelling.

6.4.1 Te Aho Tuatahi: Physical impacts

For mana whenua in Murihiku, climate change represents a continuous history of relational and empirical observations of environmental variations in the region. Scientific data on the impacts of climate change mirror the detailed observational and intergenerational knowledge of the rūnaka. Epistemic meaning making for Murihiku-based whānau has drawn on public sources to frame climate change, supported through mātauraka Māori (Māori knowledge), pūrākau (Māori intergenerational stories) and cosmogenic narratives (Cain & Manihera, 2021; Kaio, 2021; Stevens, 2021). A collective meta-narrative, drawing on creation stories, positions environmental disruption as a resurgence of conflict between atua (deities). Public and ontological narratives detail intensification of storms, drought, coastal erosion, and heat. The impacts are physical, relational, cultural and emotional, affecting sacred places, taonga species, language, practices and identity.

6.4.2 Atua in Conflict: A Cosmogenic Framework for Environmental Change

Participants consistently drew on pūrākau and whakapapa to explain climate change as a continuation of elemental tensions between three atua brothers, Tāwhirimātea (weather), Takaroa (ocean, lakes, rivers), and Tāne (forest and land). Each brother has kaitiaki responsibilities for different realms of the natural world (Marsden & Henare 1992). In Te Ao Māori, there are interpretations of atua which position them as active agents whose interactions shape the world today (Rangiwai, 2020). A relational ontology frames environmental change as the result of ongoing negotiations and tensions between ancestral forces. Tokoeka, a Kāi Tahu ki Murihiku environmental expert, described this worldview in detail, explaining that the environment was shaped through conflict and compromise among atua, and that these dynamics continue to play out in the present:

> "according to our histories and our stories, right at the very beginning of time when the atua, the environmental space is personified, so all that interaction to create an atmosphere and all that, whatever you might want to call it, it was raru [conflict], you know? It was pushing and there was loss of this and loss of that, gains here and gains there. And when we personify it, it's like a big battle. Now and then, obviously, over periods of eons and eons, things started settling down and you start creating an environment for animals and children of Tāne [atua of the forest] and then the distribution of mana [authority, prestige]. Mana was distributed to more of some certain atua or personifications of environment. We have more control.
>
> And then along come humans from Tāne and they have a certain mana and an ability to impact the environment and get away with it. But in our old days, we wouldn't just go and do it without pacification through karakia [prayers and incantations] and all that sort of stuff. So, it was identifying that you knew your whakapapa [genealogy] and where you come from. That we were just siblings to our older brothers so the uri atua [descendants of deities], uri tangata [human

descendants] we are the secondary lines of descent. The same with the older sister, younger sister, older brother, younger brother sort of line that generally the oldest sibling in the family is closer to the atua because they were born first and that's where they have the most mana. You understand that one, eh? But it's not generally worked out. But anyhow, that was why our chiefly lines always come from the oldest brother or in some cases the sister, the daughter. But yeah, all those things were lined up way back in the past when the environment was developing itself but they still get together and have a bit of a scrap. This is what one of my kaumātua [elders] told me.

Around the sea during a storm, the coast during a storm was one of the most dangerous places you can be because you've got all these atua getting back together and having a bit of a scrap. The sea doesn't like Tāne and Tāwhirimātea [deity of wind and storms] is the tapu [sacred] one, he doesn't like either of them and they'll get together and I was like, step away from there. Well, humans shouldn't be around there when they're… having a crack at each other again and that was, you know, these are some of the stories that passed on and it's like, you've just got to be aware that the atua have the ability to have another go with each other." *Tokoeka*

This framing positions climate change as a resurgence of ancient dynamics between three brothers – Tāwhiri-mātea (the deity associated with weather and climate), Tāne (the deity associated with the forest and land-based flora and fauna), and Takaroa/Tangaroa (the brother associated with the sea) (Tau, 2003). Human restraint and ritual remain central. As Tokoeka noted, actions that affected the environment were preceded by karakia (incantations) and guided by an awareness of whakapapa and relational obligations to maintaining balance.

Tītīpounamu echoed this view, describing coastal erosion as the ongoing battle between land and sea: "Tangaroa and his brothers are fighting, and that's the coast interacting with the land. It's normal." These meta-narratives centre whakapapa, relationality, and

the agency of the natural world, offering a parallel system of meaning to western science which often divorces mankind from the environment in its evaluations and treats landscapes as objects (Broadhead & Howard, 2021). Cultural meta-narratives also provide a framework for interpreting intensification of physical impacts.

Intensifying Storms and Shifting Weather Patterns

The domain of Tāwhiri-mātea is marked by increasingly volatile weather (Tau, 2003). Participants described more frequent and severe storms, aligning with regionally specific weather data (NIWA, 2019). Kahu noted that "one-hundred-year floods" now seem to occur "every couple of years," while Tītī observed changes in storm tracks from Australia, "because it used to come around Tasmania, across the bottom of Australia, across to here. But it's not now, it's been sucked up, hasn't it? It's coming across Tasmania and heading north now for some reason". This suggests a shift in regional climate dynamics.

These environmental changes are meteorological but also infrastructural and economic. Tāiko, during a hīkoi on their whenua, pointed out damage from a 2020 storm that destroyed fencing and reshaped the landscape. This was a significant event in Southland, the Insurance Council of New Zealand reported nearly $30 million in claims from that event alone (ICNZ, n.d.).



Figure 1: Image from hīkoi with Tāiko depicting some of the erosion impacts of the September 2021 storm, credit: Leader author

The framing of these events as expressions of Tāwhiri-mātea's unrest adds a layer of cultural meaning to what might otherwise be seen as isolated weather anomalies. Tokoeka and other participants' accounts of atua conflict are ontological narratives that situate personal experiences of climate change within ancestral cosmology. The atua are positioned as ancestral entities whose moods and movements are observed, interpreted, and identified patterns responded to. This interpretation reinforces vigilance and humility in the face of environmental change.

Increasing unpredictability of weather patterns also has implications for maramataka and seasonal planning (Holman-Wharehoka, 2023; Matthews, 2023; Skipper, 2020). As traditional tohu (messages/signs from the atua) may become less reliable, whānau may

need to adapt practices without established precedent. This creates uncertainty for cultural continuity. However, Māori communities are well-equipped to navigate climate change (Blackett et al. 2024). Deep-rooted intergenerational connections to atua and whenua foster responsibility and relational understanding of the environment. Māori knowledge systems are grounded in centuries of empirical observation and experiences, embedded within whakapapa, cosmogenies, and a worldview embracing both seen and unseen realms (Hyslop, 2023). This perspective strengthens Māori communities' abilities to navigate climate disruption.

Drought, Heat, and Cascading Ecological Effects

Alongside storms, participants described increasing heat and prolonged droughts, particularly in coastal areas. These conditions alter soil moisture and water availability (NIWA, 2023). Tītīpounamu noted the increasing frequency of hot days, while Toutouwai described the need for emergency water deliveries early in the season. The ecological consequences of drought are complex and intensifying. Pīwauwau explained how sediment runoff from drought-stricken land, followed by heavy rain, leads to algal blooms and oxygen depletion in estuaries. This disrupts habitats for species such as tuaki (native shellfish) (Morrison et al. 2023). Ontological narratives such as Pīwauwau's align with NIWA's 2023 findings on soil moisture deficits and cascading climate effects. Conceptual narratives, drawn from both mātauraka Māori and Western science, frame climate change as relational and systemic, part of a broader system intertwining human actions, atua dynamics, and ecological responses (Taiapa et al. 2023).

Drought also affects whānau ability to maintain mahika kai (traditional food gathering places and practices) and other land-based practices (Ministry for the Environment, 2022). As soil becomes less fertile and water less available, traditional food systems are threatened (King et al. 2010). This impacts food security and intergenerational transmission of kaitiakitaka (stewardship) knowledge and practice.

Coastal Erosion and the Boundary Between Realms

Coastal erosion was interpreted through pūrākau, the story of Kā tukemata o Tāne (the eyebrows of Tāne). Tokoeka described the native sedge plant pīkao as the "eyebrows of Tāne," gifted to Takaroa as a peace offering. Takaroa rejected this offering and threw them back at Tāne. The erosion of dunes is thus seen as an ongoing conflict between Tāne and Takaroa, in an endless battle between land and sea. The erosion of dunes, described by Tokoeka, exemplifies a nested narrative structure. At the ontological level, this is a personal interpretation of environmental change. At the public level, it aligns with scientific data on coastal erosion. Conceptually, it draws on whakapapa and cosmogenic frameworks. Meta-narratively, it reflects broader tensions between atua and global climate discourse.

This mātauraka provides a culturally specific explanation for a process documented in scientific literature. Hilton et al. (2000) highlight the role of native dune plants in stabilising coastlines, reducing vulnerability to sea-level rise and storm surges. Pīkao is considered a taonga plant and appears in whakataukī (proverbs). The loss of pīkao is not only ecologically observable but also illustrates Tāne's retreat and Takaroa's advance.

Participants also described the loss of other coastal vegetation, including harakeke, because of saltwater intrusion and erosion. These plants slow dune erosion (Bergin et al. 1995). They are culturally significant, with pīkao and harakeke used in weaving, medicine, and ceremony (McRae-Tairei, 2013). Their decline represents a loss of biodiversity and cultural resources.

Marae, Urupā, and the Displacement of Sacred Sites

Physical impacts described by participants were those affecting marae and urupā in the Ōraka and Aparima areas. Rising seas and intensifying erosion inundate wāhi tapu (sacred places) along the southern coastline. Kahu described the challenges of potentially relocating their marae and urupā:

> "we can't protect everything from Tangaroa either, so trying to make sure we have connection, we understand the stories… unfortunately, we might have to give some up, and some will already have been taken by Tangaroa. There's been work on the Southland coastline, looking at those sites at risk, and some have been taken, things like burials, I suppose, and then in some cases, I know in Ōraka and Colac Bay, they have, at times, bones have been exposed, and they get interred somewhere further up. Yeah, so it's those things, making sure those precious elements are returned."

Concerns about erosion impacting wāhi tapu are supported by the NZ Coastal Flood Layers Viewer, which visualises scalable predicted impacts of coastal flooding. The Coastal Flood Layers Viewer and regional climate projections constitute public narratives that institutionalise climate risk at the community level.

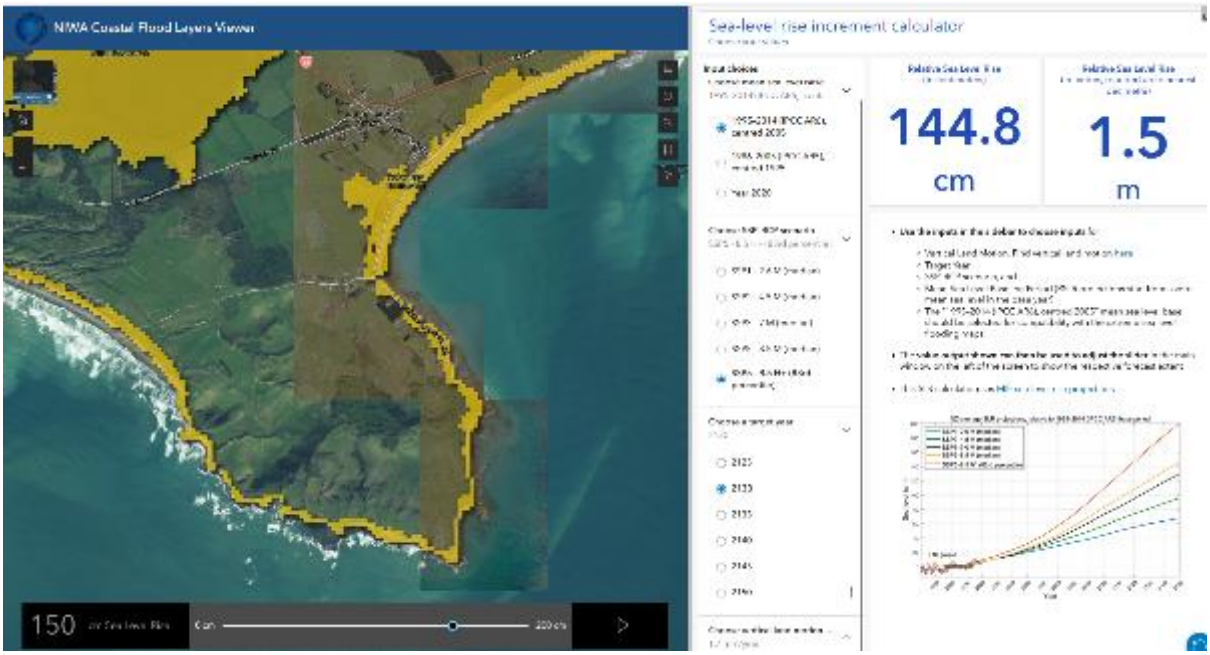


FIGURE 20: SCREENGRAB FROM THE NIWA COASTAL FLOOD LAYERS TOOL OF ŌRAKA COLAC BAY, ANTICIPATING A RELATIVE SEA LEVEL RISE OF APPROXIMATELY 1.5M BY THE YEAR 2150. 22ND OF JULY 2025. HTTPS://EXPERIENCE.ARCGIS.COM/EXPERIENCE/8E3D7262CC9846968F0BFB86DA0806F8

Riorio articulated the cultural gravity of the potential impact of urupā being eroded: "The urupā's right on the coast… if that erodes, it's our tūpuna gone." Work will have to be

conducted to re-intern tūpuna at another site. The potential relocation of urupā raises complex questions about tikaka, memory, and the rights of the dead.

Tohorā warned that several Kāi Tahu coastal marae may be lost: “possibly Taumutu, Te Tākutai o te Tītī and Te Tauraka Waka a Māui on South Westland, they’ve all been hit by waves. I would argue another decade, they're gone. We'll move them or they'll go.”.

Marae are not only physical structures but repositories of memory, identity, and mana. Their displacement, for some, signals a rupture in whakapapa continuity. While some participants acknowledged historical precedent for marae mobility, the stakes remain high.

The cosmogenic meta-narrative framing of climate change as a conflict between atua offers an interpretive framework for understanding conceptual, public, and ontological narratives detailing physical impacts observed in Murihiku. Storms, drought, erosion, and heat are not merely environmental phenomena; they are expressions of relational imbalance, interpreted through pūrākau and personal experiences. These changes affect ecosystems and the cultural infrastructure of Māori life: marae, urupā, and the whenua itself. The convergence of mātauraka Māori and scientific data underscores the urgency of adaptation strategies that are culturally grounded and relationally informed. As the domains of Tāwhirimātea, Takaroa, and Tāne destabilise, the challenge is to mitigate physical damage and uphold the integrity of relationships that sustain life.

6.4.2 Te Aho Tuarua: Relational Impacts

Climate change in Murihiku disrupts the relational fabric that connects people, species, and ecosystems. These disruptions extend from human communities to kinship networks that include birds, marine life, forests, and atua (Berkes, 2009). Participants described changes in the behaviour, abundance, and wellbeing of non-human relatives as signs of ecological imbalance.

Conceptual narratives of ecological interdependence and relational ontologies frame these changes as systemic disruptions to whakapapa and kaitiakitaka. These disruptions

are nested within meta-narratives of climate change and colonisation, which threaten whakapapa-based relationships between Takata Whenua and their non-human kin.

Kinship with Non-Human Relatives

Participants described birds, fish, and plants as kin, beings with whom relationships are maintained through observation, care, and reciprocity. Changes in the presence or behaviour of these species were interpreted as signs of environmental stress and relational disruption.

Pīwauwau described the anticipated impacts of ocean acidification and warming on tītī, a taoka species central to many Kāi Tahu ki Murihiku whānau identities and livelihoods: "Tītī will be impacted, because they're worldwide travellers… they're dependent on the sea, so changes in sort of life forms in the sea, with acidification… it will impact on them quite hard." This concern was echoed by Tītī, who described a season in which tītī were underweight due to changes in the marine food web:

> "It was a bad season for mutton-birds because they were all skinny… the [warmer ocean dwelling] barracuda and mackerel coming through and eating that smaller stuff that the tītī would normally eat… and that's all climate related, isn't it?"

Warming sea temperatures mean warm-water species from further north are impacting southern marine ecosystems and displacing indigenous cold-water species (Fletcher et al. 2021). The wellbeing of one species is intrinsically linked to the dynamics of others.

The decline in tītī condition, described by Tītī and Pīwauwau, exemplifies a nested narrative structure. At the ontological level, it is a personal and emotional account of species decline. At the public level, it aligns with scientific findings on marine ecosystem disruption. Conceptually, it reflects a relational ontology and ecological interdependence. Meta-narratively, it sits within broader forces of climate change and colonisation that threaten whakapapa-based relationships.

