Seasonal rhythms in practice : Relating localised experiences of seasons to organised responses to changing climates

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Abstract

With seasons providing important temporal references to ongoing processes of social-environmental change the world over, this thesis considers local experiences of seasonality as a basis to effecting adaptive responses to changing climates within resilient communities of place. Here, adaptation is construed as a practical attunement to the shifting temporal patterns of places, involving dynamic intersections of rhythmic human-environment relations across scales. Engaging with multiple bodies of scholarship, from critical institutional-organisational theories to geographies of time-space, the research tenders enhanced understandings of the local conditions under which seasonal adaptations and associated social-ecological resilience are implicated in the wider transitions of politicised social-ecological systems.

Focusing on coastal conservation networks operating on the Coromandel's Kūaotunu Peninsula, in Aotearoa – New Zealand, the qualitative ethnographic inquiry probes the dynamic relations of organised groups with place by engaging phenomenological methods alongside rhythmanalysis to reveal a strong seasonality to Kūaotunu's contemporary rural lifestyles. Manifest in unique forms of contemporary stewardship, including that of indigenous Māori, the findings suggest that the familiarity bred through a practical rhythmic engagement with local beach environments – according to a shared seasonal framework – is associated with distinctive capacities for navigating social-environmental shifts. Not least in their practical accommodation of coastal restoration activities around the fluxes of seasonal tourism on the Kūaotunu Peninsula, the organised activities of resident voluntary conservation groups are seen to adjust to incrementally changing conditions, from one year to the next, through ongoing processes of seasonal acclimatisation.

Alongside an intrinsic fostering of social resilience, the inherently adaptive processes of acclimatisation observed in organised conservation practices at Kūaotunu are contrasted with remotely modelled projections of retreating coastlines as the basis to district-wide strategic adaptation pathways being developed for its coastal communities by local Council. With grassroot conservation initiatives already responding practically to ongoing change from within their means, one bay and one season at a time, they are vitally contributing local wisdoms and innovations to uncertain futures. With clear imperatives to integrate 'seasoned' environmental governance approaches within deliberative adaptation planning initiatives, new forums are required to strategically align with the multiple temporalities of divergent communities of place as formative to process.

Acknowledgements

Without the CALENDARS project taking up a visiting concern with the Coromandel, it is uncertain whether I would have been granted a similar opportunity to undertake funded doctoral research as part of an international team. For this, I am specifically grateful to the CALENDARS project lead and my primary co-supervisor, Professor Scott Bremer, for providing both the inception and incentive for my personal research journey. Originally from New Zealand, Scott is now based out of Bergen University in Norway. Along with his enduring patience in seeing me through to its completion, Scott has continued to inspire and motivate my research efforts across hemispheres and timelines over successive seasons.

Through a routine participation in early forums of the extended CALENDARS project team, my research has additionally benefited from the insights and rigor provided by academic deliberations at an international level. As a relative 'outsider' to the extended academic fields of social science, I was privileged to be inducted in ranging discussions around the focal topics of seasons and climate change more generally with this wide-ranging group. As a remotely based student, I have specifically benefited from this extended (often 'afterhours') contact with a multinational team that included members of the project advisory board.

Back home in Aotearoa – New Zealand, I was originally introduced to the CALENDARS project through Dr Paul Schneider, when our children were in the same class at school. As a research fellow on the CALENDARS project, Paul was key in getting my research off the ground, while generously acting as a local mentor to my PhD candidacy more generally. Paul also shared in a key connection with my main supervisor at Massey University, Professor Bruce Glavovic. Based in Palmerston North, Bruce has served as both a pillar of academic wisdom and a voice of reason to the orientations of my research - as well as to the CALENDARS project more generally. As well as benefiting from Bruce's deep knowledge on the topics at hand, he has been a most constructive critic throughout the development of this thesis. Also at Massey, I would like to acknowledge the team of dedicated librarians, without whom I would not have experienced the sheer joy of finding a letterbox stuffed with a stack of books of interest - often requested only the day before!

Closer to home, I am naturally indebted to the benevolence of the local coastal conservation initiatives that contributed case studies to my research on the Kūaotunu Peninsula. As well as sharing in their cherished beach 'habitats' with me, I was additionally welcomed into several homes for interviews, group meetings or just a post-planting cuppa! As a volunteer, I was typically made to feel like one of the group, which made my time in the field particularly rewarding, while being vested with deeply personal insights into Kūaotunu's coastal communities. The Thames-Coromandel Coastcare team were instrumental in introducing me to local coastal restoration networks at Kūaotunu, while generously continuing to support my fieldwork through their ongoing interests.

In my own backyard, my research endeavors have been either supported, or endured by my family and our wider network of friends over the past few years. I am collectively grateful for their care and encouragement in keeping me going, while forcing me to maintain perspective over this time. Standing out amongst these is our friend, Jax Taylor, who took up the additional charge of 'beautifying' my thesis with her sublime infographics through her own studio (Reservoir Design). It was our first experience of working together and it certainly won't be the last! Heartfelt gratitude also goes to my husband, Mike, who has been vicariously dragged through all the ups and downs of my research journey. His good humor has always kept me going through the best and worst of times - even while he has been forced to take up the slack on an already busy home front – thank you, Mike. And to our daughters - as the greatest teachers of adapting to change while maintaining a long-term view - this thesis is actually all about you.

Lastly, I would be remiss in not giving due credit to our family dog, Pretzel (seen below), with whom I have held many challenging intellectual 'conversations' during our daily walks over the course of my research. Without the obligation to walk the great outdoors with Pretzel every day, I would not have had the 'airtime' to fully explore many of the concepts involved in my research with my 'more-than-human' companion. Both of our mental and physical wellbeings may well have benefited as a result.

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Abbreviated Terms

ANZ	Aotearoa - New Zealand
AP	Adaptation Pathways
CRTNZ	Coastal Restoration Trust New Zealand
DAPP	Dynamic Adaptation Policy Pathways
DoC	Department of Conservation
ECG	Environmental Conservation Groups
ENSO	El Nino Southern Oscillation
ES	Environmental Stewardship
EU	European Union
FGW	Focus Group Workshop
IL	Institutional Logics
IPA	Interpretative Phenomenological Analysis
IPCC	Intergovernmental Panel on Climate Change
KDCG	Kūaotunu Dune Care Group
KRRA	Kūaotunu Resident Ratepayers Association
MBET	Mercury Bay Environment Trust
MfE	Ministry for the Environment
MPI	Ministry of Primary Industries
NIWA	National Institute of Atmospheric Research
NWHT	Ngāti Huarere ki Whangapoua Trust
OBRA	Opito Bay Ratepayers Association
ORG	Otama Reserves Group
PDI	Practice Driven Institutionalism
RBWG	Rings Beach Wetland Group
RMA	Resource Management Act
SES	Social Ecological System
SMP(P)	Shoreline Management Pathways (Project)
SPT	Social Practice Theory
TA	Template Analysis
TCDC	Thames Coromandel District Council
WRC	Waikato Regional Council

Te Reo Māori Definitions

Aotearoa	Māori name for New Zealand, 'Land of the long white cloud'
hapū	Clan or section of tribe
hui	Gather, assemble, meet confer
iwi	Tribe, extended kinship group
kaimoana	Seafood
kaitiakitanga	Guardianship, trustee
koanga	Spring - digging season
koha	Gift, offering, present donation, has connotations of reciprocity
korero	Speaking, addressing, conversation
kaumātua	Elders
kumara	Sweet potato
mahi	Work, accomplish, do
Māori	The indigenous people of Aotearoa - New Zealand
Maramtaka	Māori moon-related calendar
Matariki	Māori New Year
mātauranga	Traditional knowledge, values and world view of the Māori people
mauri	Life force, essence/vitality, meaning
ngahuru	Autumn
pā	Fortified village, city or settlement, dam, or closed off open space. Used traditionally to block attacks
rāhui	To put in place a temporary ritual prohibition, closed season, ban, reserve - traditionally a *rāhui* was placed on an area, resource or stretch of water as a conservation measure
raumati	Summer
rohe	Territory of land, boundary, district, area, border of land
takurua	Winter
tamariki	Children
tangata whenua	Local people of the land, whose ancestors have lived and are buried there
taonga	Treasure, anything to be considered of value including socially or culturally valuable objects, resources, phenomena ideas and techniques
te reo	Māori language
tipuna	Ancestors, predecessors
tikanga	Correct procedure, practice and protocol. The customary system of values and practises that have developed over time, and are deeply embedded in the social context
tohu	To instruct, advise, or guide
tūrangawaewae	a/our place to stand, home
whanau	Family, community

Note: *Italics have been used in denoting Te Reo words throughout the text of this thesis, except where these are names of places, iwi/hapū or plants/animals.*

Source: *Te Aka Māori Dictionary : www.maoridictionary.co.nz*

CHAPTER

01

INTRODUCTION & CONTEXT

1.1 Background to Research

With seasons providing important temporal references to ongoing processes of social-environmental change in and over time, this thesis considers local experiences of seasonality as a basis to effecting adaptive responses within resilient communities of place. Specifically, the research relates the practical experience of seasonality to organised responses to change within the rural coastal communities of the Coromandel Peninsula, Aotearoa - New Zealand (ANZ). At the interface of land and sea alongside intensifying processes of human occupation, beachfront settlements are considered particularly vulnerable to local as well as global-scale processes of change.

When previously writing about places on the Coromandel Peninsula, in my professional capacity as a landscape planner, I have adopted the detached perspective of an 'expert' observer. Time and place provided me with a welcome opportunity to critically reflect on this practice when I was accepted onto the CALENDARS Project[1] (*CALENDARS: Co-Production of Seasonal Representations for Adaptive Institutions*) as the platform for my proposed doctoral research. The research presented in this thesis was undertaken as one case study of the wider CALENDARS project, in dialogue with the other members of the project team and their own respective case studies.

Conducted through the University of Bergen (Norway) in collaboration with Massey University, CALENDARS set out to explore and contrast how changing seasons are variously interpreted within a diversity of institutional-organisational settings located on the Coromandel Peninsula and in Bergen City in the context of broader climate narratives. Sited within interdisciplinary environmental social science research on climate adaptation, the Coromandel component of the project builds on ethnographic research carried out by resident Dr. Paul Schneider (also through Massey University) on the contending narratives of adapting to changing climates on the peninsula. Impelled by my professional interests, I engage with concepts of place as routes to understanding the material meanings and cultural values associated with localised representations of seasons and how they might be changing through extended lines of ethnographic inquiry. Linking to relational theories of place experience and their phenomenological origins, I explore how seasonal knowledges are alternatively practiced and performed within local organisations in the context of social-environmental change and its constituting temporalities.

1.2 Research Rationale

As an extension of the CALENDARS Project, this thesis answers the call within climate adaptation scholarship for alternative perspectives on both the conditions for, and processes of, societies being mobilised to respond and adapt to environmental change (Adger, Lorenzoni, et al., 2009;

[1] https://uib.no/en/calendars-project

Feola, 2015; Hulme, 2009). This has seen a growing group of scholars study the cultural side of adaptation, including cultural frameworks for perceiving and effecting time. Adopting a focus on seasons, as temporal frameworks, the CALENDARS project specifically engages with institutionalised representations of seasonal phenomenon in the context of societal responses to broader climatic change. Since society's constructions of climate are variously derived from combinations of both natural and social influences, a key imperative for studying institutional representations of climate involves understanding the way people collectively choose to live with it (Hulme, 2017; Jasanoff, 2010).

As a dimension of local climates, seasonal cycles typically involve recurrent (anticipated) changes in weather phenomenon over the course of a solar year, prescribing reciprocal responses in both natural and social systems. As metaphors that structure the calendar timelines of human lives, seasons also help structure and make sense of the weather (Sommerville, 2019). While the natural phenomena and temporality of seasons vary considerably across the globe - being reduced to subtle shifts in annual wind and precipitation patterns within the ostensibly 'seasonless' Equatorial Zone - seasonal transitions nonetheless provide temporal references to climates worldwide (Orlove, 2003). At the same time, seasons are also alternatively constructed by different cultures over time, emerging as a reconciliation between '*those things that happen independently of human engagement, such as the annual summer solstice, and those things that are dependent on that engagement – naming, recognising and celebrating the solstice as somehow being significant*' (Groom, 2013, p. 32).

Thus in New Zealand society, we are able to culturally inhabit the colonial meteorologically-based 'four seasons' calendar derived from the northern hemisphere (replete with the imagery of 'white Christmases'), when our physical seasonality (and that of the Southern Hemisphere generally) is more accurately reflected in the astronomical timings of the winter-summer solstices (Trenberth, 1983). Conversely, the timing and transitioning of periodic 'seasons' have traditionally been determined within indigenous *Māori* culture by locally established *tohu* ('signs' of environmental phenomenon) that are unique to place-based *iwi* (tribes) (Harris et al., 2013; Hikuroa, 2017). Recently, there has been renewed interest in customary *Māori* seasons and their relationship to the traditional *Maramataka* (*Māori* lunar calendar) as references to tracking changing climates, notably through research initiated by NIWA[2] (King et al., 2008).