Shifting Species, Ecological Imbalance and Predator Proliferation

Disruptions in kinship relationships were also reflected in participant accounts of shifting species distributions, ecological imbalance, and the proliferation of predators, which were interpreted as further signs of environmental stress and relational disconnection, particularly in Te Ara a Kiwa (the Foveaux Strait). Toroa noted the increasing presence of kingfish in southern waters:

> "I've caught kingfish… not just one or two, you know, there's scores of them now… if our temperatures are warm enough that they'll come in south, then our most plentiful fish… will go somewhere else."

Tohorā provided a broader regional perspective, describing the presence of snapper and bluefin tuna in areas where they were previously unknown: "We're now catching kingfish and snapper south of the Campbell Islands… snapper in the South Island all year round… they haven't gone back anymore."

These accounts align with scientific findings on species migration in response to ocean warming (Ministry for the Environment & Stats NZ, 2019). However, these changes were not framed solely in terms of biodiversity loss or gain. They were also understood as potential disruptions to long-standing connections between people and species, and to the seasonal rhythms that guide harvesting and observation. In addition to species loss and migration, participants described the proliferation of certain species as a sign of imbalance. Tīeke noted the effects of warming temperatures on forest ecosystems, particularly the occurrence of megamasts (large seasonal seed crop) and the resulting explosion in pest populations:

> "We're starting to experience these mega-masts… it's great for the forest bed, but at the same time, it's great for the pests as well… one of the worst rat populations… for quite a number of years."

These changes were not only affecting the kāhere (forests) but also the Tītī islands, where increased rat populations threaten nesting birds. The relational impact here is twofold:

the disruption of native species and the increased burden on whānau engaged in pest control and conservation.

Along the coast, participants described similar patterns. Toutouwai observed that crayfish populations were increasing, but not necessarily in healthy ways: “There's all these crayfish, but there's not the food chain here to feed them… if they're eating the food, what about the other species out there?”

This observation highlights the complexity of ecological change. Increases in one species may signal declines in others, and abundance does not necessarily indicate health. The relational lens applied by participants foregrounds these interdependencies and the risks of imbalance.

The accounts engage with public conceptual narratives, particularly those surrounding climate change and biodiversity. References to species migration (e.g., kingfish, snapper, bluefin tuna) align with scientific findings on ocean warming (Ministry for the Environment & Stats NZ, 2019). However, participants do not adopt these narratives wholesale. Instead, they reframe scientific observations through Indigenous conceptual lenses, interpreting species shifts as signs of imbalance between atua and their domains, rather than neutral ecological responses.

Intergenerational Disruption and the Transmission of Knowledge

The relational impacts of climate change affect the transmission of mātauraka Māori. Participants described how changes in species behaviour and environmental rhythms complicate teaching younger generations. As Pīwauwau reflected:

> “I suppose in literature and also in experience that sometimes the younger ones don't pick up that things can change as well, and so, that kind of disrupts, or makes it like, not making you so strong with your Mātauranga Māori, that you're thinking, oh, they must be wrong because they're coming at a different time or it's a different situation.”

Tīeke noted that warmer conditions alter the timing and intensity of forest fruiting, which affects bird populations and pest dynamics. These changes complicate the use of traditional tohu and seasonal indicators. Climate change disruptions are also epistemic when the environment no longer behaves in expected ways; for some individuals, the foundations of that knowledge system are placed under strain. The result is uncertainty about what is happening and how to respond in ways consistent with inherited responsibilities.

This uncertainty reflects destabilisation of ontological narratives, (stories that ground identity and meaning in predictable relationships with the environment), and challenges conceptual narratives of environmental balance and intergenerational continuity.

The relational impacts of climate change in Murihiku are deeply felt. Participants described changes in the behaviour and abundance of birds, fish, and plants as signs of ecological imbalance and relational disruption. These changes are seldom interpreted through environmental science but through whakapapa-based understandings of kinship and interdependence. The decline of taoka species, arrival of new predators, and loss of native vegetation signal weakening relationships that sustain ecosystems and cultural identity.

As environmental rhythms shift, the transmission of mātauraka Māori is affected, raising questions about how to uphold kaitiakitaka in a changing world. However, the collective mātauraka of Murihiku whānau spans thousands of years and is in constant flux. Murihiku whānau have long adapted to significant changes and embraced uncertainty as part of understanding the world and our place within it. These findings highlight the need for climate responses that are relationally grounded and consider extensive temporal scales for understanding environmental rhythms.

6.4.3 Te Aho Tuatoru: Cultural Impacts

Climate change disrupts cultural systems that underpin Māori identity and wellbeing. In Murihiku, participants described how environmental change affects practices such as

manaakitaka, mahika kai, and tangihanga, alongside whakapapa continuity, tūrakawaewae (place where one has rights of residence and belonging through kinship and whakapapa), and intergenerational transmission of mātauraka Māori.

Disruption to Mahika Kai and Seasonal Rhythms

Mahika kai is central to cultural identity in Murihiku. Participants described how climate change alters the timing, abundance, and accessibility of key species, undermining the reliability of maramataka and traditional tohu. These disruptions extend beyond food systems to cultural practices and seasonal rhythms guiding mahika kai.

Kāhu described the importance of fishing and working the land:

> "that's our intergenerational connection. And once they become unable to commit and do those practices, man, it's not just a cultural loss, it's a knowledge loss, it's a cultural practice loss, it just impacts in so many different spheres. And I think a lot of the time out of sight, out of mind. People, other people aren't out there engaging in the environment in the old way."

The decline in tītī condition was not only a concern for sustenance but for intergenerational knowledge and whānau cohesion. Mahika kai is described as a cornerstone of cultural identity, manaakitaka (hospitality), and mana. Tōkoeka states:

> "Mahinga Kai is really important to maintain our mana and the way that we feed our guests... if they're gone because of climate change impacts, that affects our whole order, our wairua."

These reflections echo findings from Moller et al. (2009), who emphasise the role of customary harvesting of tītī in maintaining cultural cohesion and ecological stewardship. Ontological narratives root identity in place-based practices and intergenerational continuity. Conceptually, the coherence of mātauraka Māori is impacted when environmental rhythms no longer align with inherited tohu. As species migrate and

ecosystems shift, the reliability of traditional harvest timings and environmental indicators is increasingly compromised.

Changing Burial Practices and the Integrity of Tūrakawaewae

One of the cultural impacts described by participants was the threat to urupā and the resulting shifts in burial practices. Rising seas and coastal erosion are placing pressure on sacred sites, prompting difficult conversations about relocation and adaptation.

Kahu reflected on the emotional and cultural complexity of these decisions:

> "There seems to be a lot more cremations occurring now than what there ever was… my personal feelings are that that's because there's more of a likelihood they can go where they want… with Ōraka being what I consider my tūrangawaewae… if I was to get cremated, then I can go there."

The shift toward cremation, described by Kahu, illustrates a nested narrative structure. At the ontological level, it is a personal response to the loss of ancestral burial grounds. At the public level, it reflects emerging practices in response to environmental displacement. Conceptually, it engages with the adaptability of tikaka. Meta-narratively, it is situated within the broader forces of colonisation and climate change that reflect a reconfiguration of how tūrakawaewae is maintained in the face of environmental uncertainty. The ability to return to one's place, even in death, is being renegotiated in response to the loss or inaccessibility of ancestral burial grounds.

Participants described how climate change is disrupting the physical and ecological markers that anchor whakapapa in place through tūrakawaewae. Toutouwai observed changes in bird behaviour and feeding patterns: "The birds this season apparently are going further for the feed to come home, to bring home to their chicks. So, that's got to tell you something as well."

The disruption of mahika kai and urupā reflects meta-narratives of colonisation and climate change, which together threaten the continuity of whakapapa and the integrity of

tūrakawaewae. The erosion of urupā, the decline of taoka species, and the loss of native vegetation were all interpreted as threats to the continuity of memory and identity. As environmental conditions shift, so too do the conditions under which cultural knowledge is transmitted and enacted.

Adaptation and the Flexibility of Tikaka

Despite the challenges, participants also described ways in which tikaka is being adapted to meet new conditions. The shift toward cremation, the consideration of marae relocation, and the modification of harvesting practices reflects a willingness to adjust tikaka while maintaining core values. Kuaka acknowledged the historical precedent for marae mobility for Kāi Tahu Murihiku: "We used to move marae all the time back in the day. We were nomadic… they were constantly moving." The extent of Southern Māori mobility, both on land and the sea was well documented by Kāi Tahu ki Murihiku historian Stevens (2018). The historical use of mobility as a solution to environmental change has however, been eroded/delimited by colonisation and related land loss.

Local adaptability is consistent with kaupapa Māori literature, which emphasises the dynamic and context-responsive nature of tikaka (Mead et al., 2004; Durie, 1998). Rather than being settled, tikaka evolves in response to changing circumstances, guided by principles such as mana, tapu, and whanaukatanga. Conceptual narratives of tikaka as adaptive and whakapapa as relational ontology frame these cultural impacts as evolving responses to environmental change. The cultural impacts of climate change in Murihiku are multifaceted and deeply embedded in whakapapa, tikaka, and place-based identity. Participants described disruptions to mahika kai, burial practices, manaakitaka, and the transmission of knowledge, all of which are central to Māori cultural life. These changes are not experienced as isolated losses but as challenges to the continuity of relationships that define what it means to be tangata whenua. At the same time, the adaptability of tikaka and the resilience of whānau offer pathways for cultural survival and regeneration. As climate change continues to reshape the physical world, it also calls for renewed attention to the cultural foundations that sustain Māori life.

6.4.4 Te Aho Tuawha: Emotional Impacts

The emotional impacts of climate change in Murihiku are deeply interwoven with whakapapa, responsibility, and intergenerational care. Participants expressed a range of emotional responses, including denial, grief, fear, and hope. These responses are shaped by conceptual narratives of collective obligations to whenua, mokopuna, and the continuity of cultural identity. Ontological narratives of emotion are also shaped by the scale and complexity of climate change, which can overwhelm, exhaust, or mobilise people to take climate change adaptation action.

Denial and Discomfort with Acknowledging Change

Some participants described a reluctance within their communities to fully acknowledge the scale of environmental changes. They reflected it was not necessarily due to ignorance, but rather a form of protective denial and managing the emotional weight of what is being lost. As Pīwauwau observed: “People know that, they don't want to acknowledge it so much, but they know that these things have happened, and there's a whole lot of ‘different’.”

This reluctance to speak openly about change may reflect the difficulty of confronting the implications for whakapapa, whenua, and future generations. It may also reflect a desire to avoid conflict or maintain cohesion in the face of uncertainty. In some cases, denial may be a temporary strategy that enables individuals and communities to process change at a manageable pace (Lehman, 1987).

Grief and Exhaustion

Participants expressed grief not only for what has already been lost, but for what is anticipated to be lost in the future. This grief was often accompanied by a sense of emotional fatigue, a recognition that the scale of change can be overwhelming. Tāiko described this emotional saturation: “They were talking about the Antarctic and the 40

degrees warmer than it had ever been… I didn't listen to the rest of it… there's only so much you can really, you know."

This kind of disengagement is not apathy but a form of emotional self-protection. The constant exposure to climate-related information, especially when it is difficult to act on, can lead to withdrawal or numbness. This aligns with literature on climate grief and ecological anxiety, which notes that being emotionally overwhelmed can inhibit engagement unless supported by collective processes of meaning-making (Cunsolo & Ellis, 2018).

Grief was also expressed in relation to cultural loss, the erosion of urupā, the decline of taoka species, and the disruption of seasonal rhythms. Conceptual narratives of emotional geography (Cunsoulo & Ellis, 2018; Rushton et al., 2022) and intergenerational care help interpret these responses as culturally embedded expressions of collective identity and responsibility.

Fear for Future Generations

A recurring theme was fear for mokopuna and the world they will inherit. Participants expressed concern that the environmental changes already underway will intensify, leaving future generations with fewer choices and greater burdens. As Tītī stated: "I'm fearful for our future, for our future generations right now."

This fear was often linked to a sense of intergenerational responsibility. Participants described wanting to leave behind something meaningful but also recognised that the conditions for doing so are rapidly changing. Toroa reflected: "We don't want to have something that they have to deal with… they may have very limited choices of what they can do with it…" Mohua added a generational perspective:

> "We're in the golden period… we're ruining the world but we're not actually feeling the consequences… it's the people that come after us that are going to have to deal with the consequences of our actions."

Tītī's fear for mokopuna and Toroa and Mohua's concern about leaving a legacy to future generations are ontological narratives that express the emotional weight of climate change through personal experiences and ancestral responsibility. These concerns are nested, at the public level with narratives of institutional inaction, conceptually with indigenous futurism and within the meta-narrative of a climate crisis. Concerns about cultural continuity expressed through doubts about the ability of future generations to maintain connections to whenua, whakapapa, and each other was central. The emotional weight of this responsibility was evident across multiple interviews.

Uncertainty and Disempowerment

Participants also described feelings of uncertainty about how to respond to climate change, particularly in the face of complex science and slow-moving institutions. Kāhu, speaking from an Iwi-wide perspective considered: "There's a bit of a sense of like, where do we even start? What do we do? What's our responsibility as a marae, as a rūnaka? What can we do as individuals?"

This uncertainty was compounded by the difficulty of accessing information in forms that are locally relevant and culturally resonant. Toroa described the challenge of translating scientific data into meaningful action: "It can become very stressful and scary… the scientific data that comes out goes over your head… how we can actually get layman term information to our members that's relevant to their situation…"

These reflections point to the need for climate communication and planning processes that are grounded in local realities and supported by trusted relationships. Public narratives, such as scientific data and adaptation frameworks, often fail to translate into culturally meaningful action, contributing to feelings of disempowerment and emotional fatigue. Without culturally appropriate pathways for engagement, the scale of climate change can lead to paralysis rather than mobilisation.

Resilient Hope and Adaptation

Despite the grief and fear, participants also expressed hope, through a commitment to adaptation and survival. This hope was grounded in whakapapa and in the historical resilience of Kāi Tahu ki Murihiku communities.

Tokoeka reflected on the adaptability of future generations: "They'll get born into quite a landscape, changing on a much quicker basis, and they'll adapt… that's what Māori did. They adapted to everything. They'll have to."

This form of hope rejects passivity. It is a recognition that while the future is uncertain, the capacity for adaptation is embedded in whakapapa and cultural memory. Murihiku tupuna born in the 1800s, experienced, and adapted to, immense changes during the period of colonisation, often eagerly pursuing new opportunities for trade and innovation (Stevens, 2022). Despite the loss of land and culture, many Kāi Tahu ki Murihiku whānau remain on their ancestors' lands and draw on a wealth of intergenerational knowledge and practices today.

Participants also described the importance of collective planning and dialogue. Kāhu noted that climate change is "absolutely a key part of conversations," even if the path forward is unclear. This suggests that hope is about the active work of preparing, discussing, and imagining futures that honour whakapapa and uphold mana.

The emotional impacts of climate change in Murihiku are complex and layered. Ontological narratives of grief, fear, denial, and hope as responses are shaped by conceptual narratives of whakapapa, responsibility, and cultural continuity. These emotions reflect the scale of what is at stake: ecosystems and infrastructure, and the relationships that sustain identity and belonging. While some participants described exhaustion and uncertainty, others drew on histories of adaptation and resilience to frame a path forward.

The findings presented here have shown that climate change in Murihiku is a profound challenge to the identity of whānau, whenua, and whakapapa. Across all thematic

domains, participants interpreted change through a lens of interconnectedness, where atua, ecosystems, and people are bound in reciprocal relationships. This Te Ao Māori worldview positions identity as a living, evolving network of obligations, memories, and care.

6.5 Te Whenu: Identity

This section draws together the four aho: physical, relational, cultural, and emotional, with a collective fifth vertical 'whenu' strand of identity. For Kāti Māmoe, Kāi Tahu, and Waitaha whānau in Murihiku, identity is shaped through relationships with whenua, atua, species, and mokopuna. These relationships are expressed through kōrero, practices, and responsibilities that span generations.

Using Somers' 1994 framework, identity can be understood as a constellation of nested narratives. Ontological narratives emerge through personal reflections on environmental change, such as Kahu's account of cremation or Tokoeka's interpretation of atua conflict. These stories are grounded in individuals' experiences and relational knowledge. Public narratives include institutional discourses around managed retreat, climate adaptation, and cultural heritage, which shape how communities are expected to respond to environmental disruption. Conceptual narratives draw on Te Ao Māori frameworks, kaupapa Māori theory, and ecological interdependence. They provide the theoretical grounding for understanding identity as relational and adaptive. Meta-narratives such as colonisation and climate change inform the broader context in which these other narratives are situated, and influence the conditions under which identity is maintained, disrupted, or reconfigured.

Participants described identity as something that includes birds, fish, forests, and atua. The erosion of dunes was interpreted as Takaroa striking Tāne's tukemata. The decline of tītī was seen as a signal from Takaroa's realm. The displacement of marae and urupā was described as a rupture in the continuity of tūrakawaewae. These impacts were experienced by whānau not only in ecological terms, but as ongoing injuries.

Emotional responses such as grief, fear, and hope were also expressions of identity. They reflected collective responsibility and intergenerational care. Tītī's concern for mokopuna and Mohua's reflection on generational privilege were part of a wider conceptual narrative of whakapapa and obligation.

The nested narrative approach identifies how identity is constructed through the interplay of personal experience, cultural practice, institutional discourse, and historical context. It shows that climate change is a challenge to the relationships, cultural and emotional structures that sustain life and meaning for Murihiku whānau.

6.6 Conclusion: He tai timu, he tai pari (the ebbing tide, the incoming tide)

This article set out to explore how Kāi Tahu ki Murihiku whānau experience and interpret climate change impacts, and what these narratives reveal about culturally grounded adaptation. The research used a Kaupapa Māori methodology and narrative analysis of twenty interviews, drawing on Somers' (1994) and Gergen & Gergen's (1988) frameworks to centre whānau voices and relational worldviews.

The study identified four interconnected domains of impact: physical, relational, cultural, and emotional. These changes, illustrated by interactions between the four atua brothers of Tāwhiri-mātea, Takaroa and Tāne, are influencing whakapapa, identity and relationships with the environment. Intensifying storms, drought, and coastal erosion intersect with the loss of species, shifts in cultural practices, and emotional responses such as grief and fear. Like the Māori whakataukī (proverb) "he tai timu, he tai pari" (the ebbing tide, the incoming tide), climate change impacts are not linear, they are constantly in a state of flux. Together, these impacts are affecting mātauraka Māori, tūrakawaewae and cultural identity.

Adaptation planning must respond to these realities. Recommendations include recognising whakapapa-based place attachment in managed retreat, embedding

Indigenous governance in adaptation frameworks, securing funding for cultural site protection and relocation, and the validation of mātauraka Māori and maramataka as scientific knowledge in policy and research.

This study was limited to whānau with whakapapa ties to Ōraka-Aparima rūnaka. Future research could extend to other Kāi Tahu rūnaka and comparative iwi contexts, and expand the bricolage of quantitative climate modelling with narrative analysis to deepen understanding of adaptation pathways.

As the domains of Tāwhirimātea, Takaroa, and Tāne shift, and the tides ebb and flow, the challenge is to adapt in ways that continue to uphold identity and intergenerational resilience. Climate change adaptation must honour whakapapa, sustain mātauraka Māori, and protect the mana of both people and place.

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We would like to acknowledge the generosity and expertise of all the participants who contributed to this research. It would not have come to fruition without your support. We also acknowledge the Indigenous peoples of the world, their lands, mountains, rivers, oceans ancestors and sacred sites being impacted by climate change. Whāia te mātauraka hei oraka mō koutou – pursue knowledge for your wellbeing (Māori proverb).

6.8 Ethical Considerations

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application SOB 21/17. We have obtained written informed consent to participate and publish from all participants who took part in this research.

6.9 Declaration of conflicting interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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CHAPTER SEVEN

Mō tātou, ā, mō kā uri ā muri ake nei: Visioning mokopuna futures through climate change adaptation strategies

Chapter Six explored the realities of climate change for Kāi Tahu ki Murihiku whānau, weaving narratives of physical, relational, cultural, and emotional impacts into a framework grounded in whakapapa and pūrākau. These stories traced not only the disruptions caused by environmental change but also the resilience and adaptive capacity embedded in Māori worldviews. Building on this foundation, Chapter Seven shifts from impacts to strategies, examining how whānau, hapū, and iwi are envisioning mokopuna futures through climate adaptation. It moves from documenting experiences of loss and uncertainty to analysing proactive, culturally grounded responses that transform externalities into overflows- creative practices of restoration, governance, and intergenerational planning. This transition marks a pivot from understanding what is at stake to exploring how Māori-led adaptation reframes climate resilience as a relational, future-focused ethic rather than a technocratic fix.

Reference: Kaiser, L.H., Kenney, C.M., Phibbs, S.R., Saunders, W.S.A, Becker, J. (2026). Mō tātou, ā, mō kā uri ā muri ake nei: Visioning mokopuna futures through climate change adaptation strategies. *Journal of Integrated Disaster Risk Management. (in press)*

The image used on the preceding page (figure 21) is an excerpt of an untitled painting, used with permission, from Ōraka Aparima artist Emma Spall©. The author offers an interpretation for the painting, depicting misty mountains and a stormy sky- emblematic of the many extreme environments Kāi Tahu ki Murihiku whānau have adapted to.

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Student name:	Lucy Kaiser
Name and title of main supervisor:	Christine Kenney

In which chapter is the manuscript/published work? Chapter Seven

Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:[1]

Lucy Kaiser is the primary author of the journal article and is responsible for leading the design and implementation of the research, the analysis and writing the manuscript. Kenney, Phibbs, Saunders and Becker have contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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Mō tātou, ā, mō kā uri ā muri ake nei: Visioning mokopuna futures through climate change adaptation strategies

Authors

Lucy H. Kaiser; Christine M. Kenney; Suzanne R. Phibbs; Wendy S. Saunders; Julia S. Becker.

Abstract

In Murihiku Southland in Aotearoa New Zealand, Māori are already responding and adapting to the impacts of climate change. Drawing on twenty interviews with Māori leaders, environmental practitioners, and knowledge holders, this kaupapa Māori study examines perspectives on adapting to climate disruption. Interviewees identified a range of whakapapa-based adaptation strategies rooted in intergenerational care, cultural continuity, and relational governance.

Guided by Te Kahu Huruhuru o Kohikohi methodology and Callon's (1998) framing theory, the research analyses how participants contest deficit-based externalities of climate disruption, such as land dispossession, environmental degradation and reframe adaptation through four interconnected strands. These include: whakapapa-based adaptive infrastructure, kaitiakitaka, ahi kā and utu; kotahitaka and strategic relationships; and visioning mokopuna futures. These responses transform externalities such as cultural erasure, land dispossession, and youth exclusion into overflows: creative, relational practices that exceed the boundaries of formal climate planning.

Findings show that Murihiku whānau are restoring whenua, revitalising mahika kai, and embedding intergenerational knowledge in governance. Adaptation is framed not as a technical fix but as a relational obligation, enacted through kaitiakitaka, cultural resurgence, and mokopuna-centred planning. Participants emphasised the importance of imagination, storytelling, and strategic leadership in preparing future generations to navigate climate change.

This study contributes to Indigenous climate change scholarship by demonstrating how Māori-led adaptation strategies challenge technocratic framings and offer culturally grounded alternatives. It calls for research, planning and practice frameworks that honour whakapapa, support mātauraka Māori, and uphold mana whenua governance.

Keywords: Kaupapa Māori; Climate adaptation; Whakapapa; Mokopuna futures; Indigenous governance; strategies

7.1 Introduction

Takata Whenua[10] (Indigenous Māori Peoples of Aotearoa New Zealand) have long enacted climate adaptation through whakapapa (genealogy)-based governance, ecological restoration, and intergenerational knowledge transmission. Across whānau (families), hapū (sub-tribes), iwi (tribes), and marae (community centres), Māori communities respond to environmental change not as passive recipients of external solutions, but as active kaitiaki (stewards/guardians) drawing on ancestral knowledges, cultural practices, and relational responsibility.

Yet mainstream climate adaptation literature frames Indigenous communities primarily through deficit-based lenses (Kenney, Phibbs et al. 2023), emphasising vulnerability (Johnson et al. 2022) while overlooking strategic, intergenerational, and place-based responses already underway. These framings often exclude cultural, spiritual, and ecological dimensions central to Māori wellbeing and fail to recognise whakapapa as living infrastructure for adaptation.

This article examines how Kāi Tahu in Murihiku (an Iwi or tribe in the South Island of Aotearoa New Zealand) experience and respond to climate disruptions, including coastal erosion, inundation, and ecosystem degradation. The discussion focuses on four interconnected strands of adaptation: whakapapa (genealogy) as adaptive infrastructure; ahi kā (sustained occupation) and utu (balance and restoration), kotahitaka (unity and relationships), and visioning mokopuna (next generation) futures. These themes emerged through narrative thematic analysis of kōrero with twenty Māori participants, privileging Māori ways of knowing and relational storytelling.

Guided by Te Kahu Huruhuru o Kohikohi (Kaiser et al., 2025), the research employs a Kaupapa Māori (Māori-centred) bricolage methodology weaving kaumātua (elder) wisdom, rakatahi (youth) innovation, ecological science, and policy critique. It draws on

[10] Some Māori terminology such as “mana motuhake” and “tino rakatirataka” have expanded definitions included within the glossary.

Callon's 1998 concepts of framing, externalities, and overflows to explore how participants contest externally imposed narratives and reconstruct them, guiding adaptation through relational, cultural, and intergenerational logics.

Institutional climate change planning policies and public narratives circulating across national and regional levels have historically excluded cultural and ecological dimensions central to Māori wellbeing or treated them tokenistically (Johnson et al., 2024; Taiapa et al., 2024). This research illustrates how Kāi Tahu ki Murihiku whānau (families) contest dominant narratives positioning Indigenous communities as vulnerable or passive, and instead reframe whānau-based adaptation as culturally grounded, strengths-based practice.

The findings document that Murihiku whānau are already adapting to climate change by restoring whenua (land), revitalising mahika kai (customary food gathering practices and sites), embedding whakapapa (ancestry) in governance, and preparing mokopuna (future generations) for leadership. Whānau strategies are deliberate and intergenerational. By centring kaupapa Māori (Māori values), mātauraka Māori (Māori knowledge), and tikaka Māori (Māori practices), whānau enact effective and sustainable frameworks for climate adaptation.

7.2 Background

Indigenous climate adaptation is grounded in intergenerational knowledge and relational governance, with global evidence showing diverse responses. In the Pacific, urban case studies in Kiribati, Samoa, and Vanuatu demonstrate how Indigenous ecological knowledge guides nature based and hybrid measures for coastal protection and wellbeing (e.g., mangrove and habitat restoration in Kiribati and Samoa, and ecosystem-based actions in Vanuatu) (Kiddle et al., 2021). Complementing these, Tuvalu's coastal programme at Fogafale (Funafuti Atoll) illustrates a locally led adaptation pathway that creates raised land and integrates community knowledge with engineered design (UNDP, 2023). Framing this socio culturally, García Acosta's historical–anthropological work

shows that vulnerability, risk, and adaptation are socially constructed through memory, institutions, and power. The above literature demonstrates that Indigenous adaptation is inseparable from the cultural and governance infrastructures that enable collective action (García Acosta, 2011; 2019).

As Indigenous peoples of Aotearoa, Kāi Tahu ki Murihiku have long maintained holistic relationships with te taiao (the environment), guided by principles such as whakapapa, kaitiakitaka (stewardship), and mana motuhake (self-determination) (Ministry for the Environment, 2022). Recent scholarship highlights the need for climate adaptation models that reflect Māori worldviews and governance structures, rather than frameworks developed in Western policy contexts (Bailey-Winiata, 2024; Blackett et al., 2022; Kaiser & Kenney, 2022; Jones et al., 2024). The Intergovernmental Panel on Climate Change's (IPCC) definition of adaptation as "In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities" (2022) is widely accepted, however, this definition lacks important cultural and relational context for Indigenous Peoples and Māori.

Academic literature explores the context of relationship-based governance for Māori and Indigenous climate adaptation. As examples, Johnson et al. (2022) emphasise that Māori women's adaptive capacity is shaped by relational dynamics within whānau and hapū, and that inclusive adaptation must engage with these realities. Taiapa et al. (2024) argue Māori responses to climate change are grounded in expansive relational understandings, constrained by Western environmental constructs. Mackintosh (2025) presents a Māori-led adaptation model centring cultural values and collective governance. Wilson, Lira, and O'Hanlon (2022) highlight Indigenous governance concepts are underrepresented in climate literature and call for recognition of Indigenous knowledge systems.

Additionally, the terms strategies, practices, and actions have their own cultural context. *Strategies* function as intergenerational focal plans for collective priorities and aspirations. Across Aotearoa New Zealand, iwi (Māori tribes) and hapū (sub-tribes) align strategies with cultural frameworks and values. Prominent iwi-led strategies released in

the past decade are discussed in Kaiser & Kenney (2022) and Bailey-Winiata et al. (2024). For the purposes of this research, Te Rūnanga o Ngāi Tahu's climate change strategy Te Tāhū o te Whāriki (2018) and Te Tangi a Tauira (2008), (the combined management plan of the four Murihiku-based rūnaka) are the most relevant as they both directly address climate change concerns and aspirations. These strategies deliberately reframe climate adaptation within Māori worldviews. Kāi Tahu ki Murihiku climate action is reclaiming power by foregrounding Māori concepts of whakapapa, kaitiakitaka, kotahitaka, and mokopuna futures as central organising principles.

The term *practices* is used in this study to refer to enduring tikaka (cultural practices and ways of doing) that enact these strategies and reinforce cultural identity over time. These include mahika kai (customary food gathering practices and places) or ahi kā (maintaining presence and responsibility on ancestral lands). *Actions* describe the discrete initiatives or projects that operationalise these practices, such as maramataka (seasonal monitoring) or wetland restoration programmes. These key concepts and interpretive definitions provide a foundation for the methodological approach that follows, which centres Kāi Tahu relationality, intergenerational intent, and culturally embedded forms of adaptive practice.

7.3 Methodology and Methods

This research employs Te Kahu Huruhuru o Kohikohi as a methodological and conceptual framework, understanding research as weaving diverse knowledge strands to create a cloak that protects and enhances participant mana (Kaiser et al., 2025). Using a Kaupapa Māori bricolage approach, this study combines: uiui (interviews) capturing experiences and intergenerational knowledge transmission; Western ecological and adaptation science situating observations within empirical climate change; and policy analysis examining how current frameworks enable or constrain Indigenous-led strategies.

The lead researcher is Māori (Kāi Tahu, Kāti Māmoe, Waitaha), approaching this mahi as an insider guided by whakapapa obligations and relational accountability. This positionality aligns with kaupapa Māori ethics, which emphasises Māori-led research, collective benefit, cultural integrity, and protection of Māori knowledge systems (Pihama et al., 2002; Smith, 2019). The research was conducted with a commitment to care, reciprocity, and mana-enhancing practices that uphold Indigenous authority and ways of knowing.

Twenty participants were interviewed for this research and a narrative analysis framework (Gergen & Gergen, 1998; Somers, 1994) was used to identify key interwoven strands of climate change adaptation. Participants, representing a range of different ages (mid 20s to over 80 years old) and gender (12 male, 8 female), were selected through whakapapa ties and snowball sampling. Most participants have whakapapa to Ōraka-Aparima, one of the four Murihiku-based rūnaka of Kāi Tahu. Other participants were selected based on their ties to Te Rūnanga o Ngāi Tahu, therefore providing insights into relational dynamics, strategy and priorities at both the Iwi and rūnaka levels.

Engagement followed a tuakana–teina (participant as teacher/mentor, researcher as learner/mentee) ethic in which participants were regarded as knowledge holders. Kanohi-ki-te-kanohi (face to face) interaction was prioritised wherever possible, with online interviews during COVID-19 restrictions. Rakatahi (youth) were nominated but were not directly interviewed within the project timeframe. Interviews were audio-recorded and transcribed verbatim. Analysis followed a kaupapa Māori narrative–thematic approach: first-cycle in-vivo and descriptive coding (honouring participant language) was followed by second-cycle pattern/axial coding and an audit trail of memos captured analytic decisions. Triangulation tested theme coherence and linked findings to theory through collective author and participant feedback. Transcript return was offered to all participants; all participants provided informed consent; and the study received university human ethics approval (Massey University Human Ethics Committee: Southern B, Application SOB 21/17).

Each participant was assigned a pseudonym based on native species with whakapapa to Kāi Tahu, reflecting cultural symbolism and ecological connection. While not all participants appear in this manuscript, every kōrero informed the interpretive framework and thematic analysis, shaping the narrative structure and ethical orientation of this work. The findings are discussed in relation to the pseudonyms below (table 8).