Distributed interpretations of seasons provide a point of departure for the CALENDARS research in seeking to advance an understanding of how seasons variously steer the way groups behave in diverse spheres of social life, or institutional fields (*Appendix **A***). Simply understood, institutions establish patterns of behaviour and organisation within a society (Gupta et al., 2010). In contemporary contexts, this includes core systems of governance, religion, health and education. In the context of changing climates, institutional arrangements are seen to capture the underlying values, beliefs, practices or technologies that variously mediate how an organised group, including levels of government, perceives, understands and interprets change in order to affect a response

[2] New Zealand's National Institute of Water and Atmospheric Research

(Bremer et al., 2021). Institutionalised cultures and customs have traditionally mediated local understandings of seasonality, involving scenarios of compliance, defiance and manipulations of seasons. Relating changing seasons to changing climates therefore requires an explicit engagement with institutional cultures and their locally organised arrangements. Although often used interchangeably in common parlance, organisations are distinguished as entities established through social relations shaped by relevant institutions (Bouma, 1998). Materially shaped by circumstances, organisations are also situationally bound within time and space. Consequently, patterns of institutional cultures are made manifest through configurations of local organisations, which form the subject of field investigations within the City of Bergen in Norway and on the Coromandel Peninsula in ANZ. How presiding 'representations' of seasons might inform adaptations to seasonal change as part of organised responses to broader climate instability is an under evaluated topic to be considered.

1.3 Seasons in Time and Place

With its focus on institutional-organisational cultures, CALENDARS tenders a novel perspective on how societies may transform to better fit the changing seasonal cycles we are experiencing. The project investigates how socially organised groups relate to seasons in their ways of thinking, acting and feeling seasonally – within diverse institutional-organisational cultures and how this affects their capacity to respond to climatic and environmental change, as experienced 'locally'. Importantly, the CALENDARS project was not content to stop at studying groups' seasonal capacities, it sought to intervene in these groups by mobilising actionable knowledge on seasonal change. In this way, the Coromandel realm of the research builds significantly on the ethnographic doctoral research conducted by Paul Schneider with distributed coastal settlements to reveal the 'countervailing community narratives' on changing climates (Schneider, 2014). While identifying common issues with the currency of climate science in the everyday lives of coastal residents, Schneider's extended ethnographic studies have served to highlight the institutional dimension of adaptation manifest within diverging cultures, socio-economic demographics and the political standing of Coromandel communities, which include indigenous *Māori* (Schneider et al., 2017).

By extension, my research adopts a practice approach to exploring the social-cultural representations of seasons on the Coromandel, whereby locally relevant seasonal knowledges and climate awareness are premised on an active practical engagement of resident organised groups with their physical environments. The situatedness of human-environment relations are effectively highlighted within this proposed focus on place-based organisations and particularly those practically involved with the use and conservation of the Coromandel's natural resources. Comparing the informal initiatives of grassroot environmental conservation groups with the statutory planning and management interventions of local government, the research recognises the different ways that groups relate to seasonality (and temporalities more broadly) through different institutional spheres. Likewise, the 'manifold actions and interactions' that comprise daily life in moving between a diversity of activities and organisational contexts is also formative of seasonal understandings (Anderson & Harrison, 2010). Fundamentally, I set out to explore how these unique relationships of people with place manifest within the divergent forms of temporal

knowledges (including seasonal), organised practices and cultures concerning local coastal settlements impacted by global forces of change.

As a physical locality, places capture the characteristic materiality of local environments, which includes the natural seasonal phenomena and temporalities with which they are uniquely associated. Alternatively conceived as a manifestation of complex human-environment interactions, a relational construct of 'place' otherwise provides a locus from which human awareness, knowledge and meaning may be generated alongside the organisation and constitution of social relations, powers and actions (Williams, 2014). Understanding how people-place relationships are formed and expressed and how they can be impacted, both directly and indirectly, by environmental change and its governance is therefore increasingly seen as important in considering the role of subjective factors in mediating adaptive capacity and sustainable transformations at the community level (Adger et al., 2011; Fresque-Baxter & Armitage, 2012; Grenni et al., 2020; MacGillivray & Franklin, 2015). In this thesis, I apprehend place-based understandings of social-environmental change by focusing on the temporal relations of communities with their environments and how they sense and attune to temporalities of seasonality within local settings (Edensor et al., 2020). This sees places as constituted through how populations perceive and effect the temporal rhythms that set a tempo to life.

In situating social orders and shared norms, local organisations demarcate social groupings within which to explore the diverse knowledges, values and meanings the group associates with a place and how these might variously influence adaptation to environmental change within shared dwelling environments. At the same time, presiding institutional arrangements, including levels of government, define how social groups and organisations evaluate and adjudicate competing meanings and identity claims on a place, along with its inherent natural resources (Adger et al., 2011). In providing the physical location for the research, the Coromandel Peninsula hosts a broad range of both formal and informal organisations with competing interests in its diversity of natural resources - associated with alternative ways of making sense of and navigating local manifestations of environmental change (Schneider et al., 2017). By mediating the interacting values and activities of organisations, institutional cultures are thereby implicit in governing responses to local change (Patterson et al., 2019).

An extended geographical engagement with concepts of place as an emergent, relational process equally involves the co-constituting function of concepts of time in comprehending social processes and societal change (Edensor et al., 2020). While natural and social systems seemingly operate within divergent temporalities, they are nonetheless bound in a relationship of co-construction, in which the resonance or dissidence between the two is reproduced through different forms of timing, tempos and rhythms (Pahl et al., 2014). The temporal dimensions of seasons (both naturally occurring and socially constructed variations) are therefore immanent to the constituting temporalities of place. And yet, there has been a limited engagement with local manifestations of changing climates through seasonal calendars and weather phenomenon within western cultures (Brace & Geoghegan, 2011; Edensor et al., 2020). In addressing this perceived

shortfall, the current research sets out to explore how seasonal temporalities might shape the situated organised practices of everyday life on the Coromandel in the broader context of change.

Drawing on a phenomenological perspective from which to explore the interdependencies between the routine practices of conservation-based organisations, their unique experience of place and resulting appropriations of seasons, the research engages an analysis of rhythms with contemporary institutional-organisational theory through which to expound discursive interpretations of seasonality in the context of changing climates. Accordingly, the research is fundamentally premised on a qualitative approach, involving a range of ethnographic methods which have additionally contributed to the elucidation of seasonal knowledges alongside participants. Seasonal knowledges have been shared within groups through combined interview formats and between groups within an invited focus group workshop format, both of which allowed for a critical reflection on shared and unique seasonal understandings with participants.

Motivated by the broader applications of environmental planning and resource management, the research is theoretically aligned with the traditions of human geography within the social sciences. Embracing the trans-disciplinary orientation of the CALENDARS project in the co-production of seasonal knowledges, I engage with a diversity of topics spanning critical theories of time and place-space, institutional-organisational theory and social practices alongside social-ecological systems and adaptive governance, while drawing from auxiliary disciplines including sociology, anthropology, political science and philosophy in the conceptualisation of my research.

1.4 Researcher Positionality

Every morning ‘come rain or shine’ I walk our Labrador, Pretzel, around a neighbouring farm property that borders our rural lifestyle residence in the Kauaeranga Valley extending to the east of Thames township at the southern base of the Coromandel Peninsula. Moving into the valley shortly before commencing my PhD candidacy, Pretzel and I have experienced almost four revolutions of the sun through successive seasons of walking together. Taking in the local rural landscapes of grazed paddocks and planted woodlots that border the conservation estate of the Coromandel Ranges, every day is different. Our winter walks are frequently wet and invariably muddy, sometimes necessitating detours, while summer mornings can get hot. Although dictated by the timing of school routine on weekdays during termtime, on the weekend, I can plan to delay our walk to capitalise on the mid-morning winter sun and conversely plan to leave at first light to avoid the looming heat of the summer sun. If I’m feeling particularly energetic (or short on time), I might choose to run the loop, or take a detour to a tributary stream for Pretzel to have a swim. On other days we might be detained by a passing encounter with a neighbour; stop to observe a bird, report a faulty watering trough or ensnared mustelid - or Pretzel might be lucky enough to catch a rabbit. Every single day is different.

Out on these walks I have been reminded of walking another family dog, Jeeves, around the rural countryside of Suffolk, where I grew up in the south-east UK. Although not a daily routine, I was always keen as a youngster for any opportunity to spend time ‘in nature’ and would then have encountered the full spectrum of European four seasons – occasionally including snow at

Christmas. My instinct for nature has guided my educational and subsequent career path as a landscape planner/ecologist as well as where I have ended up living. I originally travelled to ANZ as a cook working on charter sailing yachts and stayed after meeting my future husband while rock climbing. And in spite of being transported to the other side of the globe, I have always felt 'at home' within the ANZ landscape. After initially finding work as a landscape ecologist with an environmental consultancy, I was fortunate that my work has allowed me to 'explore' this land at close quarters. As ignorant of *Te Reo*, as I was of *Māori* culture, I quickly became fluent in the indigenous nomenclature of native plants and the symbolic narratives with which they are uniquely endowed.

It is out of a growing concern for ANZ's 'natural' landscapes that I became interested in pursuing social science research through the CALENDARS project with a specific focus on the occupied rural coastal landscapes that were the domain of much of my professional work on the Coromandel. Long recognised for its iconic scenery associated with 'outstanding' landscape and natural character values, I have become increasingly aware of more acute priorities to deploying sustainable land development and management planning within the Coromandel. Not least of these priorities is the imperative to address the global advance of rapid climate change within the local socio-ecological landscape of the Coromandel's coastal environment. For me, this has necessitated a re-orientation towards the dwelling perspective of those people that inhabit the Coromandel and their more-than-human environmental interrelations as being woven into the fabric of everyday life. This standpoint is in contention to an abstracted aesthetic backdrop that has dominated 'expert' landscape perspectives to date. It is through such everyday lives, that my research seeks to engage with local experiences and understandings of environmental change through the seasonal calendar. As much as my professional background has been instrumental in laying the foundations of my research, I have also been able to take advantage of existing professional networks within governing authorities, including Thames Coromandel District Council (TCDC), Waikato Regional Council (WRC) and Department of Conservation (DoC) in gaining entry into 'the field' of local adaptation planning. Fortified with my professional experience in landscape restoration projects, I was likewise welcomed as a 'seasoned' practitioner into the voluntary networks of local environmental conservation initiatives that became the 'subjects' of my inquiry over a series of years. In reality, I became an apprentice to the local experts I was fortunate to learn from and grow with – as my thesis will duly show.

Settling in the Kauaeranga Valley on the opposite coastline of the Coromandel Peninsula with two children of our own, we have experienced a global pandemic, change in national government through two election cycles and severe cyclones affecting the district during the successive seasons of my research. In the past year, the neighbouring property we walk over has changed hands, Pretzel has been joined by Maple (a Border Collie cross) and every day since has been different again.

1.5 Research Questions & Objectives

In adopting an institutional-organisational lens through which to explore and evaluate the relationships between cultural representations and practical knowledges of changing seasons with co-constitutions of time and place, the primary question the research seeks to address is identified below, followed by three secondary questions that serve to locate the focus of the inquiry. With rural coastal settlements providing nested case studies for the research, the relative influence of local environmental organisations-institutions in shaping community responses to change is considered in the context of ongoing debates about changing climates alongside cumulative experiences of seasonal variability.

Primary Research Question:

In what ways is seasonality constituent of place and the relative capacities of local communities to register and respond to broader patterns of social-environmental change?

Secondary Research Questions:

From this overarching agenda, the research has been developed through three secondary lines of inquiry that locate its focus within the rural coastal communities of the Coromandel Peninsula in the context of their particular relationships to broader patterns of social-environmental change, as follows:

a) *How are seasonal rhythms constitutive of social-cultural relations with place?*

b) *In what ways is seasonal variability practically experienced and accommodated by locally organised groups in the context of broader patterns of social-environmental change?*

c) *To what extent do local governance agendas reflect and give effect to communal understandings of changing seasons and climatic variability?*

1.5.1 ***Research Objectives***

Empirically, the research has been guided by two principal objectives that underscore its theoretical framings (Chapter 2); development of its methodological design and implementation (Chapter 4); data analysis (Chapter 5); alongside a critical evaluation of the fieldwork findings (Chapter 6), in responding to the preceding questions. Involving participant experiences, perceptions and behaviors, these objectives are specifically aligned with a qualitative approach to exploring the seasonal practices of coastal conservation on the Coromandel, as follows:

a) To provide detailed accounts of the seasonal practices and associated interpretations of seasonality by locally resident conservation groups and how they might be changing in the context of broader human-environment relations, including that of changing climates.

b) To understand and evaluate the relative abilities of locally organised conservation initiatives to navigate seasonal changes and how, in turn, this might influence the capacity of the wider community to respond and adapt to broader patterns of social-environmental change.

1.6 Overview of Thesis Structure

With the current chapter (**Chapter 1**) providing an introduction to the research and its guiding questions and objectives, **Chapter 2** then presents the key theoretical concepts through which the research approaches seasonality as embodied in organised practices in time and place, and the opportunities it offers for comprehending environmental change. Drawing from critical scholarship on place and time, alongside intuitional-organisational theories, the literature review finds common ground in seeing both institutions and places as processually perpetuated through dynamic relational rhythms that concurrently provide opportunities for local agents to enact change and reform these rhythms – in responding to a changing climate for instance. In highlighting the novel conjunctions of the conceptual framework, the research is advanced through an overarching objective to relate and evaluate the practical embodied experience of seasonality to organised responses to changing climates.