TABLE 8: PSEUDONYMS AND ATTRIBUTES OF PARTICIPANTS

Rūnaka General Manager	Kahu (Harrier)
Rūnaka Representative	Toroa (Royal Albatross)
Rūnaka Committee Member	Toutouwai (South Island Robin)
Rūnaka Committee Member	Pīwauwau (Rock Wren)
Kaumatua	Tāiko (Petral)
Kaumatua	Tītī (Muttonbird, Sooty Shearwater)
Kaumatua	Kākāpō (Ground Parrot)
Kaumatua	Kākāriki (Parakeet)
Kaumatua	Tīeke (Saddleback)
Rūnaka member	Kuaka (bar-tailed godwit)
Rūnaka member	Kererū (Wood Pigeon)
Te Ao Mārama Inc kaimahi	Mohua (Yellowhead)
Te Ao Mārama Inc kaimahi	Korimako (Bellbird)
Te Ao Mārama Inc kaimahi	Tītipounamu (Rifleman)
Te Ao Mārama Inc kaimahi	Tokoeka (Southern Brown Kiwi)
Retired Iwi Kaiwhakahaere	Tohorā (Southern Right Whale)
Current Iwi Kaiwhakahaere	Kōtuku (White Heron)

Iwi emergency management specialist	Pōpokotea (White Head)
Iwi emergency management specialist	Hoiho (Yellow-eyed Penguin)
Iwi environmental policy specialist	Pūkeko (swamp hen)

By privileging Kāi Tahu ki Murihiku frames, whakapapa, ahi kā, kotahitaka, and mokopuna futures, this research challenges dominant policy framings and centres whānau aspirations and responses to climate disruption.

7.4 Theoretical Fishing Net: Framing, Externalities and Overflows

This research is guided by a layered theoretical framework combining narrative analysis with Callon's sociological and market-based concepts of framing, externalities, and overflows. Framing refers to the deliberate effort to define what is included and excluded in a given situation (Callon, 1998). Frames shape how climate adaptation is understood, who is responsible, and what counts as legitimate action. In climate planning, these frames often prioritise technical and economic parameters (carbon targets, infrastructure resilience, and cost-efficiency), while sidelining cultural, spiritual, and relational dimensions central to Māori wellbeing.

Callon argues that framing is never complete: "every framing produces overflows" (1998, p. 245). Overflows are the unintended consequences or creative responses that exceed the boundaries of a frame. Similarly, externalities are impacts that dominant systems fail to account for, such as cultural severance, ecological degradation, or identity loss, yet weigh heavily on Indigenous communities. These concepts help explain how Murihiku whānau contest externally imposed narratives and reconfigure adaptation through relational, cultural, and intergenerational logics.

Framing theory has been widely applied in climate research to examine how narratives influence policy and public engagement (Guenther et al., 2023). In Indigenous contexts, framing is not neutral; it often reflects colonial assumptions about vulnerability and deficit (Whyte, 2018). Managed retreat, for example, is framed as a technical solution to climate risk, yet for Māori it can imply cultural erasure and disconnection from whakapapa (Bailey-Winiata et al. 2024). These framings produce externalities (unacknowledged costs borne by whānau), and constrain adaptive possibilities. Conversely, Māori-led strategies generate overflows: relational practices such as ecological restoration, cultural monitoring, and mokopuna-focused planning that exceed technocratic boundaries and embed adaptation in cultural ethics.

To interpret these dynamics within a Māori worldview, this article applies a fishing net metaphor developed by the lead author (Kaiser, 2026b.). Here, the fishing net represents mainstream climate planning and policy in Aotearoa New Zealand, designed to capture certain priorities like carbon efficiency and economic resilience (see Figure 22 below).

Dimension	Caught in the net (internalised within dominant frames)	Impacts of fishing (Externalities)	Thriving outside the net (Overflows)
Policy & Governance	Carbon targets, cost-efficiency, infrastructure resilience	Cultural severance, identity erosion, emotional labour of adaptation	Indigenous governance models, whakapapa-based planning
Science & Knowledge	Technical risk assessments, predictive modelling, economic metrics	Exclusion of mātauranga Māori, relational ethics, intergenerational knowledge loss	Kaupapa Māori methodologies, cultural monitoring, storytelling
Adaptation Strategies	Managed retreat, nature-based solutions, hard infrastructure, short-term resilience	Land dispossession, erosion of mahika kai, youth exclusion	Ahi kā practices, mahika kai restoration, rakatahi leadership
Economic Framing	Market-based solutions, extractive models, transactional partnerships	Tokenistic cultural consultancy, inequitable resource distribution	Mokopuna-centred redistribution, community investment, taonga species economies
Temporal Orientation	Short-term planning cycles, reactive adaptation	Failure to plan for intergenerational continuity	Visioning mokopuna futures, long-term ecological reciprocity (utu)

FIGURE 22: THE FISHING NET: INSTITUTIONAL AND SCIENTIFIC FRAMINGS OF CLIMATE CHANGE

Each knot in the net is a frame, defining what is held and what escapes. Externalities are like unintended catch tangled in the net, impacts that are not necessarily sought but ensnared regardless, such as the erosion of mahika kai or cultural identity. Overflows are what slip through the mesh: creative Māori-led responses that escape technocratic boundaries and swim free, generating new possibilities for adaptation. Like a net cast into uncertain waters, adaptation is a flexible system that gathers, releases, and reconfigures relationships across time and space.

Callon's concepts can be applied to a Murihiku-based co-governance initiative "Slow the Flow" between Kāi Tahu ki Murihiku and Environment Southland (2022-2025), as an example. Dominant scientific framing has often cast flood risk as a hydraulic/engineering problem with defined levels of service and cost envelopes (Franco & García-Ayllón, 2025). This framing excludes externalities for Kāi Tahu whānau dealing with flood risk, including impacts on mahika kai customary food practices, land-use, cultural monitoring, and cumulative ecosystem co-benefits. Whānau-led practices utilising traditional knowledge of flooding history and river behaviour were nt captured in the net as they did not comfortably translate for use by western science. By collaborating on the "Slow the Flow" regional flooding initiative, Kāi Tahu whānau and the local council had the opportunity to weave a new "net", generating new overflows, including co-designed nature-based solutions (detainment bunds, wetlands, native afforestation, reconnection of floodplains), wider cultural/community co-benefits, and a draft blueprint for integrated floodplain management (Lawton, 2025). Active reframing of flood risk that includes Kāi Tahu knowledge, values and practice reconceives the problem as a whole-of-catchment system. Mātauraka Māori can be used symmetrically with technical analysis to enable new approaches to slow, store and filter water while strengthening collective community wellbeing.

7.5 Findings and Discussion

Murihiku/Southland faces increasing climate pressures, including more frequent and extreme rainfall, shifting seasonal patterns (NIWA, 2019), and heightened coastal hazard

exposure. Rising seas combined with storm surge are projected to increase the frequency of extreme sea level events and coastal flooding and erosion, particularly affecting low lying communities and culturally significant ecosystems along the Southland coast and Rakiura (Dean et al. 2023). The February 2020 Southland flooding event, which triggered the evacuation of approximately 5000 people, highlighted systemic vulnerabilities across catchments and settlements (Kaiser et al. 2021). These climate pressures provide the context for the adaptive work undertaken by Kāi Tahu ki Murihiku whānau. Rather than detailing impacts, (addressed in Kaiser, 2026a), this article examines how whānau respond and adapt to these pressures.

The following findings are presented as woven strands, each representing a key dimension of intergenerational climate adaptation among Kāi Tahu ki Murihiku whānau. These strands emerged through narrative thematic analysis privileging Māori ways of knowing and relational storytelling. Participants' kōrero identified how climate change impacts are experienced and highlighted tensions within policy and planning.

This article focuses on how Kāi Tahu ki Murihiku whānau actively shape adaptation through restructuring past, present, and future narratives. Rather than accepting the negative externalities borne through mainstream climate change framing, whānau are weaving and casting out a new kupeka- a traditional Māori form of fishing net. They are taking externalities of Indigenous vulnerability and transforming them into overflows: strategic mana whenua-led adaptations (see figure 23). Cultural erasure is transformed into whakapapa-based adaptive infrastructure. Land dispossession becomes ahi kā and restoration. Transactional relationships become kotahitaka. Exclusion of youth is reframed as mokopuna futures.

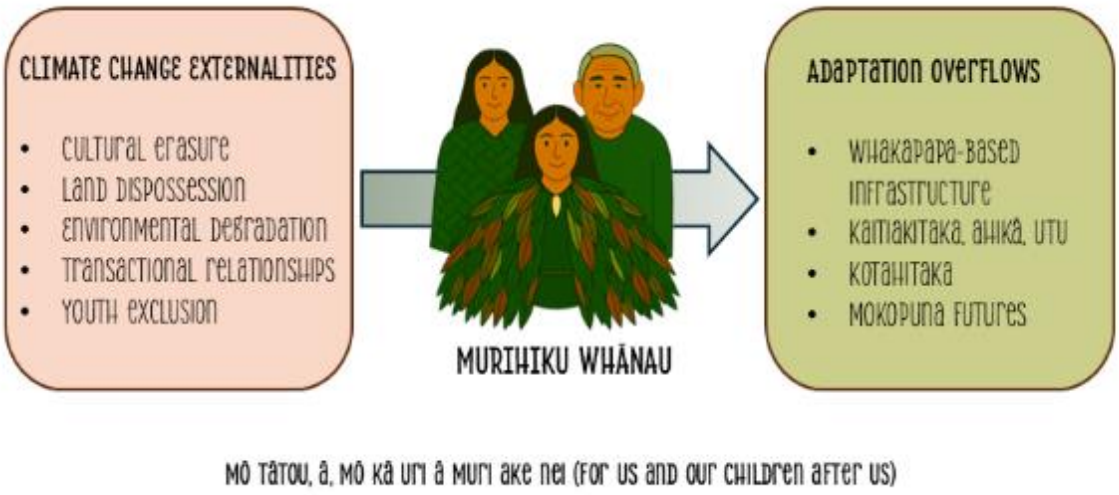


FIGURE 23: MURIHIKU WHĀNAU TRANSFORMING EXTERNALITIES INTO OVERFLOWS. (CENTRAL IMAGE GENERATED IN MICROSOFT COPILOT)

These narratives and overflows sit within a meta-narrative expressed in the whakataukī that titles this article: *Mō tātou, ā, mō kā uri ā muri ake nei* (for us and our children after us), a guiding kaupapa for Te Rūnaka o Ōraka-Aparima and Te Rūnanga o Ngāi Tahu's fifty-year tribal strategy *Mo Kā Uri* (2024).

7.5.1 Whakapapa-based Adaptive Infrastructure

In Te Ao Māori, whakapapa is both a conceptual narrative and a living infrastructure of knowledge, responsibility, and resilience. It connects people to place, species, and each other across generations, forming the foundation of identity, governance, and adaptation (Angeli-Gordon, 2024; Wehi et al., 2024). As climate change intensifies, Māori communities draw on whakapapa to interpret environmental disruption and guide culturally grounded, intergenerational, and spiritually attuned responses.

Contemporary engineering resilience scholarship describes adaptive infrastructure as a system intentionally designed to adjust to changing climate conditions, absorb disturbances, and maintain essential functions over time. Unlike traditional static

infrastructure, adaptive approaches emphasise flexibility, learning, and the capacity to evolve in response to emerging risks, (often through modular design, nature-based solutions, and continuous feedback loops) (Committee in Adaptation to a Changing Cliamete, 2018; Singh et al., 2023).

In this study, whakapapa is understood as a culturally-specific form of adaptive infrastructure: a living, relational system that embeds knowledge, responsibilities, and reciprocal obligations to support long-term resilience. As an adaptive system, whakapapa provides mechanisms for interpreting change, mobilising collective action, and sustaining intergenerational wellbeing. It therefore functions as a dynamic resilience architecture capable of guiding Māori responses to climate impacts.

Cultural infrastructure refers to embedded values, practices, and knowledge systems sustaining identity, cohesion, and adaptability over time. Scholars of cultural sustainability argue culture provides a transformative dimension essential to sustainable development, particularly in contexts of disruption and uncertainty (Järvelä, 2023). When grounded in cultural systems like whakapapa, adaptive infrastructures enable communities to interpret change, maintain continuity, and enact responses that are socially and spiritually coherent. This framing recognises infrastructure as material assets and socio-cultural capacities that enable adaptation.

This section examines how Kāi Tahu whānau in Murihiku enact whakapapa as adaptive infrastructure, navigating climate impacts, restoring relationships with whenua and wai, and building strategies for mokopuna futures.

Cultural Identity and Continuity

Whakapapa shapes how individuals and communities understand themselves in relation to land, history, and each other. Participants described it as a relational system carrying values, responsibilities, and belonging. Kuaka reflected on the emotional and cultural significance of reconnecting with whakapapa:

> "When people spend years trying to find their whakapapa and they find it… they think something's going to happen. But there's no induction into the hapū… Even for people already part of the Rūnanga… I've got to really dig for that information. It'd be mana-building to have more understanding about all that."

They also noted the absence of visible historical narratives within marae spaces:

> "I don't see a track record when I go into our marae. I don't understand the trials and tribulations that led to settlement and the apology… I don't see anything about our land blocks that were taken, and I think we need that."

This absence was attributed to colonisation and resource constraints. Marae such as Takutai o te Tītī were repurposed from colonial structures, and cultural infrastructure for whakapapa transmission was never fully restored. The disconnection described by Kuaka and others reflects externalities of colonial systems that ignored Māori relational structures and intergenerational knowledge.

In response, whānau have initiated restoration processes including wānanga on te reo Māori, tā moko (tattoo), rāraka (weaving), and workshops for kaikaraka (women who call visitors onto the marae) and kaikōrero (formal speakers). Rūnaka also lead hīkoi (journeys) reconnecting whānau to whenua they were dispossessed from, such as Whenua Hou near Rākiura (Stewart Island). Te Rūnanga o Ngāi Tahu has run online Treaty Claim sessions to support global whānau engagement. These actions reframe externalities like cultural disconnection by establishing whakapapa and place-based connection as foundations for continuity and climate resilience.

Intergenerational Knowledge and Adaptive Learning

Whakapapa enables adaptive learning between generations, linking kaumātua-held mātauraka with rakatahi innovation. This transmission is not about preserving tradition alone; it is dynamic, enabling younger generations to reinterpret ancestral wisdom for contemporary challenges.

Participants described cultural monitoring and storytelling as practices that unite generations, strengthen identity, and foster shared understanding. Pīwauwau explained: "They've suddenly got role models that aren't necessarily yourself… they know the connections, they know who they are, and what this place is about." However, several raised concerns about succession planning. Pīwauwau noted: "The younger ones are desperate to help, desperate to find a place, and are maybe not given a space, or a succession pathway."

Tōroa echoed this: "I don't see enough young people attending hui… those old folks, they're not going to be around forever."

These reflections highlight the need for strategies that support youth leadership, mentorship, and culturally safe spaces for learning. Adaptive learning is reciprocal and focused on enabling rakatahi to lead future climate adaptation.

Tītī described creative approaches for tamariki, including storytelling and drawing at marae:

> "I talk to them about the tītī and the so-called migrations… I say, righto, draw that picture of that story I just told you… and there's some great pictures coming out."

Rūnaka have also leveraged technology, collaborating with Minecraft to develop Patea/Doubtful Sound-themed content featuring karaka (welcoming song) and kaumātua avatars (Te Rūnanga o Ngāi Tahu, 2025). Such innovations engage rakatahi with whakapapa, including those living outside the rohe.

Participants advocated for storytelling that connects waka, awa, pā sites, and settlement histories as living knowledge informing decisions. Nearby at Te Rau Aroha Marae (another Kāi Tahu ki Murihiku marae in Bluff, Southland), researchers used kōrero tuku iho (oral narratives) to explore ancestor Tamarereti's travels across Te Moana Nui a Kiwa in search of the Aurora Australis, connecting kaumātua, rakatahi, and tamariki through whakapapa as a foundation to look to the future for climate planning.

Historical Reflection and Technological Transformation

Historical reflection also shapes adaptive learning. Kāi Tahu ki Murihiku historian Stevens (2018) referenced moments of technological change that define history for Southern Māori. Tōroa centred these moments around three transitions: from whale oil to aluminium smelting to green energy. Participants framed them as pivotal economic and technological shifts, moments of negotiation and identity redefinition. This framing is both temporal (past-present-future) and relational (between iwi, state, and industry).

Dominant public narratives of energy transitions are framed in market terms (efficiency, cost, and infrastructure) often excluding cultural, historical, and relational dimensions central to Kāi Tahu understandings of energy and adaptation. Participants stressed the need for rūnaka to negotiate better outcomes in future transitions and highlighted rakatahi leadership as critical for shaping climate futures.

Kererū shared examples of Māori-led programmes in Tāhuna (Queenstown) that foster energy transition, promote sustainable solutions, and provide cost-reduction advice:

> "A lot of the mahi we get in winter is energy hardship. We go into homes, talk about energy efficiency, and educate on electrification—how it can save money… because in Tāhuna, a lot of homes are still powered by diesel and LPG… and I'm talking real recent developments…"

These examples illustrate how whakapapa operates within everyday adaptation practice. The following section explores how kaitiakitaka further shapes whānau responses.

7.5.2 Kaitiakitaka, Ahi kā and Utu as Climate Adaptation

Kaitiakitaka (or kaitiakitanga) is a foundational concept in Te Ao Māori, encompassing environmental responsibility, guardianship, and intergenerational care. It is a relational obligation embedded in whakapapa. As climate change intensifies, Murihiku whānau enact kaitiakitaka through ecological, cultural, and spiritual practices sustaining people

and place. Arnt (2021) shows Kāi Tahu upholding kaitiakitaka through lobbying and direct climate action despite structural constraints.

Participants framed kaitiakitaka as inherited responsibility: "Kaitiaki is a responsibility for numerous things—looking after your knowledge, the environment, yourself, your children, everything. That's what you're born into" (Tokoeka). This ethic extends beyond the ancestral environment to include care for whakapapa, mātauraka, and community wellbeing.

Whānau narratives emphasise continuity and collective responsibility. Tīeke noted: "Kaitiakitanga… well before predator-free Rakiura came along. We've always cared for these manu so our mokopuna can do the same." Kākāpō added: "Because I'm a tangata kaitiaki. We're guardians. We monitor, educate, and listen." Here, kaitiakitaka is situated as attentiveness through listening, learning, and teaching.

Yet participants expressed frustration at community apathy and under-resourced governance: "Who's dealing with this beautiful piece of native bush? Look at the weeds, the possums. Who's doing anything about it?" Kākāriki questioned. Such neglect reflects externalities of systemic underinvestment, leaving ecological and emotional costs to whānau who uphold kaitiakitaka regardless. Tītī reinforced the collective nature of kaitiakitaka:

> "We keep challenging each other, reminding ourselves it doesn't belong to anyone… We're all just kaitiaki, looking after it for future generations. Kaitiakitanga is not a privilege, it's a responsibility."

This dialogue reflects environmental governance founded whakapapa, exceeding formal climate planning that frames land as commodity and adaptation as technical fix. Whānau resist externalities like environmental degradation by centring shared responsibility. Similarly, Tīeke highlighted the Tītī Islands' role in transmitting conservation values: "We go there not only to harvest but to care for the motū. Those values are passed from our parents at a very young age."

Place-based practices embed kaitiakitaka in everyday life. Whānau also integrate international science to strengthen resilience, reframing it through whakapapa: “To make what’s right in Murihiku, we’ll use overseas science to see how we can make things more resilient—not just for our environment, but for our people” (Tokoeka). Rather than absorbing technocratic models, whānau selectively adapt science within cultural frameworks, creating overflows that exceed dominant economic and technical paradigms.

Recent scholarship reinforces the conceptual narrative of kaitiakitaka an ethic, a practice and as a climate adaptation strategy. The Deep South Challenge’s *Te Ara o Raukawa Moana* project highlights how reconnecting to coastal landscapes and enabling intergenerational knowledge transfer are central to exercising kaitiaki obligations. McDonald (2025) demonstrates that voyaging communities respond to climate disruption through intrinsic motivation to uphold kaitiakitaka. Likewise, the work of Murihiku whānau shows how adaptation is grounded in kaitiakitaki, sustained through intergenerational care, and embedded in overflows that dominant frameworks often ignore (Nursey-Bray et al. 2022).

Ahi kā

Ahi kā, the practice of maintaining presence and responsibility on ancestral lands, was a second conceptual narrative identified in the uiui. Excluding relational practices like ahi kā from mainstream climate planning creates externalities such as land dispossession and erosion of mahika kai through managed retreat. In Murihiku, ahi kā is enacted through deliberate ecological and cultural responses: remaining on or returning to ancestral lands, restoring ecosystems, and sustaining mahika kai despite disruption. For many, ahi kā means holding ground in the face of change, through ongoing connection, responsibility, and whakapapa ties.

Tītī reflected on past relocations:

> "We've had to move marae before. It's not about leaving, it's about adapting. You don't just walk away. You take the stories, the mana, and make sure the next generation knows where it came from."

Tohorā offered a pragmatic view: "Another decade, they're gone. We'll move them or they'll go. That's reality. But it doesn't mean we lose our connection. It means we have to be smart about how we keep it." These reflections challenge managed retreat frameworks that treat relocation as cultural severance. As Bailey-Winiata et al. (2024) note, historical Māori relocations were strategic and grounded in whakapapa. Contemporary adaptation must follow these principles, recognising ahi kā as sustained through cultural practice, as well as occupation.

Dominant climate frameworks often marginalise long-term relational dimensions of Indigenous adaptation (Johnson et al., 2022; Mannakkara, 2023). Strict locationally-bound climate change plans reinforce colonial challenges to ancestral practices for whānau, such as moving seasonally to different mahika kai sites. Kuaka explained:

> "We used to move marae all the time back in the day. We were nomadic… They moved from Tītī Islands up through Waiāu… through Manapōuri… and then looped back down when it started getting cold."

This mobility reflects an overflow from rigid notions of place-based identity, embracing historical patterns of seasonal and strategic movement that inform contemporary adaptation. Whānau continue to practice seasonally-based mahika kai, however colonisation and land dispossession have reduced access to sites over time. Whānau are actively reclaiming these practices and re-asserting their strong links with the environment through strategies and plans.

In 2021, Cain and Manihera authored *Āpiti Hono Tātai Hono: Ngā Whenua o Ngāi Tahu ki Murihiku*, a Southland Cultural Landscape Assessment Study. It provides a Kāi Tahu-designed methodology grounded in *Ira Atua Ira Tangata*, a whakapapa-based framework integrating metaphysical and physical relationships across time and space. This approach

challenges Western planning paradigms by recognising deep interconnections of land, water, flora, fauna, atua, and people.

The report affirms participant narratives: ahi kā is not defined by static occupation but by ongoing cultural practice and intergenerational responsibility. Movement or relocation does not sever ties, but it requires strategic reconfiguration to maintain ahi kā and through linkages to mahika kai sites.

Utu

Dominant climate adaptation frameworks often frame restoration and adaptation around short-term, measurable outcomes such as carbon sequestration, biodiversity targets, or infrastructure resilience (Almassi, 2022; Knights, 2014). These framings prioritise technical fixes over relational or cultural processes, treat restoration as a project with an end-point rather than a continuous relationship, and view food systems like mahika kai through productivity or food security lenses instead of cultural and ecological knowledge systems.

In contrast, participants framed environmental reciprocity through the principle of utu, a concept encompassing balance in relationships, communities, and the environment (Barnett, 2021). Utu, expressed as ecological reciprocity, was described as central to kaitiakitaka. Examples included riparian planting, pest eradication, species translocation, and replanting taonga species. Tīako explained:

> "I'm trying to bring back the muttonbird trees from the islands and plant them on the coast… but we need a hundred years of leaves before the ground's enough for them to burrow into. It's not going to happen in my lifetime, but that's ok."

Here, planting becomes an intergenerational act of repair. Kererū emphasised water restoration: "We want to see that water back to a state our tūpuna [ancestors] would have had… the waterways are the arteries of our whenua and Papatūānuku [deity associated as Mother Earth]. We want to see them thriving in fifty years." These narratives shift adaptation from short-term metrics to long-term relational care. Kuaka highlighted the

cultural dimension for rakatahi in particular, "the fact that they're planting trees… every time they go past for the rest of their life, it'll be a reminder… what they're doing does impact the environment."

Such practices foster cultural resurgence and intergenerational learning (Marsden, 2003; Morrison & Kaio, 2024;). Using the kupeka metaphor, they generate positive overflows, beyond technical goals, such as cultural continuity and ecological resilience.

Mahika Kai as Climate Strategy

Participants described mahika (or mahinga) kai as both a cultural right and a climate strategy, a living system of food gathering, ecological observation, and kaitiakitaka (Dacker, 1990). Regionally, evidence syntheses (Morrison et al. 2023) link reduced sediment and nutrient loads from riparian and wetland restoration to improved kaimoana habitat conditions, aligning with whānau observations of the relationship between land-based actions and coastal mahika kai. Kuaka explained:

> "Our cultural identity is reliant on mahinga kai. If you take away the right to mahinga kai, you lose your cultural identity… it's not just planting trees, it's understanding cumulative effects and being able to enact mahinga kai."

Tokoeka noted climate-driven shifts: "Mahinga kai has been hugely affected by climate change. Instead of eating blue cod [a southern cold water species] we might be having snapper [a northern species]. That's a big shift. But we're adapting."

Tītī described the practice of mahika kai as environmental monitoring: "You see it in the birds, in the trees, in the water. You know when something's off." He also stressed the importance of reflective and iterative planning to ensure sustainability in the face of climate change impacts, particularly regarding whānau harvesting of Tītī:

> "…it might be that we have to set ourselves in a different way of management, not all the time, not every year, or whatever, and those things will, and how do we know when, when we need to change, and I don't know… how easy it's going for

whānau to change without, because for some that's the only thing they've got, and it's really difficult, and it's a really difficult situation, how do you make sure the social mechanisms and the institutions around them protect their identity, when the only thing they've got are the tītī coming?"

There are issues of equity that come into adaptation planning when prioritising sustainability. Support for whānau who are dependent on muttonbirding and other mahika kai practices for their livelihoods needs to factor into collective decision-making. However, whānau adaptation practices in the form of sustainable mahika kai management represent proactive adaptation action that reaffirms whakapapa, supports food sovereignty, and looks to maintain local ecosystems in balance through future escalating climate change challenges.

7.5.3 Kotahitaka and Strategic Relationships

Kotahitaka, the principle of unity and collective purpose, was described by participants as a foundational ethic in climate adaptation. Among Kāi Tahu whānau in Murihiku, kotahitaka is enacted through relational governance, strategic partnerships, and cultural leadership. Participants emphasised that kotahitaka must be cultivated through trust, shared experience, and long-term commitment.

Kaumātua were acknowledged as key initiators of strategic relationships with councils, government agencies, and other iwi. These relationships were often strengthened in informal settings, where cultural foresight and interpersonal trust enabled more meaningful engagement than formal consultation. Tītī reflected:

> "You're sitting around a table and you're having your formal meetings, but quite often you get more done in the drinkies afterwards. You sit down and you build those relationships with those people. If you can build a relationship with those people and convince them that this is the way to go and the reasons for it. You can't convince them across the boardroom table, you've got to have that social time with them."

Callon's framing theory helps explain how whānau reshape institutional engagement. Rather than accepting transactional frames of partnership (Wilson et al., 2022), participants reframed collaboration as whakapapa-based and culturally accountable. Pīwauwau described:

> "Ngāi Tahu ki Murihiku had a strong relationship with councils because we had some quite amazing kaumātua that actually realised early on that they need that relationship, and they built on it. So, the relationship wasn't forced because of a policy statement or a national directive. That was already there. It gets tested and strengthened as we go along."

Kotahitaka was also described as a relational ethic that must be actively sustained:

> "We keep challenging each other, you know, reminding ourselves that it doesn't belong to anyone. We're all just kaitiaki, and we're only here looking after it for our future generations, really."

This framing of shared guardianship reflects kotahitaka as an embodied practice enacted through everyday relationships.

Institutional planning often defines partnerships in terms of deliverables and timelines, excluding the relational labour and cultural ethics underpinning kotahitaka (Reo, 2019). These exclusions function as externalities, in the form of unacknowledged costs borne by whānau, including emotional labour, time and cultural risk. In contrast, mana whenua-led initiatives such as Iwi and Hapū Management Plans (IHMPs), cultural monitoring, and restoration projects represent overflows. *Te Tangi a Tauira* (2008), the IHMP for the four rūnaka ki Murihiku, was the first of its kind to acknowledge climate change issues and represents a collective shared vision and strategy. Local and regional councils are required to take IHMPs into account in their own planning (Kaiser & Kenney, 2022; Saunders & Kaiser 2019). Therefore, by including climate change specific strategies and actions, Iwi have the opportunity to embed their planning and resource management priorities into the regional plans of territorial authorities.

Kotahitaka was described as inseparable from kaitiakitaka and tino rakatirataka, guiding decision-making, shared responsibilities, and relationship maintenance. Participants reflected on tensions within the iwi, such as dairy farming decisions where economic imperatives conflicted with environmental values. Tītī recalled: "With Te Rūnanga, Ngāi Tahu getting into dairy farming, I was on the board at that time when they decided to do that, and we were going, no, don't go there!"

Kāi Tahu governance regularly balances economic opportunities (e.g., primary production investments) with environmental sustainability. Ngāi Tahu Holdings Corporation and subsidiaries are required to produce climate change response plans under the Ngāi Tahu strategy *Te Tāhū o Te Whāriki.* Tensions over how best to balance economic and environmental sustainability have yet to be resolved. However, participants described robust and regular conversations as part of kotahitaka in practice—seeking pathways that maintain intergenerational wellbeing as an outcome rather than privileging short-term financial gains.

Participants also addressed structural constraints such as fragmented policy, inconsistent government engagement, and under-resourcing are limiting full expression of kotahitaka. Pīwauwau noted:

> "The central government seems to dictate what that means on the ground level, particularly for whānau. Sometimes central government has to put the directives, but then they have to butt out and not interfere. Every place will be slightly different; they'll have slightly different issues and also have different relationships."

Another participant reflected on cultural costs of fractured relationships:

> "People get so caught up in those sort of old grudges that they end up missing those opportunities which is a shame especially when it's multi-generational feuds about stuff that people don't even really remember anymore."

Despite these constraints, whānau sustain kotahitaka through cultural leadership, relationship building, and strategic innovation. The Murihiku Southland Regional

Climate Change Strategy (Environment Southland, et al. 2024) and its Framework for Action (Environment Southland et al. 2025) demonstrate adaptation outcomes for whānau through the inclusion of kotahitaka in the governance model. Kāi Tahu ki Murihiku, councils, and communities are united for structured climate action. Operationally, this has meant Kāi Tahu ki Murihiku representatives sit within the regional climate governance structure and shape programme prioritisation and work planning, rather than being limited to consultation rounds. As an outcome, project workstreams (for example, "Slow the Flow") explicitly require iwi sign-off at key decision gates.

Participants stressed kotahitaka must be nurtured through hui, community action, and visible values in decision-making. As Tītī put it: "It's not just about agreeing. It's about holding each other to account, because we're all responsible for what comes next." In this context, kotahitaka, and relationships with rūnaka, iwi, councils, and beyond, are central to effective climate adaptation, woven through whakapapa and directed toward mokopuna futures.

7.5.4 Visioning Mokopuna Futures

Among Kāi Tahu whānau in Murihiku, climate adaptation was consistently framed as a responsibility to mokopuna. Participants described this not as a rhetorical gesture, but as a practical ethic that guides decisions about land, species, governance, and economic strategy. Mokopuna futures were invoked as both a horizon and a mandate, an obligation to ensure that future generations inherit not only thriving ecosystems, but thriving systems of knowledge, connection, and choice. Toroa stated:

> "I think like your generation, you know, I feel like you will all have a different outlook on the situation. You know, you have to adapt. I mean, we've done this. Ngāi Tahu especially have always adapted to situations, and I don't see any difference in it, really. I think we will adapt. We have no choice, you know, but you've got to look forward like that."

Tokoeka agreed and articulated this responsibility with clarity: "They'll be born into this world… we have to leave them the knowledge to survive in it."

This knowledge was described as relational and ecological, encompassing mātauraka Māori, practical skills, and cultural ethics. Participants framed mokopuna, not as passive recipients of inherited challenges, but as future kaitiaki who must be equipped to lead. Tītī reflected on his own role in this intergenerational transition:

> "I'm 72 now and I'm thinking, how much longer have I got where I'm going to be in a position like being a part of Te Ao Mārama and being a part of Rūnaka? Right now, I've got some influence. I go to councils, I know all the councillors, and when I've got something to say, they listen. I remember when I first got involved, I'd go to these council meetings and say, 'This is not [Tītī] speaking. This is a Rūnaka speaking.' So, while I've got that influence, I want to do as much as I can—especially in climate change. I want to challenge people. And I want them to challenge me back if I'm heading down the wrong track."

The emotional and cultural labour of kaumātua, like Tītī, who work to transfer influence and knowledge before their time ends, is an externality, unseen and unsupported by institutional structures.

Economic decisions that prioritise extractive models over mokopuna wellbeing (e.g., tokenistic cultural consultancy vs. community investment) also represent externalities that undermine long-term resilience. Participants rejected deficit-based framings that position Māori communities as vulnerable or reactive. Instead, they constructed a strengths-based frame in which adaptation is a generative process rooted in whakapapa, cultural foresight, and mokopuna wellbeing.

The exclusion of rakatahi from strategic climate planning is an externality. It reflects a failure to recognise youth as decision-makers and future leaders. McMeeking et al. (2025) discuss how storytelling and pūrākau support Indigenous youth leadership in climate futures, framing rakatahi as capable agents of change. Kōtuku reflected on the potential value of a rakatahi-led review of Ngāi Tahu's climate strategy:

> "Perhaps one of the first steps would be having a Ngāi Tahu climate rangatahi group actually review our Te Kounga Paparangi strategy and provide some expert advice and guidance on that. Because if anything, it's going to be our rangatahi that are left to implement and carry that in future generations."