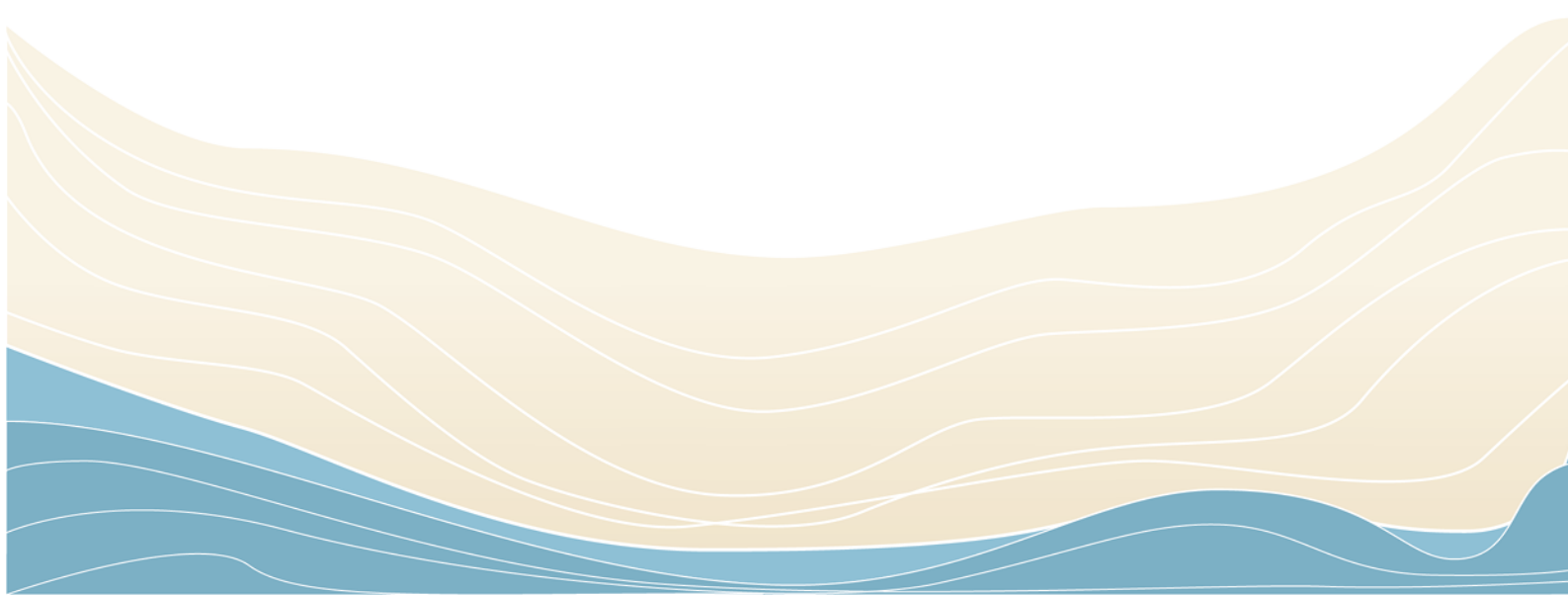
The relevant socio-political and physical geographical contexts of the Coromandel Peninsula case-studies are introduced and described in **Chapter 3** with particular attention to prevailing climates; calendar cultures; *kaitiakitanga* and conservation; adaptation planning and governance. The strategic approach to the research design and methodology is set out in **Chapter 4**, including in the selection of participating organisations and suite of methods tailored to the research questions and conceptual framework. Following a detailed account of the broadly ethnographic methods of fieldwork undertaken with different groups for the qualitatively based research, Chapter 4 then sets out the analytical frameworks by which the data was compiled and evaluated. Ethical considerations are documented alongside methodological reflections gathered over the course of the research.

The findings are presented in **Chapter 5**, alongside their provisional analysis, structured around the research questions, and organised by the case study organisations. Incorporating data from alternative methods, these formats were reconciled within the templates that formed the basis of my analysis, which was in turn structured around original quotations from participants alongside a concurrent analysis of rhythms encountered throughout the research. A critical evaluation and associated interpretation of the research findings is developed from its provisional analysis within **Chapter 6**, followed by a concluding **Chapter 7**. The format of discussions contained within Chapter 6 are broadly aligned with the original research questions in reconciling the changing rhythms of place with the relative timing of adaptive responses in the context of local politics and strategic governance interventions. In rounding off the thesis, Chapter 7 incorporates a critical reflection on the broader contribution of the research to scholarship, alongside my recommendations for extended lines of inquiry. The limitations to my own research are also identified at the end of Chapter 7.

CHAPTER

02

CONCEPTUAL CONSTELLATIONS



2.1 Exploring existing theories

In setting out the theoretical waypoints that have guided the pathway of my inquiry, the current chapter is broadly orientated around the secondary research questions from section 1.5. In setting up the conceptual frameworks that made certain phenomena visible, I have drawn from a diverse array of disciplinary perspectives, beginning from human geography before moving into anthropology, sociology, institutional-organisational studies alongside ecology through which to explore different dimensions of seasonality. The research is otherwise anchored within the interdisciplinary field of human adaptation to environmental change through resource management planning. While my academic and professional backgrounds lie within this 'home field' of environmental planning and management, the conceptual developments of my research have otherwise taken me in directions for which I had limited foundational knowledge.

Starting from a concept of place as human-environment relations defined by temporal rhythms, the practical experience of seasons by locally organised environmental conservation groups is considered in the context of sociologically-orientated organisational theories of institutions. From here, the emergence, persistence and adaptability of local organisations from grassroot[3] to local government is explored in the context of evolving processes of social-environmental change, from changing seasons to changing climates. How the situated practical seasonal knowledges privileged to autonomous local environmental groups might inform strategic planning and governance of climate adaptation at the community level are then considered in the context of adaptation and resilience scholarship alongside political aspects. In pulling these intellectual threads together, a conceptual framing is outlined in the summary of this chapter (Section 2.7) as the platform for my empirical research.

2.2 Changing Places : Spatial Relations

In order to understand socio-cultural relations to place (Research Question (a)) I needed a sophisticated relational concept of place, alongside communal ways of knowing place and creating place through shared practice.

With the growing realisation that global environmental change will be uniquely experienced in manifold and unpredictable ways by local communities within a diversity of living environments, there is growing consensus that the concept of 'place' offers a critical human perspective from which to approach adapting to localised impacts of changing climates (Adger et al., 2011; Fidelman et al., 2017; Fresque-Baxter & Armitage, 2012; MacGillivray & Franklin, 2015). While differentiating the localised nature and human experiences of such impacts is clearly important in planning for adaptation, comprehending the local realities of a changing environment has, arguably, as much to do with framings of the experience of place. I outline below a pathway to understanding place as a hybrid, unbounded relational process that is grounded in

[3] 'Grassroot' is used throughout this thesis to infer a foundational local organisational level

phenomenological understandings of human-environment interactions, as a route to exploring seasonal knowledges and meanings.

2.2.1 ***Perceiving Place***

At its most rudimentary, 'place' is commonly understood as a discrete geographical location or area. As a foundational concept to the academic discipline of human geography, place has been advanced as a 'fundamental means through which we make sense of the world and through which we act' (Sack, 1992).

Consequently, evolving geographical accounts of place are distinguished by variations on phenomenological and relational perspectives. Humanist geographers, notably Yi-Fu Tuan (1977) and Edward Relph (1976), originally adopted phenomenology as a pre-reflexive 'science of experience' focused on the situated phenomenon of person-or-people directly experiencing place, and its associated values and meanings, as distinct from objective scientific formulations of space (Entrikin, 1976). Drawing heavily from the phenomenological workings of Merleau-Ponty (Merleau-Ponty & Landes, 2011) from the 1940's their work established a 'sense of place' with its resulting localisms, as distinct from a preoccupation with particular spatially defined 'places' (Cresswell, 2004).

In the context of evolving time-space compression and globalisation (Robertson, 2018), a relational analysis of space subsequently emerged through Doreen Masseys' influential emphasis on the dynamism of *processes* involved in making (unbound) places that are constantly under construction and contestation (Massey, 2005; 1999). Informed by the social concepts of structuration outlined by Anthony Giddens (Giddens, 1984), the mediated relations of Massey's spaces highlight the progressive political distributions of agency between people, physical places and material assemblages of connectivity. This presented an alternative take on place to that accessed via individual experience. Consequently, Massey's spatial theory tenders an institutional construction of space aligned with the socio-political 'power-geometries' of a globalised western society.

The apparent dialectic between individualistic phenomenological (subjective) and relational accounts of place have been partially addressed in the relational phenomenology of the dwelling perspective proposed by Tim Ingold in his treatise 'Perception of the Environment' (Ingold, 2000). Ingold takes the significant step of breaking down the dichotomies of nature versus culture, by presenting human experience as fully immersed within the embodied entanglements of a relational environment. Otherwise conceived as complexes of dynamic relational 'zones of entanglements', his occurrent 'dwelling environments' are also partially sympathetic to Massey's account of relational space as open and processual.

Contemporary conceptualisations of social space as processual over time have put further emphasis on the relational, dynamic processes involved in the synthesis of 'hybrid places' from physical, social and experiential components (Pierce & Martin, 2015). In recognition of the inherent irreducible hybridity of places, there is a nascent understanding that places cannot be

understood by any single theory but require 'epistemic multiplicity' to be even partially known (Pierce & Martin, 2015; Robertson, 2018).

Following this lead, it may be construed that an embodied relational understanding of place might offer routes to knowing that are inherent to both individual and culturally appropriated awareness of seasons. Such a framing has been advanced within the ethnographic methods of Sarah Pink, in which she highlights place-based knowledge-in-practice as an analytical approach (Pink, 2012, 2015). A concurrent sensitivity to socio-political constructions of social space might also offer insights into how discursive knowledges around changing seasons and climate might be mediated at and across broader spatial-temporal scales; from local to regional, national or international.

*2.2.2 **Knowing Place***

Inherent within the diversity of generative place theories outlined above are the diversity of knowledges through which places are intentionally and vicariously known – with fundamental implications for how we know and experience seasons in place, while adapting to seasonal variability and change. A socio-political relational constitution of place is associated with constructions of knowledge involving material discursive practices that are continually contested and negotiated in process (Fabinyi et al., 2014; Whatmore, 2009). As an interpretation derived of (phenomenological) experience, 'knowledge' is definitively value-laden with cultural and symbolic meanings (Williams in Stewart et al., 2013). Here, phenomenological traditions in human geography link to parallel discussions in adjoining fields; in anthropology, science and technology studies, philosophy of science and adaptation governance.

Representations of knowledge also vary geographically between what Thomas Nagel has famously coined as the 'view from nowhere' to the view from somewhere (Nagel, 1986). Here, a distinction is drawn between detached generalisable 'knowledge' as abstracted from experience and ways of 'knowing' through subjective emplaced experience. Capturing the epistemic tensions between local context-dependant and global context-independent knowledges and their validation, the opposing 'place views' (Sack, 1992) also depict a dissention between science and practice that plague the rhetoric of climate change and environmental management generally (Agrawal, 1995; Fabinyi et al., 2014; Stewart et al., 2013).

Thus Mike Hulme contests the currency of global mean temperatures as a form of 'globalised knowledge masquerading as universal truths that assert themselves as the view from everywhere' (Hulme, 2010). A global and planetary knowledge-making that is detached from place-based meaning-making, consequently 'requires extraordinary efforts of the imagination for it to acquire purchase in the practices of everyday living' (Hulme, 2010) – see also parallel work on this topic in Science & Technology Studies, (e.g. Jasanoff, 2010). In his denigration of the 'globalising instincts' of the political framings of knowledge produced by climate science, Hulme is effectively highlighting the discursive values attached to the abstractions and objective interpretations of scientific knowledge within polity agendas. Such values additionally reflect the 'systematic undervaluation' of places and cultures in the economic calculus underlying much adaptation work typically involving cost-benefit and risk analysis deployed at the expense of the 'layered

investments that societies have made in the worlds as they wish them to be' (Adger et al., 2011; 2009).

The invert of globally communicated planetary knowledges are the tacit/intuitive knowledges privileged to contextualised individuals engaged in everyday practices. Embodied by the phenomenological perspective of experiential knowing, implicit knowledge was alternatively isolated by philosopher Michael Polanyi's 1958 Personal Knowledge, (Polanyi, 1962) as counter to the explicit knowledges defining the scientific paradigms of modern society (Margitay, 2010). Whereas explicit knowledges may be linguistically communicated, tacit knowledges often transcend interpretation through words; their disclosure otherwise being limited to embodied participation in communal practices (de Melo et al., 2019).

In contrast with the dominant scientific paradigm of western societies, embodied knowledges are fundamental to the many alternative 'ways of knowing' and forms of knowledge evaluation associated with traditional indigenous knowledges, including that of *Mātauranga Māori* in ANZ. As access to traditional indigenous knowledges are increasingly sought by scientists in comprehending local contexts of environmental change around the globe, their appropriation by western science is concurrently seen as exploitative (see Agrawal, 1995; Ingold & Kurttila, 2000; Petty et al., 2015). Although highlighting the adaptive capacities of indigenous communities to environments in flux, such knowledges are highly contextual (culturally, spatially and temporally) and therefore confined in their assimilation and application elsewhere. Meanwhile, the externalised claims of expert scientific knowledge, specifically relating to climate change and adaptation policies, continue to lack traction with the residing general publics of western democratic societies (Mahony & Hulme, 2018; Maibach & Priest, 2009; Whatmore, 2009).

Democratic society is otherwise distinguished by a diversity of lay knowledges constructed by publics drawing vicariously from the measured political discourses of science-policy and institutional norms alongside personalised practical know-how in making sense of environmental change (Brace & Geoghegan, 2011; Geoghegan & Leyshon, 2014; Lejano et al., 2013; Vanderlinden et al., 2020; Whatmore, 2009). Since lay knowledges are evaluated through local experience and cultural meanings of places, they inevitably contribute 'context-dependent complexity' to scientific understandings of environmental change (Adger, Lorenzoni, et al., 2009; Geoghegan & Leyshon, 2014). Therefore, as well as providing localised citizen-based verifications (or contentions) to scientific forecasts of imminent environmental change from within the diverse experience of everyday lives, situated lay knowledges concurrently offer customary framings to projections of future environmental change - involving a spectrum of experiential aspects of place meanings and cultural associations. Climate and its changes may also be 'felt, sensed, apprehended emotionally, passing noticed and unnoticed as part of the fabric of everyday life', (Brace & Geoghegan, 2011). Consequently 'each situation, each temporal scale, each and every place may generate its own interpretations' of plausibility versus accuracy in responding to projected scenarios of change (Brace & Geoghegan, 2011).