These reflections point to a critical tension in adaptation planning. Institutional frameworks often frame youth engagement as symbolic or supplementary, rather than strategic (Ingaruca et al. 2022). This exclusion functions as an externality in Callon's terms, an unacknowledged consequence of planning that fails to centre mokopuna as decision-makers. In contrast, whānau-led initiatives that support rakatahi leadership, cultural monitoring, and intergenerational wānanga represent overflows. These practices exceed the boundaries of formal adaptation frameworks and reconfigure climate governance around mokopuna futures.

Participants also spoke about economic strategy as a site of adaptation. Kōtuku emphasised the need to move beyond reactive inclusion and toward proactive enablement:

> "If a company reaches out to Ngāi Tahu and says, 'Hey, we'd like a partnership and offer some cadetships,' we often say, 'Okay, let's go there.' But I don't know if we're actively saying, 'Where are the big players in the climate space, and how can we expose rakatahi to those opportunities?' That's a good challenge to the table."

Kuaka offered a sharp critique of extractive models and tokenistic cultural engagement:

> "Let's get a cultural… what do they call it? Consultant. Fuck that. We don't want just a cultural consultant. If we get Lord of the Rings doing a one-billion-dollar film in our takiwā [region], we want 10% of their royalties off that film so we can put it back into the community. We don't want a consultant on the ground saying a karakia [incantation] and getting paid 300 bucks an hour to sit there for two years. Let's manaaki [hospitality, care] back to the whenua. And if we do that, it'll be able to impact people."

This critique exposes the framing of cultural engagement as a transactional add-on, where Māori presence is commodified rather than enabled. Kuaka's call to redirect royalties into community investment reflects an overflow: a strategy that exceeds the narrow economic framing of cultural consultancy and reasserts mana whenua governance and mokopuna-centred redistribution. Kuaka also reflected on missed opportunities in the mānuka honey industry:

> "There's actually opportunities there for the mānuka industry. If we'd set up some form of control—like a trust that mānuka companies, a central distribution network for mānuka honey—you could plant your farm block into that and the trust controls distribution. Then the money goes back into the protection of that plant. Pest control. Massive opportunity. Massive missed opportunity for one of our taonga species that brings in billions of dollars worldwide. And now we've got mānuka honey in Australia."

These critiques reveal how economic decisions are deeply tied to mokopuna futures. Participants were asked not only what kind of ecosystems would be inherited, but what kind of systems, economic, cultural, and political, should be in place to support mokopuna wellbeing. Tītī reflected:

> "Ultimately, everyone wants the same thing. As far as I can figure, they want a good future for the future generations, for the children and such like to come through. But I think there's a whole lot of greed in amongst all that too. But ultimately, that's where everyone wants to go."

He also spoke about the importance of imagination:

> "Try to get those new generations to imagine. Imagine if we could have this—and it is actually achievable, eh? To get them to understand that it is achievable, because I still believe it is."

This emphasis on imagination resonates with Māori and Indigenous futurist scholarship, where future-making is understood as a deliberate act of cultural continuity and

sovereign design. Thinkers such as Simpson (2017) and Yates-Smith (2019) describe Indigenous futures not as speculative fiction but as grounded in ancestral relationships, lived responsibilities, and the creative regeneration of knowledge. In Aotearoa, Māori futurism emerges through mokopuna-focused planning, narrative practice, and innovation that resists colonial timeframes and affirms tino rakatirataka (sovereignty). As participants in this study made clear, envisioning mokopuna futures is a strategic form of climate leadership that reconfigures governance around Indigenous priorities and long-term care.

Participants reflected on the need for individual attitude shifts. Tītī described his own discomfort with fossil fuel use:

> "I've got a big old diesel van at home… occasionally you pop the foot on the accelerator, there's a big puff, smoke comes out the back, and I think, man, I don't even want to start it up anymore. But we've got to get people thinking about that. Everyone's still buying diesel vehicles. Trying to get the clean green. But they're not thinking about the waste. The waste at the end of the day."

Despite these challenges, the tone of this kōrero was one of clarity and determination. Participants described mokopuna futures as a guiding ethic for adaptation that creates space for future leadership.

7.6 Conclusion

This findings of this research demonstrate that Kāi Tahu whānau in Murihiku are actively reshaping understandings of adaptation. From the IPCC definition regarding "the process of adjustment to actual or expected *climate* and its effects, in order to moderate harm or exploit beneficial opportunities" to "an ongoing, relational process through which Kāi Tahu whānau adjust and redesign social–ecological relationships to sustain whakapapa, wellbeing, and tino rakatirataka under climate- and policy-driven change". This specific form of adaptation is being instituted through culturally grounded, intergenerational, and relational strategies, systems of practice and actions.

Across four conceptual strands, whakapapa-based adaptive infrastructure, kaitiakitaka, ahi kā and utu, kotahitaka and strategic relationships, and visioning mokopuna futures, participants described strategies that restore whenua, revitalise mahika kai, embed intergenerational knowledge in governance, and cultivate rakatahi leadership. These actions reconfigure adaptation as a continuous, culturally coherent practice. They also challenge deficit-based framings that position Māori communities as passive or vulnerable, asserting instead a strengths-based narrative of resilience, foresight, and innovation.

Whānau responses address externalities, those often unacknowledged costs of mainstream climate planning, such as colonisation, cultural erasure, land dispossession, and youth exclusion. These externalities are manifested in the loss of mahika kai, the erosion of intergenerational knowledge systems, and the emotional labour of sustaining cultural identity under systemic neglect. Rather than accepting these constraints, Murihiku whānau transform them into overflows: creative, relational practices that exceed technocratic boundaries and embed adaptation in cultural continuity.

To conceptualise this shift, the kupeka (fishing net) metaphor offers a powerful lens. Mainstream climate policy in Aotearoa operates like a fishing net designed to capture specific priorities (carbon targets, infrastructure resilience, economic efficiency) while letting cultural and relational dimensions slip through its mesh. Yet Murihiku whānau are not simply escaping the mainstream adaptation net, instead they are weaving a new one. This Indigenous kupeka is constructed from strands of whakapapa, ahi kā, kaitiakitaka, utu, and kotahitaka, knotted together through relationships and strategic vision. It is a flexible, living system that gathers knowledge, releases constraints, and reconfigures adaptation around the whakataukī (proverb) *mō tatou, a mo ka uri, a mui, ake* (for us and our children after us). In this kupeka, strength lies not in a single strand but in the collective future-focused weave, a network of practices that sustains identity, restores ecosystems, and prepares mokopuna for leadership.

By reframing adaptation as a long-term process of weaving rather than capturing or simply responding, Murihiku whānau demonstrate that climate resilience can be relational and aspirational rather than reactive and fear-based. It is enacted through dialogue, reciprocity, and imagination, through planting trees that will not mature in one lifetime, restoring waterways for future generations, and embedding enduring culture in governance and practices. These strategies affirm that adaptation goes beyond surviving disruption towards designing futures that honour whakapapa and uphold tino rakatirataka.

The implications are clear: climate planning in Aotearoa must move beyond narrow policy nets and embrace frameworks that recognise Indigenous knowledge as infrastructure, not as an add-on. In Murihiku, this shift is already underway: Kāi Tahu ki Murihiku-led cultural and environment regenerative work in tandem with co-governance and the collaborative regional climate strategy/framework signal movement. Kāi Tahu ki Murihiku whānau offer a blueprint for transformative adaptation, a kupeka woven for mokopuna futures, strong enough to hold cultural integrity and flexible enough to adapt to the changing tides of climate disruption.

7.7 References

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CHAPTER EIGHT

Tying Off the Strands: Toward Indigenous-Led Climate Futures

Chapter Seven of this dissertation explored how Kāi Tahu ki Murihiku whānau are visioning mokopuna futures through climate adaptation strategies grounded in whakapapa, ahi kā, kotahitaka, and kaitiakitaka. These narratives reframed adaptation as a relational and intergenerational practice, transforming externalities of climate disruption into overflows of cultural resurgence and ecological restoration. Having examined these proactive strategies, the thesis now moves to its concluding synthesis. Chapter Eight gathers the strands woven across previous chapters, the global and national framings, iwi-led responses, methodological innovations, and whānau narratives, and ties them into a coherent framework for Indigenous-led climate futures. This final chapter reflects on the contributions of the research, articulates its implications for policy and practice, and calls for a paradigm shift that upholds tino rakatirataka (sovereignty) and embeds mātauraka Māori (Māori knowledge) as central to climate resilience.

The image on the preceding page (figure 24) is a photograph used with permission by the author's husband, Scott Kaiser. It depicts the author on the beach of Aparima at sunrise.

Chapter Eight: Tying off the strands: Towards Indigenous-Led Climate Futures

8.1 Introduction

This thesis began with a pepeha (formal introduction) and a tauparapara (incantation), setting the Kāi Tahu ki Murihiku tone and orientation of the work that follows. It followed the tītī across vast oceans of literature and policy, then turned inward like the kākā to Murihiku Southland, to kā whānau (families), kā rūnaka (local Māori councils), and kā taoka (treasured) places where whakapapa (ancestry) is lived. The central question, **"how are the impacts of climate change being experienced and addressed by Takata Whenua in Aotearoa?"** required a kaupapa Māori (Māori-led) methodology capable of holding plurality: the empirical and the relational; the measured and the storied; the seen and the unseen. In response, *Te Kahu Huruhuru o Kohikohi* was woven as both method and metaphor: aho (horizontal strands) of analysis and whenu (vertical strands) of whakapapa binding together kā hou (the feathers/data) collected through kōrero (talk), pūrākau (intergenerational stories), policy texts, and observations across land and sea.

Across chapters, the research traced four arcs. First, the thesis situated Indigenous emergency management and climate adaptation within global and national contexts, revealing enduring epistemic tensions and colonial framings (Chapters Two to Three). Second, the analysis documented Takata/Tangata Whenua responses in Aotearoa and the iwi and hapū strategies that often precede and exceed state policy (Chapter Four). Third, a place based Kaupapa Māori methodology, Te Kahu Huruhuru o Kohikohi, was developed and articulated through whakapapa, whatu, and ethical practice (Chapter Five). Fourth, the study examined whānau narratives of climate change, identifying physical, relational, cultural, and emotional strands of impact, before turning to mokopuna futures and Indigenous governance of adaptation (Chapters Six and Seven). Together, these arcs form interwoven panels of a single korowai, a living cloak of knowledge that is worn, tended, and passed on.

8.2 Synthesis: What the Cloak Now Holds

The preceding chapters established the thesis's kaupapa (values and foundations), methods, and trajectory, moving from global and national frames to Kāi Tahu ki Murihiku whānau (Southern Kāi Tahu) realities, and set out how *Te Kahu Huruhuru o Kohikohi* weaves empirical, relational, and storied knowledges into a single analytical cloak. The purpose of the following discussion is to gather these strands and present a clear synthesis of what the research now holds: first, how the *Indigecene* and the kupeka (fishing net) metaphor reframe epistemic boundaries in climate science and policy; second, how Murihiku narratives identify four interwoven strands of impact, physical, relational, cultural, and emotional, without relinquishing Māori ontologies to external technocratic frames; and third, how Indigenous leadership moves adaptation from isolated projects to systemic adaptation practice through biocultural restoration, co-governance, and Indigenous infrastructure ownership. Read together, these syntheses articulate the cloak's structure: aho (horizontal strands) of findings bound by whenu (vertical strands) of whakapapa and rakatirataka (self-determination)- and prepare the ground for the contributions, implications, and futures that follow.

8.2.1 The Indigecene and the Kupeka: Reframing Knowledge Boundaries

The analytical lens of the Indigecene, developed in dialogue with Callon's concepts of framing, externalities, and overflows, revealed how dominant climate science operates as a kupeka. The net captures what is convenient, leaving Indigenous knowledge and practice to slip through its mesh. These exclusions reflect epistemic framings that privilege technocratic norms and marginalise Indigenous sovereignty. This thesis demonstrates that "overflows" slipping through the mesh of the kupeka are expressions of Indigenous governance, temporalities, and obligations to atua and mokopuna that cannot be bracketed by technocratic frames. Rather than closing uncertainty through tighter models, the Indigecene invites symmetrical science: co-weaving Western instrumentation

with Māori indicators under Māori authority, restoring conditions where mātauraka Māori (Māori knowledge) governs engagement.

8.2.2 Murihiku Narratives: Four Interwoven Strands of Impact

In Chapter Six, narratives from Kāi Tahu ki Murihiku whānau traced climate change as a woven ecology of impacts across four strands. Physical impacts include intensifying storms, drought, coastal erosion, and species redistribution, interpreted through cosmogenic narratives of atua (deities) in conflict (Tāwhirimātea, Takaroa, and Tāne). These conflicts are reshaping landscapes and exposing urupā (burial grounds). Relational impacts involve disruptions to kinship with manu (birds), ika (fish), and rākau (trees). Taoka (treasured) species such as tītī face altered marine food webs, while pest dynamics surge after megamasts, straining kaitiakitaka (environmental stewardship). Cultural impacts manifest in shifting mahika kai (food gathering) rhythms, recalibration of maramataka, and evolving burial practices as urupā confront inundation, requiring tikaka-consistent relocation protocols. Emotional impacts (grief, fear, and fatigue) coexist with resilient hope grounded in whakapapa and mokopuna-focused obligations. These whatu (strands) are finger-twined together with whakapapa and rakatirataka, to be read alongside public narratives without surrendering Māori ontologies.

8.2.3 Visioning Mokopuna Futures: Adaptation as Whakapapa Led Practice

Chapter Seven demonstrates that effective climate adaptation in Murihiku is fundamentally whakapapa-led and mokopuna (future generations) focused, orienting practice toward intergenerational futures rather than short term technical fixes. The analysis identifies four interconnected strands through which Kāi Tahu ki Murihiku enact adaptation: (i) whakapapa as adaptive infrastructure, where genealogical relationships to whenua (land), wai (water), manu, and atua constitute the enduring scaffolding for decision making and risk navigation; (ii) ahi kā (continuous occupation) and utu, the maintenance of continuous presence, reciprocity, and accountability in place, which

operationalises kaitiakitaka across daily and seasonal rhythms; (iii) kotahitaka and strategic partnerships, in which rūnaka cultivate purposeful alliances with councils, Crown agencies, science providers, and sector groups while retaining rakatirataka over priorities, indicators, and time horizons; and (iv) visioning mokopuna futures, a practice of looking forward through the lens of ancestral obligations that centres identity security, cultural continuity, and mauri uplift as core adaptation outcomes. Read together, these strands show adaptation as a relational system: it weaves cultural resurgence, ecological restoration, and governance innovation under Māori authority, pairing instrumented monitoring with Māori indicators and anchoring choices in mokopuna wellbeing.

8.3 Meeting the Aim and Objectives

Returning explicitly to the aim and objectives, this thesis demonstrates clear alignment between the research design and its outcomes. The aims of this research were to understand firstly, **how climate change impacts are being experienced by Takata Whenua** and secondly, **how Takata Whenua are responding and planning for current and future impacts**. These aims were achieved through three objectives.

Objective (a) to identify what the impacts of climate change are for Takata Whenua, is met through the narrative ecology developed in Chapter Six, which evidences the physical, relational, cultural, and emotional impacts as experienced by Kāi Tahu ki Murihiku, and read through pūrākau (intergenerational stories), mātauraka, and empirical observation.

Objective (b) to identify how these impacts are being addressed and planned for at the takiwā (regional)/**rūnaka** (local Māori council) /**iwi** (tribal) **levels**, is met via the documentation and analysis of Māori-led responses in Chapter Four (IHMPs, iwi strategies, marae practices) and the governance and practice architecture for mokopuna futures in Chapter 7, demonstrating rakatirataka enacted through biocultural restoration, symmetrical monitoring, and purposeful partnerships.

Objective (c) to identify how Takata Whenua-led approaches are situated within an Aotearoa/New Zealand context, is met through the critical positioning of Māori adaptation within national policy and legislative frames in Chapter Four**.** Chapters Two, Three and Five, offer the philosophical and methodological underpinnings of this investigation. In these chapters the constraints of Western technocratic framings in the emergency management and climate change science, policy and practice systems are analysed and examples of pro-active and successful Indigenous-led adaptation and disaster risk reduction actions, are explored. The combined research findings answer the overarching research question by evidencing how climate change is lived, governed, and transformed through whakapapa-led practice in Aotearoa.

8.4 Contributions of the Research

Te Kahu Huruhuru o Kohikohi in combination with the Indigecene/kupeka reframing articulate the distinct contributions of this thesis to knowledge, method, and practice. These methodological and theoretical tools also showcase how dominant climate paradigms operate as a kupeka, one that privileges technocratic legibility while bracketing Māori relational ethics and decision rights. Through drawing on Kāi Tahu ki Murihiku narratives, the tools also demonstrate that adaptation successes must be read in terms of identity secured alongside risk reduction.