In attempting to reconcile the alternating and diversifying accounts of changing climates, it is increasingly recognised across social science scholarship that transdisciplinary co-constructions of knowledges are required, 'while remaining respectful of the epistemological differences in their approach' (Brace & Geoghegan, 2011; Pierce & Martin, 2015; Vanderlinden et al., 2020). Efforts to 'broker' complex formats of environmental knowledges are being creatively explored within a wide range of disciplinary approaches towards mediating changing climates as a result (see (Chapman et al., 2017; Rathwell et al., 2015; Rodrigues et al., 2025). This includes in the explicit use of customary seasonal calendars for communicating meteorological forecasts back to indigenous communities of the Pacific Islands, (Chambers et al., 2021) and to document customised Savanna fire management practices in Northern Australia (McKemey et al., 2020).

Within this context, seasonal framings have already entered the global climate discourse as a scientific object of study, whereby remote meteorological records and modelling have tentatively isolated links between global anthropogenic forces of climate change and deviant seasonal weather temperatures (Santer et al., 2018). Within ANZ, the 2020 State of the Environment Report 'Our Atmosphere and Climate', published by the Ministry (MfE), has an explicit seasonal orientation in giving currency to the 'broad scale' effects of a changing climate that are already being 'observed' in statistically warmer winters, hotter summers and heatwaves, decreased frosts and extended growing seasons alongside erratic rainfall patterns, (MoE, 2020). What is apparently missing beyond these global and national accounts of changing seasonality, while ostensibly calling local 'communities' into action, are the grounded, emplaced experiences of past and present seasons derived from the everyday lives of the diverse cultures that uniquely constitute places.

*2.2.3 **Practicing Place***

Accepting that a degree of variability is inherent within the natural rhythms of most environments, including through daily weather patterns and seasonal cycles (Orlove, 2003), the registration of environmental change as a cause for concern relies fundamentally on an accumulated definition of what typically occurs. Rather than looking to external expert evaluations, environmental change may alternatively be 'revealed' to individuals as agents distinguished with an acute practical knowledge of their local environment, gained through everyday life experiences in a relational phenomenology.

Embracing the notion of relational phenomenology illuminated by Tim Ingold, here concepts of 'embodied presence' developed from Merleau-Ponty in his 1945 Phenomenology of Perception (Merleau-Ponty & Landes, 2011), are combined with 'practice theory' from Bourdieu's Outline of a Theory of Practice (Bourdieu, 1977). In this conjunction, knowledge and skill are thereby acquired through an individual's practical engagement with, and sensory experience of, the constituents of their surroundings (Ingold, 2000). Skill is defined here as the 'capabilities of action and perception of the whole organism being situated in a richly structured environment' (Ingold, 2000, p. 5). Contrary to western scientific forms of knowledge inquiry that objectify the environment to a detached expert observer, the 'agent-in-environment' perspective promoted by

Ingold, sees human organisms as element beings within an open world of possibilities, 'not as minds having to make sense of it' (Ingold, 2000, p. 47). Within his scheme of relational entanglements, Ingold's 'environment' is thereby conceived as a process under continuous construction.

Accordingly, the perceptual skills that are highly attuned to an individual's monitoring of the environment, through ongoing practical experiences, are equally responsive to change. Within this framing, knowing-in-practice is seen as a dynamic embodied process, ascribed to a particular situation in a particular moment while always changing and emergent (Harris, 2007:4, cited inPink, 2015). By extension, the everyday routines of sensory experiences of knowing offer a sustained education of experiential learning through 'sensory memories' spanning the course of our lives (Pink, 2015). These personal knowledges thereby act as tacit references to understanding processes of change.

For educational theorist Etienne Wenger, the broader experience of knowing-in-practice involves participation, whereby the ability to negotiate new understandings and new meanings fundamentally arises through sharing in practices with others (Wenger, 1998). This social framing of knowledge and learning has led to his conceptualisation of 'communities of practice' popularised within organisational management (Wenger & Snyder, 2000). Conceived as an informal sharing of interests between constellations of practitioners within and across organisational structures, communities of practice 'appear to have the potential to galvanise knowledge sharing, learning and change' (Smith & McKeen, 2004). Yet, the organic intangible nature of communities of practice is specifically problematic for formalised organisations focused on contemporary management regimes. For this reason they have been alternatively equated (notably by collaborations between Mark Pelling and Chris High) with many of the attributes of informal institutions and thereby implicated in facilitating reflexive adaptive responses to environmental change outside of formally sanctioned initiatives and practices (High et al.; Pelling et al., 2008). While founded on emplaced ways of experiential knowing-in-practice, the distributed nature of communities of practice, emergent through dynamic and relational processes and networks, equally provides for extended learning opportunities beyond localised configurations of knowledge and power (Pink, 2015, p. 40). I will return to consider communities of practice again in Section 2.4.4 of this chapter under social dynamics.

The socialisation of practices otherwise forms the basis of social practice theories, notably grounded by Theodore Schatzaki (2001) and Andreas Reckwitz (2002) around the turn of the millennia. In referencing the eclectic forebearers of praxis theories offered by Bourdieu, Giddens, Foucault and Garfinkle (among others) the broader doctrine of social practice theory examines the constitution of social life through human action and agency. Drawing on the phenomenological perspectives of Heidegger and Wittgensteinian philosophies of mind, contemporary developments of social practice theories have an 'untapped potential' for understanding processes of social change and innovation through practice (Shove et al., 2012). Specifically, a practice ontology permits an analysis of how 'certain practices and broader configurations of practices emerge, become established in and disappear from social life' (Blue,

2019). With the practical affordances of places being central to this analysis, we can see how seasonal practices may be implicated in the changing rhythms of social life in ways that matter for effecting local communal responses to social-environmental change.

2.3 Changing Times : Temporal Rhythms

From multiple points of entry to apprehending the relations of communities to place, this thesis focuses on the (seasonal) temporalities that mediate place relations. The social construct of time has been an ongoing preoccupation of the social sciences, including within human geography, through its co-constitutions with space and their function in understanding social processes (Edensor et al., 2020). Concepts of time equally inform our understanding of patterns of weather, climate and seasons from place to place. Yet, beyond the pervasive predictions of future climates, there has been a relatively limited engagement with the situated temporalities of changing climates and their local manifestations in seasonal calendars and weather within western societies (Brace & Geoghegan, 2011; Edensor et al., 2020). With this deficit in mind, I explore below how local interpretations of seasonal rhythms might infuse the practical experience of everyday life in order to reveal the broader undercurrents of social and environmental change. Here, developments in anthropology, sociology, critical time theory – among other fields – provide conceptual hand-holds.

2.3.1 ***Everyday Lives***

Everyday life suggests a commonplace human existence ostensibly embedded in circadian rhythms. In pre-industrial times, the social rhythms of everyday life essentially revolved around the recurrent cycles of nature in linking time with space. A residual resonance of nature's rhythms (including seasonality) remains overt within the vestiges of traditional indigenous societies and subsistence farming regimes identified from around the world today. With the dawning of the mechanistic era of clock-time in the western world, it is contended that the temporal modalities of the everyday have become standardized by a 'humdrum' of repetitive movement, 'one that defies nature even as it emulates it' (Zayani, 1999). In effect, the recurrent rhythms of nature's cyclical time (in which no two seasons are experienced exactly the same) are set in tension against the repetitive linear schedules of contrived clock time. Detailed accounts of the modern day workings of *repetitious* linear versus *recurrent* cyclical time have been provided in the works of sociologists Michael Young and Eviatar Zerubavel (Young, 1988; Zerubavel, 1981). Social theorist, Barbara Adam, has otherwise been a notable voice in elucidating the political contrivances of linear time and its consequences for everyday life and the trajectories of 'environmental time' (Adam, 1995, 1998).

Focused on the routine activities of 'ordinary' people in common places, the contemporary study of everyday life within the social sciences critically incorporates a grassroot perspective within an egalitarian agenda. An academic concern with everyday life largely arose with the groundswell in western social movements advocating for political change alongside a democratic engagement with general publics following WWII (Ebrey, 2016).

French philosopher-sociologist, Henri Lefebvre, is claimed as the 'quintessential theorist of everyday life' (Gardiner, 2000). His 'Critique of everyday life' comprised three volumes published over the course of five decades (1947-1981). While Lefebvre's Marxist critique addressed the colonisation of the everyday by the linear workings of a bureaucratic capitalist system, Lefebvre appealed to the 'active creative force' of the subjugated human being towards a radical rehabilitation of normative everyday life (Lefebvre & Goonewardena, 2008, p. 217). His subsequent 'Production of Space' (Lefebvre, 1991) expanded on this theme in developing the constituting relationship of everyday practices with social space produced under a capitalist system, while inciting change through resistance. Lefebvre's preoccupation with the workings and obfuscation of multiple rhythms in the constructions of everyday life and experiences of place were subsequently culminated in his Rhythmanalysis Project published after his death in 1991[4]. Lefebvre's linking of space and time in rhythms is a major reference to my conceptual formulations and therefore recalled throughout this chapter. Also to note that although principally a sociologist, Lefebvre's work had significant influence, including within British readings of human geography.

Most apparent in his later work, Lefebvre (Lefebvre et al., 1999/2004) significantly builds on phenomenological perspectives of the experienced 'lifeworld' (Edmund Husserl) and 'being and time' (Martin Heidegger) that concurrently engaged human geographers, notably Anne Buttimer in her accounts of 'timespace rhythms' (Buttimer, 1976). Lamenting a lack of 'ideas and languages to describe the human experience of nature, space and time', Buttimer suggested (in line with Lefebvre) that the lifeworld experience could be alternatively described as 'the orchestration of various time-space rhythms' (Buttimer, 1976).

While making an important reference to bringing nature's rhythms back into the everyday, the diversification of modern society and its resulting lifestyles are otherwise characterised by an escalating multiplicity of temporal rhythms (Mels, 2004). The everyday lives of westerners are often depicted in complex daily schedules and practical routines involving a reconciliation of increasingly fluid work times, family/ home time and leisure times (Southerton, 2003; 2006). These are variously intersected by the seasonal and annual temporalities of political/economic cycles and holidays, which may either interrupt or provide structure to key aspects of daily routines. Alongside increasingly mobile lifestyles, the tenure of the everyday, and of nature's rhythms within this, is consequently highly distributed and individualised (Mels, 2004, p. 4).

2.3.2 ***Calendar Times***

In his book, *Hidden Rhythms*, calendars are ascribed by Eviatar Zerubavel as 'the first major institution that humankind invented in order to establish and maintain temporal regularity' (Zerubavel, 1981, p. 31). Zerubavel goes on to demonstrate that although the primary function of

[4] *Le project rhythmanalytique*, was first introduced in a paper published with Lefebvre's wife, Catherine Regulier-Lefebvre in 1985, before *Elements de rythmanalyse: Introduction a la connaissance des rythmes* was published as a completed work in 1992 and subsequently translated into English for publication in 2004.

early versions of formalised calendars were founded within the rituals of religious cultures, their temporal architecture was celestial. In the same way that mechanised 24-hour clock time is based on the diurnal cycle, the enduring calendar year remains concomitant with the solar cycle. Thus, while many cultures, including traditional *Māori*, also make reference to the more overt monthly revolutions of the lunar cycle, with which to phase time, the annual solar calendar maintains an orientation to changing seasons and prevailing climates.

While the seasonal calendar remains a vital reference for subsistence-based cultures and societies, calendars have otherwise endured as templates for social planning within westernised urbanised societies as much as through modern primary production systems. The meteorological reference to four seasons within ANZ is a key illustration of this detachment, whereby many indigenous *Māori* traditionally identified with just two seasons (a summer and a winter) within the calendar year. The imposition of the colonial calendar is similarly contended within Australia, where a great diversity of seasonal representations have been revealed from amongst distributed native aboriginal tribes (O''Brien, 2016; Wilson, 2019).

Under the orthodox regime of the Gregorian calendar, the temporal regulation of western society has undeniably created certain expectations (and tensions) in environmental relations and their particular sense of order. The transition to industrial capitalism has involved further temporal reconfigurations of the cultural basis to many human-environment interactions (Wood, 2008). And yet, through the cosmic rhythms of nature, the seasons still cycle - with much of our productive economies and contemporary tourism still vitally dependent on their unique passing. In his blurring of nature-culture dualisms, Ingold perceives a nested configuration of human-environment relations, whereby 'the rhythmic pattern of human activity nests within the wider pattern of activity for all animal life, which in turn nests within the pattern of activity of all so-called living things, which nest within the life-process of the world' (Ingold, 2000, p. 201). So what then is the role of seasonal calendars within the social structures – the institutional-organisational cultures and everyday lives - of western society? Franz Krause, drawing on Ingold's relational phenomenology in his study of the seasonal rhythms of the Kemi River landscape in Finnish Lapland, has suggested a distinction be made between *seasons* as culturally regulated temporal blocks and a dynamic *seasonality* as that which is directly experienced through situated practice (Krause, 2013).

2.3.3 Contemporary Climates

Larger climate cycles operate outside of the calendar year, notably including the El Nino/La Nina phases of the Southern Oscillation (ENSO) which irregularly transition every 5-7 years. Over longer timescales humans have transitioned historically through ice-ages to contemporary warming climates and this is the argument of many climate change sceptics. Of concern are the rates at which 'normal' ideals of seasons and climates are being destabilised across the globe in the wake of the dominant excesses of human consumption and production, tipping the balance of residual natures. When linked to capitalist systems, this is a fundamental issue of temporality.