Te Kahu Huruhuru o Kohikohi, contributes methodologically to the field of climate disaster research through operationalisig Indigenous Data Sovereignty and Kaupapa Māori bricolage as ethically robust, place-based inquiry Finally, this thesis offers practical and policy design principles that translate woven insights into woven action, from mandated decision rights and symmetrical monitoring to cultural externality assessment and long-horizon partnership resourcing. The following sections expand on the thesis's theoretical, methodological, and applied contributions.

8.4.1 Theoretical Contributions

This thesis advances three theoretical contributions. The Indigecene provides a framework for interrogating epistemic boundaries and proposing symmetrical science as an ethic that accords equal weight to Māori epistemologies and Western instrumentation under mana motuhake (Māori self-determination). Uncertainty is reframed as an ontological condition that intensifies ethical responsibility rather than an error state to be eliminated, aligning Māori spiral temporalities with adaptive practices focused on mokopuna. In conclusion, the research introduces a narrative ecology of impacts: a four-strand model (physical, relational, cultural, emotional) grounded in Kaupapa Māori analysis and nested narratives.

8.4.2 Methodological Contributions

The development of *Te Kahu Huruhuru o Kohikohi* demonstrates the value of a kaupapa Māori bricolage methodology that weaves pūrākau, uiui (interviews), policy texts, and environmental data through whatu, guided by ethical principles of aroha ki te takata (love to all people), kanohi ki te kanohi (face to face), titiro whakaoraka kōrero (listen first, speak later), kia tūpato (be cautious), and manaakitaka ki te takata (be generous in sharing). The methodology operationalises Indigenous Data Sovereignty by embedding CARE/OCAP® principles as ongoing relational processes, including member checking, return of results, and iwi/rūnaka governance of use.

8.4.3 Practical and Policy Contributions

The research articulates Māori-led adaptation mandates, demonstrating how Iwi/Hapū Management Plans (IHMPs) and iwi climate strategies function as first-order adaptation plans that often precede regional frameworks. It proposes cultural externality assessments for Nature-based Solutions and adaptation investments to anticipate impacts on taoka (treasured species and places), governance, and identity. Design principles include centring ethics as ongoing harm-prevention, co-governed monitoring that pairs

Indigenous indicators (mauri (life force), mahika kai, whakapapa ties) with instrumented metrics, and long-horizon resourcing of partnerships.

8.5 Limitations and Boundaries of the Cloak

This thesis is intentionally place-based, centred in Murihiku Southland with a concentrated lens on Ōraka–Aparima, privileging qualitative narrative depth over quantitative breadth. The sample of twenty Māori participants offers rich, emic perspectives, yet does not claim exhaustiveness across takiwā (region). While scientific and policy literatures are engaged, the study does not attempt to map every hazard pathway or legislative change across Aotearoa; rather, it situates climate change within a narrative ecology grounded in whakapapa, tikaka, and mātauraka. The metaphors and dialect employed (e.g., tikaka, mātauraka, rakatirataka) are Kāi Tahu rooted, and though they resonate widely, they may take different forms in other iwi contexts. The institutional landscape is changing, and some policy details will evolve; this underscores the need for longitudinal inquiry and comparative research to track adaptation practice and governance over time.

8.6 Recommendations

Read as a completed kahu huruhuru, the findings gathered in this thesis call for a movement from woven knowledge to woven action. This shift is needed across policy architectures, institutional practice, and kāika (village)-level adaptation. The Indigecene analysis shows that prevailing climate frameworks, like a tightly set kupeka, have historically privileged technocratic legibility over relational ethics. These frameworks have produced cultural externalities and epistemic asymmetries that limit Māori authority in adaptation governance. Narratives from Kāi Tahu ki Murihiku offer a different direction. They demonstrate that effective and just adaptation emerges when monitoring and decision making are symmetrical. This occurs when instrumented metrics are paired with Māori indicators under Indigenous authority. It also occurs when

iwi and hapū planning instruments, including IHMPs and *Te Tāhū o te Whāriki*, are treated as first-order adaptation infrastructures rather than peripheral consultative texts.

The analyses presented in this thesis indicate that climate adaptation is most effective when governance and practice are anchored in whakapapa, ahi kā, kaitiakitaka and mokopuna-centred responsibilities, and when mātauraka and instrumented knowledge are accorded symmetrical standing in decision making. The policy environment within which adaptation occurs is marked by periodic shifts between centralised and localised settings, producing variability in authority, responsibilities and resourcing for mana whenua. In contrast to the broad mainstream policy environment, for Māori whānau, relational obligations and place-based stewardship endure across generations. Therefore, the following recommendations prioritise the establishment of enduring institutional and governance for rakatirataka and the resourcing of place-based practice.

8.6.1 Centre whakapapa within climate and hazard governance

Climate impacts and responses are interpreted through genealogical relationships between people, whenua, wai, taoka species and atua. Effective adaptation is therefore embedded in collective responsibility and intergenerational ethics rather than in technical assessment alone. Decision frames that privilege only what is metrically legible reproduce the bracketing out of whakapapa-based obligations and generate cultural and epistemic externalities that erode authority and identity security for mana whenua. To remediate this, planning and governance instruments that materially affect mana whenua (such as IHMPs, regional and district planning instruments, natural hazard and climate adaptation frameworks, and CDEM group and recovery plans), should adopt whakapapa-centred objectives and decision criteria. This would enable effects on relationships and obligations to be evaluated alongside assessments of risk, cost and efficiency. Within these instruments, specific provisions are required that explicitly recognise whakapapa as a determinant of risk, authority and adaptation responsibility. This includes policy provisions that state the protection and maintenance of whakapapa relationships as a planning objective. It also includes rule provisions that trigger

additional information requirements where activities may affect whakapapa connections with whenua, wai, taoka species or wāhi tūpuna.

Further assessment provisions are needed to require relational impact assessments alongside technical hazard assessments. These should be accompanied by mana whenua co-drafted decision-making criteria provisions that require commissioners and officers to evaluate how proposals uphold mana, rakatirataka and intergenerational responsibilities. Additional provisions should normalise the use of Māori environmental indicators (such as mauri, taoka species health and mana o te wai (water health)) in both plan-making and consenting decisions.

8.6.2 Embed Te Tiriti o Waitangi as a sustained foundation for decision making

The consistency of outcomes for iwi and rūnaka is undermined when participation is procedural rather than constitutional and when authority fluctuates with political change. Te Tiriti o Waitangi provides an enduring basis for Crown–Mana Whenua relations and affirms rakatirataka in ways not contingent on electoral cycles. Climate, planning and hazard governance should embed Te Tiriti principles as operative decision rights through explicit charters and standing orders that specify shared authority, decision pathways and dispute resolution with mana whenua. Co-governance schedules or compact-style agreements should also be lodged alongside plan instruments to ensure durability, while long-term plans and regional frameworks should be required to give effect to these commitments and to report publicly on implementation.

At the national scale, the National Adaptation Plan signals an intent to work in partnership with Māori. However, it also requires reforms to ensure that rakatirataka is embedded as an operative decision right. These reforms include mandating cultural externality assessment for Nature-based Solutions and resourcing long-horizon co-governance arrangements. Such measures are necessary to secure identity alongside risk reduction.

At the kāika and marae scale, adaptation is enacted through relocation pathways that remain consistent with tikaka and through relational restoration. Success in these contexts could be evaluated as mauri uplift, manaakitaka, and strengthened identity.

8.6.3 Consolidate Mana Whakahono ā Rohe as a mechanism for Tiriti-consistent engagement

Mana Whakahono ā Rohe agreements provide a statutory pathway to stabilise arrangements between councils and iwi/hapū for planning and resource management. Under the current reform proposals, existing or initiated Mana Whakahono ā Rohe at the time of Royal assent would continue, creating a strong incentive to initiate agreements prior to commencement and thereby placing time pressure on iwi and councils to conclude complex arrangements[11]. In addition, draft provisions require plans to be prepared in accordance with any existing or initiated Mana Whakahono ā Rohe, further elevating their effect but again privileging agreements formed before the legislative transition[12]. To avoid a cliff-edge for iwi and hapū that have not yet initiated negotiations, the new Planning Bill should preserve the opportunity to establish future Mana Whakahono ā Rohe on equivalent terms and require agencies to resource the initiation, drafting and implementation of these arrangements. Guidance and support should draw on the national materials developed for iwi/hapū and councils, and on existing exemplars that demonstrate the potential of these agreements to organise engagement on climate adaptation, natural hazards and recovery[13]. A sustained, statutory footing for Mana Whakahono ā Rohe would reduce procedural volatility created by wider system reform and provide a practicable vehicle for encoding tikaka-anchored participation and rakatirataka within planning and hazard governance.

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[11] Planning Bill cl.21 clarifies Mana Whakahono ā Rohe that exist or have been initiated immediately before Royal assent; the structure creates urgency to initiate prior to commencement.
[12] Planning Bill cl.3 requires local authorities to prepare/change plans in accordance with any existing or initiated Mana Whakahono ā Rohe.
[13] MfE guidance and public registers of arrangements; sector guidance led by Papa Pounamu/NZPI demonstrates scope and drafting practice (MFE, 2026)

8.6.4 Sustain recognition and resourcing for Māori-led, place-based adaptation

Iwi, hapū and marae are already undertaking adaptation through the protection of mahika kai and wāhi tapu (sacred sites), biocultural restoration and the strengthening of local governance; these practices constitute established systems of environmental care that require structural recognition and stable resourcing. A mixed funding ecology is needed: multi-year co-governed lines for rūnaka- and iwi-level programmes, and small- to medium-sized community grants that enable ahi kā and local collectives to activate practical initiatives. As an immediate precedent, the Auckland City Council has introduced *Te Ara Urutau – Climate and Emergency Ready Fund*, a consolidated annual programme exceeding $1 million that supports emissions reduction, emergency readiness, and climate adaptation planning and implementation at the community scale. Replicating this model nationally with Māori-specific streams, (and co-designing assessment criteria, reporting requirements and indicators with mana whenua), would directly empower rūnaka and ahi kā to implement locally-grounded adaptation.

8.6.5 Develop relocation guidance and resourcing that centre Te Ao Māori

Where relocation becomes necessary, current practice is heavily weighted toward built-asset risk and engineering feasibility, with insufficient attention to cultural landscapes, wāhi tapu, mahika kai networks and identity security. Relocation frameworks should be revised to require early, co-governed cultural assessments that identify taoka values, whakapapa relationships and mātauraka-based criteria for site selection. They should also provide for land-for-land options where appropriate. In addition, frameworks need to ensure that marae, urupā, biocultural corridors and mahika kai are planned as first-order elements rather than residual considerations. Resourcing should include dedicated implementation funds for tikaka-consistent relocation, including design, whenua acquisition and cultural site stabilisation.

8.6.6 Establish a national fund for intergenerational Māori adaptation and enterprise

The creation of a national *Māori Adaptation and Enterprise Fund* is recommended as a mechanism of Te Tiriti redress to address the structural conditions under which climate adaptation is currently expected to occur. While rakatirataka over adaptation decision-making appropriately sits with iwi and hapū, the responsibility to resource adaptation rests with the Crown. Current policy settings frequently assume that iwi and hapū can independently absorb the costs of climate adaptation, despite uneven settlement status and highly variable asset bases. These expectations are misaligned with the scale, duration, and complexity of kaitiakitaka, particularly where mana whenua responsibilities extend across large, ecologically significant, and nationally valued territories. Iwi and hapū exercise kaitiakitaka over substantial areas of the conservation estate that underpin biodiversity protection, tourism, and regional economies, yet the costs associated with climate risk, ecological degradation, and visitor pressure are often borne locally. Where the Crown relies on this enduring Māori responsibility without providing dedicated, long-horizon resourcing, co-governance and co-management arrangements risk becoming mechanisms through which public costs are devolved to Māori. These arrangements are misaligned with Te Tiriti o Waitangi, particularly where the environmental, social, and economic benefits of effective Māori stewardship accrue to Aotearoa New Zealand as a whole, while financial risk and implementation burden remain localised.

Such a fund would enable Māori-led, place-based, and intergenerational adaptation pathways in which sustainable Māori enterprise and wealth sovereignty are integral to resilience. It would support rakataki-led and intergenerational initiatives that integrate ecological restoration, circular-economy practices, and place-based Māori business development, recognising that adaptation is increasingly enacted through hybrid arrangements that combine environmental stewardship, employment, and enterprise. There is precedent for this approach: although the 2020-2025 government programme

Jobs for Nature attracted criticism for Crown programme design, evidence indicates that adequately resourced Māori-led initiatives delivered employment, restoration, and cultural benefits[14]. Positioned to leverage consolidated research and climate finance arrangements, a national *Māori Adaptation and Enterprise Fund* could stabilise and extend these gains, align research, enterprise, and community practice, and strengthen climate resilience across landscapes that are environmentally, economically, and culturally critical to Aotearoa New Zealand.

8.6.7 Enshrine symmetrical science and monitoring within adaptation systems

Adaptation monitoring should be re-constituted on a symmetrical footing, in which mātauraka-based indicators (tohu, maramataka, mauri) and instrumented metrics are co-designed, co-interpreted and reported under mana whenua authority. This will require statutory and policy direction for the co-development of indicator suites. Recognition of Indigenous Data Sovereignty-aligned governance of knowledge repositories, suitable access conditions and return-of-results as well as cultural authorisation for outputs involving taoka knowledge or spatial layers, will also be necessary. Embedding symmetrical science in legislation, national direction and standards would move environmental monitoring practices toward bicultural partnership. It would reduce the cultural externalities produced when technocratic systems bracket out Indigenous epistemologies.

8.6.8 Re-conceptualise risk, uncertainty and climate change within policy and practice

Prevailing approaches treat risk as probabilistic exposure, uncertainty as a deficit to be minimised and climate change as a linear trajectory. This research demonstrates that

[14] A series of reports evaluating the programme and case studies are available on the Department of Conservation website: https://www.doc.govt.nz/our-work/jobs-for-nature--mahi-mo-te-taiao/jobs-for-nature-benefits-and-outcomes/

Māori and other Indigenous epistemologies construe these domains relationally and intergenerationally, with uncertainty navigated through ethics, ritual and tikaka rather than marginalised. A reframing of statutory definitions, planning tests and evidential standards is required to accommodate Māori temporalities, mokopuna responsibilities and the legitimacy of tohu and pūrākau in decision making. Such a shift would catalyse a broader cultural and political realignment in which climate response is understood as an obligation arising from whakapapa rather than a technical optimisation problem. The procedural vulnerabilities and epistemic asymmetries that currently constrain Māori authority, would also be reduced.

Climate and hazard governance in Aotearoa currently relies on definitions of risk and uncertainty that are operationalised through modelling, thresholds, and evidentiary standards designed to support regulatory decision making. These approaches shape how climate change is interpreted and acted upon across statutory and institutional settings. This research demonstrates that for Māori, risk, uncertainty, and environmental change are understood as conditions that unfold through whakapapa and are interpreted across generations. Uncertainty is navigated through tikaka and through attention to tohu and narrative signals that inform when and how to act in relation to whenua, wai, and taoka. These practices are established forms of governance knowledge that guide decision making and responsibility over time.

Current statutory and planning systems do not consistently provide mechanisms for these forms of knowledge to be effectively integrated with mainstream processes. As a result, Te Ao Māori understanding of climate change and natural hazard risk are often difficult to accommodate within existing definitions, tests, and decision criteria. Addressing this requires institutional adjustments so that Māori temporalities and whakapapa-based indicators are able to be explicitly recognised within policy and regulatory frameworks.

Re-conceptualising risk, risk tolerance and uncertainty would re-situate climate adaptation in a uniquely bicultural framing. It could enable decision making to account for change as it emerges, and support mana whenua authority in shaping adaptation

pathways over the long term. For Aotearoa New Zealand more broadly, such a shift has the potential to improve adaptation outcomes by strengthening foresight, continuity, and place-based responsiveness within governance systems. Integrating mātauraka Māori and tikaka-informed indicators alongside existing technical tools can enhance situational awareness, reduce maladaptive responses, and support investments that endure over longer time horizons.

8.6.9 Implementation and evaluation

Implementation of these recommendations should first secure the system anchors: whakapapa-centred decision criteria, Te Tiriti (Treaty of Waitangi)-based authority, the continuation and future initiation of Mana Whakahono ā Rohe, and cultural-externalities appraisal. This would enable the stabilisation of governance architecture. The second phase should scale place-based practice via multi-year, co-governed funding lines, Māori-specific community grant streams modelled on *Te Ara Urutau*, marae-centred adaptation hubs and first-order treatment of iwi and hapū strategies in planning and consenting.

Evaluation should adopt a symmetrical science approach. It should include evidence of authority and continuity, such as confirmed mana whenua decision rights and agreements that persist across electoral cycles. It should also consider relational outcomes, including documented mauri uplift, strengthened mahika kai, and protection of wāhi tapu (sacred places) tracked alongside hydrological and coastal indicators. Finally, evaluation should assess resourcing, including the operation of co-governed, multi-year investments and the benefits and externalities across initiatives.

Read as a completed kahu huruhuru, these recommendations move from woven knowledge to woven action by securing rakatirataka within institutional architectures, consolidating Mana Whakahono ā Rohe as an enduring instrument, and resourcing whakapapa-centred stewardship at rūnaka and ahi kā scale. In doing so, they provide stability for Māori climate futures on Māori terms and align adaptation practices with the

long-horizon responsibilities that whānau, hapū and iwi carry for whenua, wai and mokopuna. Accordingly, the thesis conclusion turns briefly to future research directions that can test, refine, and scale the approaches proposed here.

8.9 Suggestions for Future Research

The programme of recommendations outlined above establishes institutional anchors for rakatirataka and resourcing for whakapapa-centred adaptation. Building on this foundation, a focused research agenda could test, refine, and extend the approaches proposed here across multiple scales and timeframes.

A first strand of work could examine risk communication within the Indigecene. Existing affect-metric and probabilistic approaches often privilege what is optimisable and metrically legible. This is an issue because such approaches tend to bracket out relational, spiritual, and genealogical dimensions of risk that are central to whakapapa-based worldviews. When these dimensions are excluded, the resulting risk narratives may distort Māori priorities, understate intergenerational obligations, and undermine mana whenua authority in decision-making.

Phase one research could therefore specify and trial whakapapa-based communicative indicators, (such as tohu, maramataka, and mauri), alongside conventional instrumented metrics. It could also evaluate governance arrangements for framing, authorising, and disseminating climate-risk narratives under mana whenua leadership.

A second research strand could investigate ahi kā as a policy technology[15]. As sustained occupation and care of place shape adaptive capacity, research may clarify the mechanisms by which ahi kā can inform plan-making, consent decision criteria, funding design, and emergency governance on Indigenous terms. How ahi kā might be recognised

[15] Here, *policy technology* refers to Lascoumes & Le Galès (2007) interpretation, describing a governance mechanism through which social relations, values, and authority are rendered operational within policy systems.

within adaptation investment as a relational asset rather than a background context, could also be explored.

Comparative Indigenous adaptation studies could examine governance architectures that deliver symmetrical science in practice. Such studies might also analyse co-management regimes, the legal personhood of ecosystems, and Indigenous ownership of energy and water assets, grounding analysis in demonstrated cases of biocultural restoration and Indigenous-led infrastructure (e.g., legal-personhood stewardship at Te Urewera: Kauffman, 2020; Indigenous grid ownership models such as Wataynikaneyap: Electricity Canada, 2024).

Longitudinal narrative research ecologies could track the four strands of impact: physical, relational, cultural, and emotional, over multi-decadal horizons. These research programmes would document how the transmission of mātauraka and tikaka adapts to changing rhythms, including recalibrated maramataka and emergent adaptive tohu, and could relate these dynamics to ecological and hazard indicators as well as community wellbeing outcomes.

Further jurisprudential work on managed retreat and relocation is needed to address the specific issues faced by Māori communities. The term *managed retreat* frequently denotes displacement from tribal lands, which is fundamentally incompatible with whakapapa, ahi kā, and tikaka obligations. For many iwi and hapū, removal from whenua tūpuna (ancestral land) severs genealogical relationships, interrupts cultural authority, and risks reproducing the historical dispossession that adaptation policies are meant to avoid. Future research could therefore articulate alternative legal framings, (such as whenua-anchored adaptation pathways or tikaka-guided relocation within takiwā). Local dialects, tikaka and kawa would need to be respected to suit the diverse needs of hapori Māori (Māori communities) across Aotearoa New Zealand. Work building on this, scholarship could establish tikaka-consistent protocols for adaptation decisions affecting marae, urupā, and kāika. Such protocols would outline culturally appropriate thresholds for protection, relocation, or redesign, and define equitable cost-sharing arrangements

across Crown, local government, and mana whenua. These instruments would also need to be aligned with spatial planning statutes and emergency management legislation to ensure consistency across regulatory regimes.

Complementary research on emotion, arts, and adaptation could extend creative methodologies that translate climate affects into communal practice. This work could develop evaluative frameworks that measure identity, cohesion, and mauri uplift alongside ecological metrics and hazard indicators, supporting a more symmetrical and whakapapa-centred understanding of climate impacts.

Finally, because implementation depends on resourcing architectures as much as on governance design, policy-adjacent studies could evaluate Māori-specific community-grant models and multi-year investment instruments for rūnaka and ahi kā. This evaluation research might identify how funding rules, reporting templates, and measurement frameworks can sustain Indigenous leadership while assuring public accountability. From these evaluations, practical guidance to assist the replication of successful models could be created.

8.10 Closing: Binding the Here, Facing the Swell

He tai timu, he tai pari (the ebbing tide and the incoming tide) captures the temporalities through which climate change is lived in Te Ao Māori. At times, the tide reveals loss: exposed urupā, displaced manu, unfamiliar predators. At times, it brings renewal: seedlings in restored wetlands, mokopuna carrying revitalised cultural knowledge and practices, partnerships that restore authority.

In this thesis, whakapapa is treated as the adaptive method and governance technology for whānau responding to climate change. At Te Takutai o te Tītī, the wind can be fierce; Takaroa (deity of the sea) can take and give in the same season. Yet Kāi Tahu ki Murihiku have always been born into change and thrive within it. Our tūpuna (ancestors) adapted to new currents, new trades, new worlds, without relinquishing the here (the binding cord), of who we are.

We tie off the strands of this research as one ties the here of a kahu huruhuru: not to conclude the weaving, but to ready the cloak for use.

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10. Glossary

Māori	English translation
ahi kā	continuous occupation
aho	horizontal strands in weaving
Aotearoa	Common Māori name for New Zealand
aroha ki te takata/ aroha ki te tangata	respect the people you're working with
atua	deities
hapori Māori	Māori communities
hapū	Māori sub-tribe
harakeke	flax
here	cord
hikoi/hīkoi	Journey/journeys
hui	meeting
hui-a-wānaka/hui-a-wānanga	collective discussion and learning
ika	fish
iwi	Māori tribe
kahu huruhuru	feathered cloak
Kai Tahu	an iwi or tribe based in the South Island of Aotearoa New Zealand, otherwise known as Ngāi Tahu
kāika	Local village
kaitiaki	guardian or steward
kaitiakitaka/kaitiakitanga	guardianship or stewardship
kākahu	garment
kanohi ki te kanohi	face to face
karakia	Prayers, incantation
kaumātua	elders
kaupapa	values or foundation
kauapapa Māori	Māori approach, philosophy, and set of values rooted in Te Ao Māori (the Māori world)
kawa	cultural protocols
kete	baskets
kia mahaki	be humble
kia tūpato	be cautious
koha	gift, contribution
Kohikohi	coming together, gathering

kōrero	interviews or discussion
korowai	cloak
kotahitaka/kotahitanga	unity
kupeka	fishing net
kura	school/s
mahika kai/mahinga kai	traditional food gathering practices and places
mana	prestige
mana motuhake	self-determination
Mana Whenua	Authority over ancestral land, iwi, hapū or rūnaka with paramount authority over ancestral land
manaaki ki takata	be generous in sharing with people
manu	birds
manaakitaka/manaakitanga	generosity or hospitality
marae	communal meeting house
maramataka	lunar or seasonal calendar
mātauraka	knowledge
mauri	life force, essence
moana	ocean, seas
mokopuna	Future generations, grandchildren
muka	a silky fibre made from processing harakeke (flax) materials
Murihiku	The Southland region of Aotearoa New Zealand
kā/ngā hou	feathers or data
kākāpō	A rare parrot, native to Southern Aotearoa New Zealand
Ngāti Ruaka	A tribe based in the southeast of the North Island of Aotearoa New Zealand
noa	profane
Oraka/oranga	wellbeing
rakatirataka/rangatiratanga	self-determination
pākehā	New Zealander of European descent
panui	communication, written notice
Papatipu rūnaka	regional iwi governance bodies
pepeha	Māori-medium formal introduction
pīkao	Native sedge grass that grows in coastal areas.
pono	honesty, transparency
pūrākau	intergenerational stories
rakatahi/rangatahi	youth
rakatira/rangatira	respected leaders
rakatirataka/rangatiratanga	sovereignty

rākau	trees
raru	conflict
reo	language
rūnaka/rūnanga	Local/regional Māori councils i.e. Ōraka-Aparima
Takata/Tangata Whenua	Indigenous Peoples of Aotearoa New Zealand
takiwā	region
tapu	sacred
tauparapara	incantation
Tāwhirimātea	Deity associated with weather
Te Ao Māori	the Māori world or Māori worldviews
Te ao Tūroa	the natural world
Te Ara a Kiwa	The Foveaux Strait, separating the bottom of the South Island and Rakiura (Stewart Island)
Te Kahu Huruhuru o Kohikohi	"the feathered cloak of Kohikohi", a kaupapa Māori methodology
Te Reo Māori	the Māori language
Te Rūnanga o Ngāi Tahu	governing body of the Iwi Kāi/Ngāi Tahu
Te Tiriti o Waitangi	The Treaty of Waitangi- the 1840 agreement between Māori and the British Crown that established a framework for shared authority, guaranteeing Māori tino rakatirataka while granting the Crown governance, forming the constitutional basis of Aotearoa New Zealand.
Te Waipounamu	Common name for the South Island of Aotearoa New Zealand
Te Whare Pora	the house of weaving
Takaroa/Tangaroa	deity associated with the ocean
takiwā	region
Tāne	deity associated with forests
taoka/taonga	treasured items
teina	younger sibling/mentee
tika	Appropriate process
tikaka/tikanga	cultural practices
tino rakatirataka/ tino rangatiratanga	sovereign authority
tītī	muttonbirds/ sooty shearwaters- a treasured species and food source for Kāi Tahu ki Murihiku
titoro whakaoraka korero	listen first, speak later
tohu	Environmental signs and indicators
tuakana	Older sibling/mentor
tuatahi	first

turarua	second
tuatoru	third
tuawha	fourth
tūpuna	ancestors
tūrakawaewae/turangawaewae	a place to stand and speak from
tūturu	permanent
uiui	interviews
uri atua	descendants of deities
uri takata/tangata	Human descendants
urupā	burial grounds
utu	balance, reciprocity
wāhine	women
wāhine tūpuna	place of ancestral significance
waiata	song or songs
waiora	health of a body of water
wairua	lifeforce
wānaka/wānanga	workshops
whakamana	empowering
whakaaro	thinking
whakamā	cultural shame
whakawhanaukataka/ whakawhanaungatanga	building relationships
whānau	families
whakapapa	genealogy, ancestry
whakataukī	proverb
whatu	hand-weaving
whatuora	methodology
whenu	vertical strands in weaving
whenua	land
whenua tūpuna	ancestral land

Appendix

a. Information Sheet

INVESTIGATING TANGATA WHENUA RESPONSES TO CLIMATE CHANGE

INFORMATION SHEET

Who is doing the research?

Tēnā koe, ko Ngāi/Kāi Tahu, Kāti Māmoe me Waitaha ōku iwi, kō Lucy Kaiser tōku ingoa, I am a part time student enrolled in Massey University's Emergency Management PhD programme and am currently employed as a researcher at Massey University and GNS Science specialising in natural hazards and disasters. This PhD is funded by a scholarship from the Ministry of Business, Innovation and Employment's National Science Challenge Resilience to Nature's Challenges programme through the Mātauranga Māori theme.

What is the research about?

I am interested in understanding in the increasing number of climate-change related events that have impacted our people such as sea level rise, coastal inundation and severe storms and flooding. Our people have an enduring and strong relationship with the whenua and moana and it is my hope to learn more of our mātauranga concerning how we have historically adapted to climate change-related events and environmental stressors as well as the impacts of climate change that Mana Whenua are experiencing in the rohe today. I am also very interested in the strategic plans and frameworks that are been used for climate change adaptation and mitigation by our iwi, hapū and rūnanga.

Who can participate in this research?

If you are:

- Māori,
- Aged 16 years or older,
- Affiliate to marae situated in hazard prone regions
- And are concerned about marae resilience to natural hazard events such as major earthquakes we invite you to participate in this research project.

What are you expected to do?

Should you agree to participate in this research you will participate in an interview during which we will korero about the impacts of climate change historically and today, how whānau, rūnaka/rūnanga and iwi have and are currently responding to climate change, and how we might respond effectively in the future.

Please inform me that you will be attending the interview at least 48 hours before commencement in order to facilitate travel arrangements.

Based on your experiences at the interview you may decide to participate in a follow up interview or hui.

What will happen to the information you provided?

All interview notes and digitally recorded interviews will be transcribed. Transcripts will be sent to participants for review and if necessary, alteration to ensure research information is accurately documented. If we do not hear back from you within two weeks, we will follow up with you to ensure that you agree the transcript is accurate and that approval is given to commence analysis.

How will this information be stored?

Interview tapes and transcripts will be securely stored in a document safe. Your contact details and consent forms will also be securely stored in a separate location to preserve privacy during, and after, completion of the study.

What are your rights?

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- withdraw from the study at any time;
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be informed regarding research findings once the project is concluded.
- Ask for the recorder to be turned off at any time during the interview

Who can I contact if I have any questions about the research?

After reading this information sheet, if you would like to participate in our research or should require further information, or have any concerns about the study, please do not hesitate to contact me (Lucy Kaiser) using the below contact details:

Lucy Kaiser
Mobile: [redacted]
Email: [redacted]

Committee Approval Statement

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application SOB 21/17. If you have any concerns about the conduct of this research, please contact Dr Gerald Harrison, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83570, email humanethicsouthb@massey.ac.nz .

b. Interview Schedule

Investigating Tangata Whenua Responses to Climate Change

2021-2024

INTERVIEW SCHEDULE

Overarching Question: How is climate change impacting Ngāi Tahu in Southland?

Potential Topics for Discussion

- Role of mātauranga Māori, kaupapa and tikanga for understanding climate change impacts

- Impacts
- Taiao
- Mahika/Mahinga kai
- Wairua
- Hauora/Waiora

- Historical responses to the changing climate in the rohe

- Māori-led responses to current climate change impacts

- Barriers to/enablers of Māori-led responses

- Barriers to/enablers of Ngāi Tahu participating in mainstream climate change responses

- Policy and Practice recommendations for Ngāi Tahu**,** Māori-led and mainstream responses to climate change

- Future opportunities for Tangata Whenua engagement in enhancing climate change resilience at local, regional and national levels

- Community governance/governing communities

c. Consent Forms

Investigating Tangata Whenua Views and Responses to Climate Change

INTERVIEW PARTICIPANT CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I wish/do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name - printed .....

Investigating Tangata Whenua Views and Responses to Climate Change

INTERVIEW PARTICIPANT CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I wish/do not wish to have my recordings returned to me.

I agree not to disclose anything discussed in the interview.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name - printed .....

d. Confidentiality Agreement

Investigating Tangata Whenua Responses to Climate Change

CONFIDENTIALITY AGREEMENT

I ..... (Full Name - printed)

agree to keep confidential all information concerning the project ***Investigating Tangata Whenua Responses to Climate Change.***

I will not retain or copy any information involving the project.

Signature: ..... **Date:** .....

e. Letter of Support

20th April 2021

Tēnā koutou,

I am writing to express my support for Lucy Kaiser's PhD research "Investigating Tangata Whenua Views and Responses to Climate Change". In my capacity as a Kaumatua of Ngāi Tahu, I will be providing cultural oversight and support for the project including facilitating engagement with key stakeholders from Ōraka-Aparima and the Southland/Murihiku region.

Ngā mihi,



Tā Mark Solomon

f. Ethics Approval Confirmation

-------- Original message --------
From: humanethics@massey.ac.nz
Date: 11/06/21 4:30 pm (GMT+12:00)
To: "Kaiser, Lucy" <L.H.Kaiser@massey.ac.nz>
Cc: Human Ethics <gmhumeth@massey.ac.nz>, "Kenney, Cassie" <C.Kenney@massey.ac.nz>
Subject: Human Ethics Application SOB 21/17 Approved

HoU Review Group

ReviewerGroup
A/Pro Christine Kenney

Researcher: Mrs Lucy Kaiser
Title:Investigating Tangata Whenua Views and Responses to Climate Change

Dear Lucy

Thank you for the above application that was considered by the Massey University Human Ethics Committee: Human Ethics Southern B Committee at their meeting held on 11/06/2021.
On behalf of the Committee I am pleased to advise you that the ethics of your application are approved.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.
If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

If you wish to print an official copy of this letter, Please logon to RIMS (http://rims.massey.ac.nz) , and under the Reporting section, View Reports you will find a link to run the Ethics Committee Report.

Yours sincerely
Professor Craig Johnson
Chair, Human Ethics Chairs' Committee and
Director (Research Ethics)