In unofficially claiming an alternative humanist epoch to that of the current geological Holocene, the 'Anthropocene' is contemporaneous with the 'Great Acceleration' in the human-induced environmental degradations that followed WWII and the ensuing globalisation of a cumulative capitalist era (Steffen et al., 2015; Zalasiewicz, 2019). In effect, the deep cycles of geological change that formerly extended well beyond the comprehension of the human life-cycle appear to have been short-circuited by the industrialisations of an all-consuming human society to create a contemporary timeline for life on an exponentially warming planet[5]. But while the sophistications of our 'knowledge society' have furnished us with scientific determinations of an impending global catastrophe, we are otherwise suspended in a 'crisis of futurity' (Hope, 2020).

According to geographer James Evans, this crisis of temporality is not least due to the linear framings of historical time being perpetuated by capitalist thinking dominated by economic rationalities that refuse to deal with the catastrophe on its own terms (Evans, , 2010a). Through predicted scenarios of global temperature thresholds, humanity is essentially being 'insulated from the ultimate catastrophe of a changing climate by its simulation into the future' (Evans, 2010, p. 209).

Echoing the 'globalising instincts' of climate change discourses contended by Mike Hulme, the temporal roundings of a future climate has little regard for the locally heterogenous experiences of time (in which diurnal cycles and seasonality are implicit) that characterise the everyday lives of humanity (Edensor et al., 2020). Cultural, social and spatial knowledges of time are uniquely associated with norms, habits and conventions of time as well as experienced past and imagined futures. While many communities are yet to definitively experience local indicators of a warming climate, others are already set on trajectories of survival that are necessarily focused on the altered lifeworlds of their present (Evans, 2010, p. 210).

Any concerted attempt by humanity to counter the future catastrophes of a changing climate, fundamentally needs to contend its manifestations within the present (Evans, 2010; Kothari & Arnall, 2020). As a relational phenomenon, climate change may be alternatively comprehended as part of the rhythms of human existence and in the context of distinct spatialities and temporalities (Brace & Geoghegan, 2011; Edensor et al., 2020). Brace & Geoghegan divert our attention to a focus on the vernacular landscapes of everyday life in order to understand the 'ways that the climate might be changing' in customary terms (Brace & Geoghegan, 2011). This importantly includes an engagement involving 'rhythmic interrelations' with more than-human materialities and cycles in the local detection of meteorological change through a phenomenological perspective of embodied dwelling 'with' the landscape (Ingold, 2000; Krause, 2013). As Furberg et al. (2018, p. 88) have noted in their work with Sami reindeer herders in Northern Sweden, 'humans living close to nature observe changes before data analysis reveals statistically significant trends'.

[5] To note that a 15yr long proposal developed by the Anthropocene Working Group to the Sub-commission on Quaternary Stratigraphy (SQS) for formal recognition of the Anthropocene as a geological epoch was rejected in March 2024 by the International Union on Geological Sciences (IUGS).

Thus, while it may be contended that the emergent subjectivity of a phenomenological perspective is less collectively orientated to the future – the embodiment of shared practices and localised ways of knowing is considered a fundamental skill in the present situation, by reference to the past (Ingold, 2000). As well as establishing a sound basis from which to enact ongoing adaptations to emerging cycles and scenarios of change – informed by past learnings - the subsistence practices of many traditional indigenous societies were and are still commonly designed around the longer-term stewardship of their dwelling environments for generations into the future (Krause, 2013). This is in clear opposition to the myopic dispositions of many westernised lifestyles.

2.4 Social-Cultural Dynamics : Agencies in Action

Varying scenarios and experiences of changing environments are expected to elicit responses from the local grassroot scale (bottom up) as well as within authoritative governing systems (top-down) across a broad range of social contexts. Representing unique forms of agency, a contextual appreciation of the dynamic workings of social systems is considered a prerequisite to understanding a potential for both local and societal level change. The account below departs from human geography to explore the interdisciplinary field of social science on institutions-organisations by highlighting their enduring traits - based on core values, beliefs and meanings held within divergent cultural schema - alongside their material adaptations to changing environments. Situated social practices are highlighted in expanding theories of practice-driven institutionalism being applied to local scenarios of environmental change – including seasonal change - in combination with dynamic interinstitutional system theories of logics.

2.4.1 ***Social Institutions***

As a point of departure, social institutions establish patterns of behaviour and organisation within a society that may be contemporaneously construed as 'intertemporal arrangements that shape human relations in support of particular values' (Jupille & Caporaso, 2022, p. 3). Here social-cultural values are highlighted in the organisation of societies across time and place. The rapid advance of western society, under a pervading capitalist market economy, has been accompanied by evolving theories on the increasingly dynamic constitution of social life – involving the complex interplay of social, economic and political phenomenon (DiMaggio & Powell, 1991). Configurations of social, political and economic institutions, and the values with which they are associated, are thereby understood as the socio-cultural building blocks of contemporary human society that are central to social inquiry (Abrutyn & Turner, 2011). At the same time, Lockie & Wong note that: 'all economic and social activity is embedded in earth system processes' (Lockie & Wong in Boström & Davidson, 2018, p. 332).

As social institutions have diversified under burgeoning populations, our global environment has been plundered into critical decline, heralding an impending catastrophic imbalance (Hoffman & Jennings, 2018; Rockström et al., 2024; Wijkman & Rockström, 2012). By 'mediating the roles, interactions and practices of state, private and civil society actors in regard to local issues', institutions are also formative of environmental governance structures (Patterson et al., 2019, p.

361). Accordingly, the foremost institutional and governance arrangements that define modern society are implicit in many of the global environmental challenges confronting humanity today (Hoffman & Jennings, 2018; Hoffman et al., 2021). We see, for instance, an apparent inertia of capitalist governance institutions for addressing global threats of changing climates (Rosenschöld et al., 2014). For this reason, institutional cultures - and more specifically their tenures and effects - have become widely problematized within the social sciences in contending global environmental change (Amaru & Chhetri, 2013; Bremer et al., 2021; Hotimsky et al., 2006).

A key concern is understanding the entrenched nature of core institutions versus their potential to transform society in contending these current challenges (Hoffman & Jennings, 2018). In the context of warming climates and associated declines in biodiversity, a deeper appreciation of the linkages between social and environmental systems has also become a major preoccupation – including in the potential formulation of adaptive responses (notably by Gunderson & Holling, 2002). At the same time, contemporary institutional theory has elucidated the roles of organisations and individual actors in the agential workings of institutions, while concurrently offering potential avenues for exploring mechanisms of change from the ground up (Beunen & Patterson, 2019). Cutting across civil, public and private sectors, environmental governance has emerged as an enhanced format to engendering collective responses to change involving networks of autonomous organisations (operating outside of formal government) within multi-level interactive governance scenarios (Kauffman & Hill, 2021; Patterson et al., 2019). Collaborations between agents moving between social structures/orders are likewise seen as central to formulating polycentric adaptive governance arrangements, involving diverse stakeholders and cultures working together towards transformative social change as the crucible to achieving positive environmental outcomes (Amaru & Chhetri, 2013; Cleaver & de Koning, 2015; Hotimsky et al., 2006).

2.4.2 Structure & Agency

Over time, institutional theories have been variously tendered within the social sciences around the key variables of temporality (history), sociality (sociology), efficiency (economics) and power (politics) – (Jupille & Caporaso, 2022, p. 2). While much early scholarship was economically and politically streamlined towards the classical functions of primary institutions and governance arrangements, new institutional theories have advanced a more analytical concern with the broader social arrangements and workings of modern society (see eg. Dobbin, 1994; Scott, 2014). Contemporary scholarship has specifically included a proliferation of theories of institutions contributed within organisation studies - sitting at the juxtaposition of structure-agency dualisms. From a sociological perspective, there were initially two key agendas to early organisational intuitionalism: advancing the role of culture-cognition over the rational behaviours of individual actors and a resulting redress of social structures over agency (Abrutyn & Turner, 2011; DiMaggio & Powell, 1991; Scott, 2014).

Scholars have long debated the tension between governance as defined by ‘structures’ representing the stabilizing (constraining) orders of societies and ‘agency’ representing the

capacities of individuals and groups to act (Emirbayer & Mische, 1998; Scott, 2014; Sewell, 1992). While institutionalism is founded on explicating the endurance of macro-level social structures through regulating forces, alternative social theories have specifically engaged with distributed forms of human agency in dynamically shaping contemporary society. Although polarized, both orientations seek to explain the role of institutions – as macro-level social orders - on everyday life (Smets et al. in Greenwood et al., 2017, pp. 365-391).

Anthony Giddens seminal structuration theory tendered a bridging resolution, whereby agency was reconceived as being recursively related to social order (Giddens, 1984). In Giddens 'duality of social structure' social stability and change are crucially seen as alternative outcomes of the same dynamic process, with both requiring agential 'work' in either their maintenance or progress (Feldman & Orlikowski, 2011; Lawrence et al., 2009). Thus, in the ongoing (re)production of social structures, social actors have bearing on their enactment of appropriate rules/prescriptions (both formal and informal) and resources (both human and non-human) (Sewell, 1992). Pierre Bourdieu's theory of habitus is a related piece of theoretical work, looking at how social orders (as classes) are upheld through the cognitive dispositions of actors to cultural schema influencing how they act (Bourdieu, 1977). In this way, Bourdieu was formative in drawing attention to the cultural-cognitive frameworks constituting social orders, as advanced within organisational-institutionalism (including by DiMaggio & Powell, 1991, March & Olsen,1984, and Meyer & Rowan, 1977).

2.4.3 Agency in Practice

While offering alternative framings for agency, both structuration theories are vitally informed by practice ontologies. For Giddens, '…the day-to-day activity of social actors draws upon and reproduces the structural features of the wider social system' (Giddens, 1984, p. 24). Structuration is therefore: 'neither the experience of the individual actor, nor the existence of any form of social totality, but social practices ordered across space and time'(Giddens, 1984, p. 2). Likewise for Bourdieu, the relationship between structure and habitus is effectively explained through his culturally orientated theory of practice (Bourdieu, 1977). In both accounts, routine practices are seen as performative acts of collective agency more-or-less embedded in the relational reproduction of social orders. But in maintaining a hierarchy between grounded practices as subordinate to social structures, the analytical purchase of practice ontologies have been somewhat marginalised in institutional theory (Smets et al., in Greenwood et al., 2017).

Social Practice Theory (SPT) has alternatively levelled a practice ontology in the wake of Giddens and Bourdieu, whereby 'individuals, practices and structures exist in a continuously emerging state of reciprocity and interconnectedness by which they generate, reproduce, maintain and change social order' (Smets et al., in Greenwood et al., 2017). In this conception of society, agency is distributed more-or-less 'horizontally' in time and space through practices (interrelated activities) as the core units of analysis (Schatzki, 2001; Shove et al., 2012) and so transcending geographical, organisational and structural boundaries (Smets et al., in Greenwood et al., 2017).

As practices remain phenomenologically orientated in time and place through the situatedness of individual agents 'being in the world' (from Heidegger's' Being & Time, 1962, see: Gorner, 2007) it is through their collective experience of socialised activities that participants develop an intersubjective reflexive 'practical rationality' of how to act accordingly in a given situation (Nicolini, 2012; Sewell, 1992). Practice-orientated perspectives thereby support a contextually variable version of human agency associated with a self-determining capacity of individuals to creatively make a difference to the 'institutional status quo' by modifying their practices (Emirbayer & Mische, 1998; Sewell, 1992). While respecting the organizing principles of regulatory rules and reference cultural schema, the contemporary practice theory promoted by Theodore Schatzki subversively follows a Wittgenstein (1953) proposition that rules are themselves subject to contextual interpretations and thereby simultaneously represent opportunities or conditions for creative change (Smets et al., in Greenwood et al., 2017; Schatzki, 1996; Shove et al., 2012). In this way, actors are implicit in constructing their own 'structured yet flexible social universes' (Emirbayer & Mische, 1998) in which both social order and individual identities can result from the conditions of possibility involved in organised practices (Schatzki, 1996, p. 13).

Engaging with multiple organisations through the course of their lives (or indeed their everyday) social actors are also purported by some scholars to develop 'institutional biographies' acquired through successive practical successes and failures that are formative to their agential profiles and capacities (Bertels & Lawrence, 2016). Consequently, changing circumstances 'profoundly influence how actors in different periods and places see their worlds' based on their participation and identity within it (Emirbayer & Mische, 1998). Expanding on this premise, Emirbayer & Mische distinguish between three temporal dispositions to agency being orientated to the past, present and/or future. These temporal phases are respectively manifest in social strategies of historically informed resilience (iterational-habitual), interim adaptation (practical-evaluative) and future transitions (projective capacity) in the flow of time 'by actors capable of formulating projects for the future and realizing them, even if only in small part and with unforeseen outcomes, in the present' (Emirbayer & Mische, 1998). When confronted with challenging situations, this transpiring 'self-transformative' potential of human agency to respond is concurrent with revaluations of cultural norms and values as a result (Emirbayer & Mische, 1998).

2.4.4 ***Organising Institutions***

In highlighting the material workings and effects of agency, practice theory does not explicitly engage in institutionalisms; social orders are seen instead to emerge from practices distributed across time and place (Giddens, 1984; Schatzki, 2002). The *practice-driven institutionalism* (PDI) latterly conceived by Smets, Arisidou & Whittington (in Greenwood et al., 2017) thereby seeks to extend social practice theory towards understanding 'the broader enactment and impacts of shared practices' while concurrently restoring institutional theory to its 'practice-theoretical roots'. This means relating practices to the scripts and routines engrained in social structures, alongside rules and norms. So that, each enactment of a practice – such as driving a car or planting a garden – adheres to an institutionalised 'way of thinking, acting and feeling' while also having

the potential to 're-write the script'. This recourse to institutionalism additionally invokes work on *Institutional Logics* (IL), in reflecting current discourse within organisational studies based on the dynamic complexities of contemporary society (Smets et al. in Greenwood et al., 2017; Lounsbury et al., 2021).

When institutional logics was originally tendered by Friedland & Alford in 1991, their intention was to 'bring society back'[6] into the neo-institutional developments of culturally-premised theories within organisation studies (DiMaggio & Powell, 1991). From their ideations of set societal logics, the IL perspective has since been developed to provide a bridging (meta-) theory for extended processes of institutionalization through patterns of practical relations (and contradictions) between institutional orders, organisations, groups and individuals (Thornton, 2012). Fundamentally, logics are seen as dynamically distributed throughout nested social arrangements as opposed to pre-given social structures centred around core institutions – with social practices effectively providing the 'laws of motion' to their ongoing enactment (Friedland & Alford in DiMaggio & Powell, 1991; Mutch, 2018; Smets et al., 2012). The associated distributions of human agency concurrently provides increased opportunities for logics to be socially reconfigured in line with particular interests, practices and events.

A contemporary definition of an evolving IL construction is thereby tendered as 'systems of cultural elements (values, beliefs, and normative expectations) by which people, groups, and organisations make sense of and evaluate their everyday activities, and organize those activities in time and space'(Haveman et al., 2023). What this means is that within a given social world, actors will adhere to a particular ontology of what constitutes the world alongside a normative sense of right and practical conduct as part of its material manifestations. Numerous institutional logics are therefore employed in the sense-making, evaluation and planning activities of organisations, groups and people going about their daily lives. In highlighting the dynamic relativity between micro-processes (as recurrent routine practices) and macro-structures (as nested social orders), a logics perspective critically transcends the duality of structure and agency that had previously marginalised smaller organisations (along with sub-groups and individuals). Logics can account for social variability within a range of institutional and cultural-geographical contexts as a result (Mutch, 2020; Thornton, 2012).

By affording partial autonomy to distributed institutions and their agents, a material orientation towards practice-driven processes of institutionalism is additionally able to account for institutional and organisational heterogeneity alongside endogenous mechanisms of change (Thornton, 2012). The attribution of schematic logics with core cultural elements (values, beliefs, interests, expectations and emotions) additionally bridges symbolic and material dualisms in ultimately seeking to explain how culture consciously and unconsciously shapes and motivates action '..and thereby rendering the experience of space and time meaningful' (Friedland & Alford

[6] The full title of Friedland & Alford's seminal paper was: '*Bringing Society Back In: Symbols, Practices and Institutional Contradictions*' – From DiMaggio & Powell's 1991 edited volume: New Institutionalism in Organisational Analysis, University of Chicago Press.

in DiMaggio & Powell, 1991, p. 248; Mutch, 2018; Thornton, 2012). Thus the phenomenological underpinnings of practice theory are extended into an institutional logics approach, in giving licence to experientially embodied intersubjective social agencies (Ocasio et al. in Greenwood et al., 2017).

A focus on practice-driven institutionalism (PDI) likewise opens up a dynamic relationship between practices and logics and the spatial-temporal social contexts they emerge from. On the one hand, practices such as environmental conservation, are fundamentally situated in place - tailored to the unique features of an environment and its inhabitants. On the other hand, practices can be seen as transcending geographical and social boundaries and therefore ultimately transferable worldwide. In their introductory text to Social Practice Theory, (Shove et al., 2012) trace the spread of practices such as driving and Nordic walking to different contexts. In this sense, local innovations and adaptations may spread and have far-reaching repercussions (across time and space) including through informal social networks, such as communities of practice, that are themselves instantiations of core logics (Smets et al. in Greenwood et al., 2017; Schatzki, 2001; Shove et al., 2020).

A conceptual strength of IL lies in its holistic approach to exploring institutional workings and effects across a broadly heterogeneous scalar interinstitutional system that both begins and ends with agential praxis (Smets et al. & Ocasio et al. in Greenwood et al., 2017; 2018). Through relational networks, micro-level adaptations of situated practices can have broad effects across an entire 'field' of interlinked organisations and groups sharing similar practices and cultures. Field-level institutions and orders are thus (re)constructed from the ground up as the sum of activities of people constituting that field, and the moment-to-moment adjustments they make to their practices on a situational basis (Fligstein, 2012; Fligstein & McAdam, 2014). Representing meso-scale aggregations of organisational activities and interests in common practices and shared pursuits, field-level orders can also give rise to new and/or hybridized negotiations of core societal logics and resulting organisations (Mountford & Cai, 2023; Pache & Santos, 2013; Scott, 2014). A relevant example is provided by Lepoutre & Valente (2012) in Belgium's traditional high-yield horticulture industry being collectively coerced by emerging environmentally focused logics to cultivate 'green' practices as standard. Further change can then arise within local organisations as a new equilibrium of logics is derived from the peculiarity of the place in which the organisation is located during a particular period (Ponte & Pesci, 2022).

While the IL perspective originated from relatively few 'core' societal logics, the approach has since evolved to encompass a more nuanced and heterogeneous view of multiple societal logics, in creative tension with each other (Ocasio et al. in Greenwood et al., 2017; Lounsbury et al., 2021). This has seen a proliferation of proposed new and hybridized logics extended to institutional fields such as healthcare and education (Mountford & Cai, 2023; Reay & Hinings, 2009) private corporations and industries (Battilana & Dorado, 2010; Durand et al., 2013; Rao et al., 2003) and of pertinence to this thesis, environmental governance (Ansari et al., 2013; Berge & Torsteinsen, 2023; Milosevic et al., 2023). In contributing community, profession and corporation to Friedland & Alford's provisional core 'western' institutions of state, capitalist market, nuclear

family, democracy & religion, Thornton & Ocasio (in Greenwood et al., 2008) with Lounsbury (Thornton, 2012) have been instrumental in developing institutional logics into an holistic analytical model, spawning further empirical research. The transdisciplinary aspirations of the IL model has concurrently invited allied approaches such as Practice-Driven Institutionalism (Smets et al., 2012; 2017) Institutional Work (Lawrence et al., 2009) and Institutional Bricolage (Cleaver, 2012; Cleaver & de Koning, 2015). This has seen linked methodological advances fitted to studying ILs, involving ethnomethodology and phenomenology and therefore extending both its theoretical and empirical reach (Ocasio et al, in Greenwood et al., 2017; Lounsbury et al., 2021).

For my own purposes, I broadly draw on an IL perspective for its contextualization of complex socio-cultural relations in time and place through the situated routine practices of actors operating at the grassroot level of change. Specifically, instantiations of enduring societal logics are anticipated to affect local understandings of how seasons vary and change with globally scaled social-environmental change, while concurrently mediating practical responses within different institutional and physical contexts (Bartlett et al., 2009; Gümüsay et al., 2020). As participants routinely transition through a range of organisations in the business of their daily lives, they are assumed to be continually confronting scenarios of competing and congruent logics, as alternate routes to addressing environmental[7] challenges (Almandoz et al., 2017; Bertels & Lawrence, 2016; Lee & Lounsbury, 2015). Multiple logics also provide opportunities for actors to appropriate logics towards particular interests. Thus the cultural-geographical biographies of actors and the logics they act by are considered relevant in formulating responses to local scenarios of social-environmental change, including in communities on the Coromandel and in the context of local governance arrangements, policies and practices.

Subsequently, institutional logics are increasingly referenced in strategizing complex adaptive governance arrangements and practices made up of a diverse range of stakeholders with contending values and agendas (Ansari et al., 2013; Fan & Zietsma, 2017; Gümüsay et al., 2020; Lounsbury et al., 2021). In the context of ANZ, this includes the accommodation of alternative worldviews (and politics) originating within opposing hemispheres. In the context of rapid global change, the transformative potential inherent within a dynamic interinstitutional logics perspective 'speaks directly to [the] policy and practice domains' of multi-level environmental governance (Gümüsay et al., 2020).

2.5 Processing Change : Material and Temporal Realities

Institutional scholarship has a common preoccupation with change (Jupille & Caporaso, 2022; Scott, 2014). On the one hand, this reflects the dynamism and complexity associated with modern society and the changing directions that institutional-organisational arrangements need to make to face up to globally scaled social-environmental change (Gümüsay et al., 2020; Kolinjivadi et al., 2020). On the other hand, a swath of scholarship looks at the persistence of institutions - as a core attribute - alongside an established concern with time (Jupille & Caporaso, 2022; Mutch, 2018).

[7] 'Environmental' is used here to refer to contextual challenges of either a social or environmental nature.

Adopting a processual perspective of institutional workings, involving enduring social participation, additionally establishes a material concern with place, while facilitating a critical engagement with dynamic configurations of spatio-temporal rhythms as potential catalysts of ongoing change.

2.5.1 ***Processual Change***

A processual perspective sees institutions as dynamic processes in a constant flow of becoming (Langley et al., 2013; Reinecke & Lawrence, 2023; Steele, 2021; Weik, 2019). Consistent with an IL approach, the process perspective resists 'hard' structure-agency dualisms, alongside the reification of institutions, by recognising the inherent fluidity of their temporalities. Weik (2019) specifically likens the omnipresent pace of contemporary institutions to the perennial flow of a river, involving ongoing processes of stabilization associated 'with evolving and enduring meanings, prescriptions and forms of participation'. From a process view, participation involves the 'myriad of individual and collective actions necessary to keep a process on track…even if that involves improvisation and a changing cast of characters' over time (Lok & De Rond, 2013). Meanwhile, institutional meanings retain their value to participating actors in the present, while anticipating future states and being informed by past events (Meyer et al., 2021). An ongoing engagement in processes of constant evolution, rather than as alternating states of stability versus change, thereby distinguishes institutions from other social processes through their very persistence (Reinecke & Lawrence, 2023).

Within this continuum, institutions are otherwise distinguished by a characteristic temporal patterning of events - manifest in distinctive rhythms - stretching back in time and towards the future (Reinecke & Lawrence, 2023). Effectively, rhythms allow an otherwise indivisible continuous flow of time and experience to be navigated and comprehended as meaningful social processes (Bluedorn & Standifer, 2004; Reinecke & Lawrence, 2023). In this way rhythms may act as key 'orientating devices' with which to compare, contrast and connect seemingly detached processes in meaningful ways. And yet, in spite of the meaning of some institutions being essentially established and upheld by unique rhythms, such as election cycles to political democracy, there has been limited engagement with rhythms as temporal phenomena of significance within institutional scholarship (Reinecke & Lawrence, 2023). Key contributions to theory have originated from within organisation studies, (Ancona & Chong, 1992; Ancona et al., 2001; Bluedorn & Standifer, 2006; Langley et al., 2013; Reinecke & Ansari, 2015; Weik, 2019).

Drawing on Barbara Adam's 'timescapes' to capture the temporal features of individual and shared activities and 'interactions of organisms and matter' (Adam, 1998, p. 11), Bluedorn attributes a formative 'temporal imagination' to both individuals and groups composed of the cultural milieus in which they are immersed (Bluedorn & Standifer, 2006). As timescapes emphasise the rhythms, timings and tempos of social activities and interactions alongside their changes and contingencies, the temporal imagination represents the ability of participants to perceive and understand their own timescapes within broader temporal and social contexts (Bluedorn & Standifer, 2004). Since time is understood as both abstracted mechanistic linear clock

time as well as ‘natural’ cyclical time - both modes require reconciling within temporal imaginations. As Wiber (2014) notes, linear time is typically associated with science, regulatory law, progress and government (within western cultures), while cyclical time is more ubiquitously synonymous with rural livelihoods, seasonality, lifecycles and ecosystems worldwide. Consequently, we can see how rural grassroot organisations, in being ‘naturally’ disposed to cyclical time, might be temporally conflicted with the activities of central and local governments.

Applying Bluedorn’s concept to the experience of seasons in the current research, we can conceive how the temporal imaginations of participants could guide the social co-ordination of seasonal practices, as cultural rhythms, while accounting for broader climatic variability through changes in seasonal timing and tempos. Moreover, an accruing temporal imagination would presumably, over a period, be able to detect any conflict with the situated lived experience (and inherent variability) of changing seasonal cycles and associated conditions. Group dynamics (informed by a suite of uniquely assembled temporal imaginations) could consequently influence the ways in which a local collective might address practiced approaches to time and their resulting timescapes - including in their relations to external pacers (Bluedorn & Standifer, 2004).

More recently, Reinecke and (Reinecke & Lawrence, 2023) have introduced ‘temporal expectancies’ to represent the taken-for-granted rhythmic patterns of social life that legitimate particular institutions (and institutional logics) by temporal behaviours, such as adherence to the conventional academic year. Embedded in shared values and authority structures, actors comply with conventional norms and rules through their ongoing participation. At the same time, the timings of the educational school year, in temperate Europe at least, were originally co-ordinated to avoid conflict with the labour requirements of the summer harvesting season. In this synchronization of early schooling with traditional farming cycles, we can see how past events can continue to encode current prescriptions in the stabilization of core institutions, in spite of evolving circumstances (Hernes & Schultz, 2020; Reinecke & Lawrence, 2023). Likewise, the behaviours and beliefs expected of participants can include an awareness, or integration, of the future - as is common to many non-western traditional indigenous world views, including *Mātauranga Māori.* In contrast, the institution of capitalism, is almost exclusively orientated towards short-term performance outcomes, with a limited concern for future patterning of events or historic recourse (Reinecke & Lawrence, 2023).

Within the present, participation is practically co-ordinated with institutional rhythms through process of entrainment. Originating as an innate chronobiological adaptation to altered environmental states, entrainment has been adopted as a temporal mechanism within the social sciences and imbued with human agency (Reinecke & Lawrence, 2023; Shipp & Richardson, 2021). Advanced within organisational studies, notably by Deborah Ancona, (1992; 2001) entrainment herein involves strategic adjustments in practical behaviours in order to synch the endogenous rhythms of an organisation. The aspired ‘harmonics’ indicate optimal organisational performance and endurance. Often working across institutions-organisations to achieve beneficial outcomes, entrainment invokes a relational basis of organisational temporality, as well as being synonymous with social agency and the aligned concepts of institutional work and entrepreneurship (Lawrence

et al., 2009). With actors tactically shaping process dynamics towards improvement, entrainment is recognised as a fundamental mechanism by which many institutions may endure through advantageous adaptations (Ancona & Chong, 1992; Bluedorn & Standifer, 2004; Lockie & Wong in Boström & Davidson, 2018; Reinecke & Lawrence, 2023).

Entrainment can help understand the stabilization of operations within diverse organisations, from fledgling non-profit groups to established state agencies. Attempts at temporal co-ordination across institutions and stakeholders within a field might involve negotiations and transpositions of rhythms and relationships with the past, present and/or future (Reinecke & Lawrence, 2023). Entrainment is likewise invoked for aligning organisations-institutions with external environmental 'pacers' such as the phenological rhythms of plant propagation to horticultural practices. Successful synchronisation to external 'zeitgebers' (Aschoff, 1979 from Ancona & Chong, 1992) is critically reliant on adept baseline monitoring of the external environment by temporally attuned agents, that are also cognisant of the relative interdependencies of organisational processes (Shipp & Richardson, 2021). To this end, the changing temporalities of global climates may challenge the degree to which actors, participating across multiple affected fields, are able to manipulate timings in order to shape institutions for the future (Howard-Grenville & Lahneman, 2021; Reinecke & Lawrence, 2023).

2.5.2 ***Substantiating Social Spaces***

In addressing institutional dynamics, there is an impetus to study local manifestations of institutions and their culturally premised material aspects through richly textured contextual accounts (Friedland, 2009, 2013; Jones & Massa, 2013; Weik, 2019). Not, according to Weik, because they offer local interpretations, but because the 'visceral', embodied experience of social processes provide the 'substance' from which subsequent institutional abstractions, including societal-level logics may be derived (Weik, 2019).

For many institutionalists, this means shifting the emphasis to the material traces of social structures – the physical settings, tools and resources that affect what people do – from previous tendencies to focus on cognition or how the ways people think affect what they do (Drori & Preminger inBoxenbaum et al., 2018; Carlile et al., 2013; Dale et al., 2018; Friedland, 2009; Meyer et al., 2013). For these scholars, 'the cognitive bias in institutional theory casts institutions as malleable, prone to episodic fads and fashions', whereas 'materiality illuminates why some ideas persist in the face of competition and environmental shifts', (Jones & Massa, 2013, p. 1127). From their architectural exemplar of a modern-day temple, Jones and Massa go on to observe that 'the instantiation of ideas is central not only to their durability, but also to the social relations that form a community and underpin institutions' and thus invoking a material, relational sense of place. Likewise, Drori & Preminger (in Dale et al., 2018, p. 105) summon a Lefebvrian reading of space 'not only as a social product, but as an *institutional sphere'* involving assemblages of social actors in unique configurations, while continuing to draw on institutional logics, sensemaking, enactment and actorhood 'as social devices for the scripting and use of space'.

Institutional theory has hitherto engaged more fundamentally with spatiality in situating institutional fields within uniquely populated social spaces, (Fligstein, 2012). Organisational scholarship is increasingly linked with places as culturally invested spaces, from a Canadian social housing project, (Lawrence & Dover, 2015) to provincial Jesuit accounting practices in Sicily, (Quattrone, 2015). Fields can therefore be created around an issue as well as a set of products or services (Hoffman, 1999). Latterly, the geographical concept of place has been recognised as embodying 'many of the issues connected with [organisational] field level theories' most notably 'in representing a governance order…involving politics and power' (Ponte & Pesci, 2022). As Scott illustrates, the field of environmental protection [conservation] joins participants from selected industries, governmental agencies and environmental activists as each group attempts to influence the others over time (Scott, 2014, p. 224). Consequently, institutional fields are seen to bridge organisations and society in the study of community change (Scott, 2014). Concurrently, the inherent complexity manifest in multiple meanings, values, beliefs and symbols uniquely attributed to places by relations of individuals and groups is not inconsistent with a culturally premised situational institutional logics perspective (Hermelingmeier et al., 2023; Ponte & Pesci, 2022).

For Lefebvre, his dialectic triad, or 'trialectic' of socially produced space has a material organisational focus, whereby, 'social relations…have no real existence save in and through space' (Lefebvre et al., 1999, p. 404). Involving power-laden enactments of coercion, resistance and struggles within the everyday, social organisation is ultimately understood through Lefebvre as a highly politicised 'processual and contested spatial phenomenon' - suggestive of both transformation and resistance (Beyes in Dale et al., 2018, p. 34). Founded on his own Marxist critique of the capitalist urban system, Lefebvre tenders 'dissent, resistance and subversion' as latent mechanisms of radical self-organizing agencies that run counter to 'established frames'. Lefebvre's spatial politics are thus predicated on a processual, heterogeneous and contested nature of space production specifically attuned to alternative and transient spaces of organisation and *autogestion*[8] (Beyes in Dale et al., 2018, pp. 39-40); 'at once homogenous and divided, at once unified and fragmented' (Lefebvre, 1991, p. 306).

As an extension of his prior critique on everyday life, Lefebvre's production of space was equally concerned with time. So that, in tracing the 'trialectic' composition of his conceived (planned), perceived (representational) and lived (experienced) space, there is an inextricable engagement with the everyday organizing of the social (Beyes in Dale et al., 2018). Prior to the 'spatial turn'[9] within social science more generally, the concept of space had been largely foreshadowed within organisation studies by a preoccupation with physical time (Omidvar et al., 2022; Wright et al., 2023). Lefebvre's notion of time and space as socially co-constitutive was consequently a profound elaboration alongside processual approaches to place: 'when seen as an ongoing

[8] *Autogestion* meaning 'self-organisation' from Lefebvre's original text

[9] The 'spatial turn' refers to a paradigm shift in thinking perspectives that occurred within the humanities and social sciences in the late 1980's by which to approach and better understand social interactions and cultures.

emerging and lived property of social life', rather than a material arrangement or backdrop, 'then space of and in itself becomes a temporal concept' (Omidvar et al., 2022, p. 2). Resonant with social geographical accounts of dynamic processual relational time-spaces covered in Section 2.2 and 2.3, the social confluence of time and place was critically accounted for by Lefebvre in his everyday rhythms. 'Every rhythm implies the relation of a time with space, a localised time, or, if one wishes, a temporalized place' (Lefebvre, 2004, p. 96(1986)).

2.5.3 ***Temporalising Social Spaces***

Lefebvre's subsequent Rhythmanalysis project (with Regulier) was an ambitious sketch theory/method aimed at capturing and interrogating the ubiquity and spectrum of life's rhythms across disciplines and scales. Involving intersections of cosmological, bio-physical and societal rhythms, a central tenet of Lefebvre's rhythmanalysis rests in the relations of temporalities as wholes: 'simply because, the [essence of the] everyday does not contain a series of time-lapses, but lies instead in their concatenation – i.e., their rhythm' (Lefebvre et al., 1999). Rhythms thereby contend a 'linear spatialisation' of time in masking the complexities of lived experience as they materialise 'in unique spatio-temporal and affective tangles' (Lyon, 2019, p. 4). As well as engaging with the embodied experience of the intuitive individual at the corporeal level and grasping the dynamism of lived experience, Lefebvre's conflictual rhythms critically account for the societal-level power struggles of the human agent (Mels, 2004, p. 10). While initially advanced by human geographers, the broader appeal of rhythms across the social sciences has seen an increasing engagement with Lefebvre's rhythmanalysis as an exploratory route to enhanced understandings of social-environmental relations; 'Approaching recurring phenomena as rhythms provides a perspective that emphasizes the dynamics of social and ecological processes and allows us to recognize them not as fundamentally separate or opposed, but as implicated in each other' (Krause, 2013, p. 24).

In seeing everyday life as traversed by 'great rhythms that are both cosmic and vital', Lefebvre and Regulier also identified the 'conflictual unity' at play between nature's cycles and the repetitions of homogenous (linear) constructions of time (Lefebvre et al., 1999, p. 5). For Lefebvre and Regulier, the repetitions of linear time denotes tedium when pitched against the allure of cyclical time in heralding 'both an advent and an event' (Lefebvre et al., 1999, p. 6) with seasonal variability being demonstrative of this phenomenon. With reference to the 'refrains' of Deleuze (Deleuze, 1994) repetition is alternatively portrayed as a dynamic process whereby rhythmic phenomena return with difference in which discontinuous instants open the way to revolution (Lyon, 2019). This is alternatively articulated by Chen with the fulfilment of a moment distinguishing the past from the future 'through inscription in its preceding form while simultaneously anticipating future returns and renewals' (Chen, 2017, p. 26). This notion of difference explains why, in spite of their regularity, no two moments, days or seasons are ever exactly the same (Ingold, 2011).

For Franz Krause, studying remote dwellers of the Kemi River in Finnish Lapland, the abilities of traditional societies to negotiate and manipulate natural and social rhythms to their mutual

benefit is due to their active participation within a rhythmic world, in which cyclical time is sustained (Krause, 2013). In this scenario, Krause sees seasonal rhythms as a coupling of social and ecological cycles, whereby humans are practically involved in the transformation (as opposed to the regulation) of their immediate worlds (Krause, 2013, p. 32). Traditional life proceeds rhythmically through people's continual attention and adjustment to rhythmical environmental processes rather than as social adaptations to natural phenomenon, whereby 'seasons' are reconceived as an emergent outcome (Krause, 2013, p. 44). This inherent disposition of rural river dwellers has also facilitated their entrainment of traditional fishing practices to the timed operations of a modern hydroelectric dam on the Kemi river (Krause, 2013).

By attending to cyclical temporalities, we can thereby see how a focus on rhythms might generate insight into a range of temporal relations across timescales, from the contemporary everyday to include a consideration of calendrical, lunar, life-cycle and somatic temporalities in the experience and organisation of social time (Edensor, 2010a, p. 1). In potentially providing a rich analysis of synchronic practices in space, Lefebvre's rhythms can equally expose the taken-for-granted in order to reveal the workings of social life and power within the everyday (Edensor, 2010a, p. 2). Contemplating the inundation of urban space with predominant everyday rhythms, Lefebvre distinguished the 'everyday' as phenomenologically co-present with, but distinct from, the quotidian 'everydayness' of the capitalist system (Beyes in Dale et al., 2018, p. 34). Consistent with his dialectic politicized thinking is the immanent potential of rhythms to generate societal change that provided a key motivation for Lefebvre's rhythmanalysis project. Indeed, this project echoed other initiatives of the time, of British geographer Nigel Thrift, for example, and his work (first with Don Parkes and subsequently with Andrew May) on Spacemakers & Entrainment (Parkes & Thrift, 1979) and 'Timespace' (May & Thrift, 2001) and later Non-representational Theory (NRT). This approach, like rhythmanalysis, is based on a post-phenomenological sensitivity to particular experiences, daily practices and daily life within place (Buser, 2014). Both endeavours are aimed at producing new understandings of social life as it unfolds, while remaining open to transdisciplinary styles of thinking (Flemsæter et al., 2019).

The work of sociologist, Stanely Blue, in his conceptual conjunction of Theodore Schatzki's social practice theory with rhythmanalysis to explore processes of institutionalisation, exemplifies this approach (Blue, 2019). In recognising institutional arrangements as reflecting the organisation of regular everyday practices, Blue posits that the conceptual power of rhythmanalysis is not limited to the temporal connections between practices, but how 'in their repetition, practices have affect across ranging types of connections in ways that matter for the ongoing establishment, maintenance and decline of institutions' (Blue, 2019). Consistent with Lefebvre's rhythms and drawing on Parkes & Thrift's notion of entrainment, practices are defined by Blue (from Schatzki, 1996) as 'discrete, inherently open spatio-temporal entities' that exhibit forms of regularity (as well as difference) through their repeated performance as opposed to a 'routine' enactment (Blue, 2019). Lefebvre's eurhythmic (harmonic) and arrhythmic (discordant) compositions of polyrhythms are tendered by Blue, alongside processes of entrainment, as practical examples of institutional self-organisation or *autogestion*.

Here then, in Blue's work, some of the conceptual strands of this thesis converge. Blue invokes the inherent rhythmicity of nexuses of practices as an enhanced route to understanding the constitution, co-ordination and reproduction of large social phenomena and institutions alongside mechanisms of change. Blue's conceptual conjunction additionally offers a prospective route to engaging rhythmanalysis alongside an institutional logics perspective, via social practice theory - with its own claims on elucidating societal processes of transformative change and stability across scales in the context of changing climates (Shove, 2010; 2022).

For Edensor, and other geographers working with Lefebvre's rhythms, the interludes afforded through temporal repetitions simultaneously provide for improvisation, creative innovation and adaptation through the enactment and performance of everyday practices within a familiar inter-relational (cultural) sense of place (Edensor, 2010b; Hallam & Ingold, 2014; Harrison, 2000). In writing on geographical rhythms, Tom Mels maintains that, 'humans have always been rhythm-makers as much as place-makers' whereby our existence has contemporaneously involved a 'plurality of encounters with material rhythms corresponding to shifting social roles and meanings' (Mels, 2004, p. 3 & 7). Through the rhythmic relations of routines and repetition with emergence and difference, we can potentially appreciate the making and remaking of social practices according to the seasons as well as adaptations over longer periods of time, in giving effect to the societal transformation that was the crucible of Lefebvre's work. Within a broadening scope of rhythmanalysis, we are given extended creative licence to engage with rhythms as a pervasive force and critical concept with which to map larger socio-political developments in modernity (Henriques et al., 2014, p. 14). This potential of rhythmanalysis as a rich reservoir of ideas for critical empirical work has consequently resulted a proliferation of research projects in recent times.

Although dominated by urban case studies, as the familiar terrain of Lefebvre's conceptualisations, rural examples of rhythmanalyses are expanding, including recent explorations of seasonal canal and mountain tourism in Norway (Flemsæter et al., 2019; Flemsæter et al., 2020); amphibious wet-land rhythms in Europe, (Krause, 2022); shifting sands in the Maldives (Kothari & Arnall, 2020); outdoor recreation in Denmark (Johansen et al., 2021); surfed waves in Wales (Anderson, 2012) and lunar tidal estuaries worldwide (Jones, 2011). Drawing on the collaborative work of practice theorist Elizabeth Shove out of Lancaster University (UK), Gordon Walker and colleagues have additionally covered case studies specifically looking at environmental rhythms in relation to patterns of human consumption and practice in the context of socio-environmental change (Oppermann et al., 2020; Walker et al., 2022). Meanwhile (Reinekoski et al., 2023) have recently deployed Lefebvre's rhythmanalysis to review the political resistance to climate change initiatives within local city governance municipalities in Finland and thereby empirically exploring the social-political purchase of Lefebvre's rhythms.

2.6 Accommodating Change : Systems, Strategy & Innovation

Research on climate risk governance has increasingly focused on the institutional-organisational arrangements necessary to make societies resilient to the impacts of environmental change.

Encompassing interim localised adaptive response measures, through to longer-term transformative strategies, social resilience is widely embraced as an enduring attribute in the governance of complex dynamic social-ecological systems that are concurrently being undermined by global environmental change. While adaptation was originally modelled on the functional dynamics of localised ecological systems, social transformation involves processes of structural reformations that depend on organised distributions of human agency and innovation at pivotal junctures. In this context, the way people routinely experience and practice seasonal change offers insights into their adaptability as a form of locally embedded community resilience that may additionally underscore broader mechanisms of societal transformation in the face of changing climates.

2.6.1 Social-Ecological Adaptations

In its simplest terms, adaptation is conceived as a dynamic relational process response to accommodate change (Pelling, 2011). The ways in which traditional societies have adapted to environmental perturbations over time is comparable with species adaptations conceived within ecological systems science as part of naturalised evolutionary processes seeking to maintain stability (Armitage, 2005). To take seasonal behaviour as a focus, nature abounds with examples of how plants and animals have 'evolved exquisite sensitivities and adaptations to the [changing] seasons' (Kreitzman & Foster, 2010). Alongside classic examples of international bird migrations and mammalian hibernations by which to habitually avoid or weather the colder months, plants respond through physiological adaptations to seasons in the relative timings of their flowering-seeding, autumnal leaf fall (senescence) and associated periods of dormancy. Although seasonally (periodically) expressed, these are examples of evolutionary adaptations involving heritable traits (Kreitzman & Foster, 2010). Other types of evolutionary adaptations involve permanent morphological/structural changes or physiological adaptations in both plants and animals that allow them to inhabit niche environments. Biologically, the 'rationale' for such adaptations is ultimately based on optimising energy for survival and reproduction (Kreitzman & Foster, 2010).

By extension, a conditional binding to seasonal rhythms through traditional pursuits of harvesting, hunting and fishing mean that human communities (in both developed and developing nations) are attuned to changing patterns of weather and climate by which to adjust their practices in the pursuit of subsistence, profit or recreation. And while the highly modified environments of westernised conurbations increasingly seek to buffer the natural variability in seasons, through technological advances (such as air conditioned offices and transportation) seasonal distinctions otherwise persist ubiquitously through financial, marketing, school and sporting terms being strategically reconciled with appropriate conditions or windows of opportunity (Hitchin, 2021; Whitehouse & Lanman, 2014).

Alongside species extinctions, whereby plants and animals have been pushed beyond their limits of survival by (episodic or permanent) environmental change, there are increasing examples of species that may already be adapting to changing climates, typically in extended or shifting distributional ranges or seasonal timings. The earlier upstream spawning migrations (by the order

of two weeks) observed in both Pink and Sockeye salmon species over recent decades are illustrative (Crozier et al., 2011; Kovach et al., 2012).

When humans are considered integral to the same system, manifest in complex interdependencies and relations, eve discrete adaptations in 'nature' have potential bearing on society (Ingold, 2000). Accordingly, the contemporary conception of a social-ecological system (SES) maintains an integrated humans-in-nature perspective of human-environment relations, in which adaptive capacity is fundamentally grounded in systemic resilience (Folke et al., 2010; Gunderson & Holling, 2002). Resilience is the definition of a system's comprehensive ability to anticipate and accommodate change and disturbance while maintaining its core functional identity (Folke et al., 2010; Walker et al., 2004). In a community of place, social resilience is construed as a coherent capacity to thrive in the face of adversity and uncertainty (Berkes & Ross, 2016).

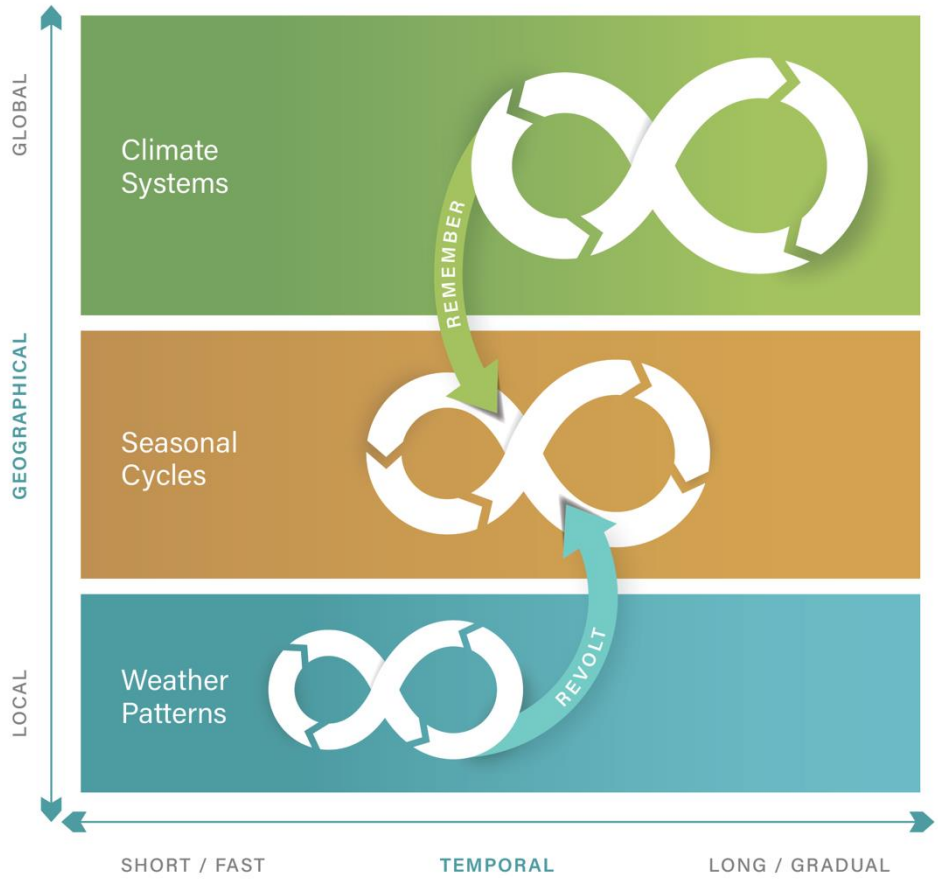
In the context of rapid environmental change, the local experience of changing seasons - conceived as recurring iterative place-based response to changing climates - is tendered as a vital reference to climate adaptation as well as a primary indicator of resilience. Within ANZ, the potential of situated knowledges to inform adaptation strategies to contemporary issues of environmental change is already recognised in the recent interest of the customary seasonal knowledges of local *iwi* (*Māori*) (Hikuroa, 2017; King et al., 2008). But how might diverse practices and understandings of seasons influence adaptation and innovation potentials within and between contemporary multi-cultural communities and how may this knowledge be valued and shared within the political framings and power-geometries of modern societies?

Conceptually, one body of adaptation and resilience theories (as notably championed by Gunderson & Holling, 2002) draw from ecological principles in the modelling of nested adaptive cycles within a panarchy arrangement to represent the complex dynamics of SESs and their cross-scalar relations in space and time (Chaffin & Gunderson, 2016). As a metaphor for dynamic change, the 'adaptive cycle' captures the broadly prescribed fluctuations between phases of slow growth and stability (exploitation and conservation) with rapid change and development (release and reorganisation) in a system responding to environmental change and establishing a new stasis (Chaffin & Gunderson, 2016). The related 'panarchy' concept depicts the nested hierarchies of multiple cycles exerting influences between embedded scales of a larger SES and the challenges associated with maintaining resilience (McGowan & Westley, 2021). Returning to seasonal cycles, we can see how their manifestation in daily weather patterns, while being subject to broader climate systems, would appear in a nested panarchy arrangement across scales of space and time (*Figure **1***). In highlighting the complex cross-scalar connections involved in human-environment relations, the panarchy concept helps understand resilience at the community and other societal levels (Berkes & Ross, 2016).

While effectively advancing a systems perspective of adaptation, critics have argued that the adaptive cycle and associated panarchy concepts inadequately account for social systems in their analogous representation with ecosystem functionality (Barnes et al., 2017; Cleaver & Whaley,

2018; Cote & Nightingale, 2012; Fabinyi et al., 2014). A key concern relates to the power asymmetries inherent within alternative social systems potentially introducing biases into adaptation pathways, alongside the deviances of conflicted political agendas (Barnes et al., 2017; Blythe et al., 2018). When pitched against the strategic interventions of centralised governance, the focal interests, concerns, values and agendas of local communities highlight this issue as a significant potential barrier to the legitimisation of planned adaptations (Moser & Ekstrom, 2010).

Figure 1 – Showing a reworked conceptualisation of a nested adaptive cycle applying to interactive levels of Climate, Seasons and Weather across scales.



2.6.2 Adaptive Governance : Strategy & Intervention

Strategic adaptations raise political questions of what is being adapted, at what scale and when, for whose advantage and, relatedly, how success might be attributed and framed within specific settings (Barnes et al., 2017; Helfgott, 2018). Consequently, there is a complex landscape of resilience and adaptive governance scholarship evolving iteratively[10] (Barnes et al., 2017). One line of research has focused on the role of institutions in facilitating resilience and adaptation,

[10] While generating theoretical complexity, some argue that alternative disciplinary theories of adaptation contribute creatively to shared discourse around the common resolution of grand challenges – much in the scheme of transformational resilience.

while accommodating the inherent diversity of interests and values reflected in heterogeneous societies (Amaru & Chhetri, 2013; Barnes et al., 2017; Cleaver & de Koning, 2015). By imprinting common interests and values, institutions (and their logics) build communal capacities to adapt to unprecedented challenges within familiar contexts. The unique skills, experience, creativity and knowledges within social worlds, drawn on and modified by networked groups of agents, is often associated with enhanced resilience (and reduced vulnerability) of communities to a range of external factors, including changing climates (Berkes & Ross, 2013).

In this vein, adaptation in human systems has been defined by the IPCC (2023) as 'the process of adjustment to actual or expected climate and its effects in order to moderate harm or take advantage of beneficial opportunities' (IPCC, 2023). In this social process, institutions can mobilise and activate human capacities to catalyse positive outcomes at the community level. Here, a distinction can be made between adaptation as an interim 'coping' strategy to localised episodes of environmental change and a more long-term strategic reorientation towards social transformation in response to ongoing and incremental change (Davoudi et al., 2013; White & O'Hare, 2014). Representing the revolutionary realm of the resilience spectrum, transformative adaptation involves a fundamental paradigm shift in the structural organisation of social systems responding to significant challenges. In ecological terms, transformation results from the breaching of a critical threshold, representing the limit/capacity of a broader system to recover from a substantial external challenge (Clifford et al., 2020).

As an organising strategy that capacitates environmental managers and policy decision makers to confront variable degrees of uncertainty inherent to complex dynamic SESs, adaptive governance is intrinsically related to building system resilience (Chaffin Brian et al., 2014; Dietz, 2003; Folke et al., 2005). The dynamic interplay between persistence, adaptation and transformation across multiple scales and levels is at the heart of resilience thinking in confronting scenarios of abrupt or sustained change (Folke et al., 2010). Following an institutional perspective of social resilience, organisations and networked individuals are uniquely capacitated to pro-actively adapt to changing circumstances at an operational level in the short-medium term through a reflexive process of practical experimentation and innovation. Institutional arrangements simultaneously govern the enabling or opposing conditions for organisations subject to ongoing reformations to collectively transform through periods of sustained or incremental challenges (Howard-Grenville et al., 2014; Nyberg et al., 2022).

But while an anticipatory progressive governance style is implicit to overseeing the long-term evolutionary transformation processes, many established agencies are constrained by the conservativisms of existing structures, disposed to reacting to disasters as they unfold (Asadzadeh et al., 2023; Croxatto et al., 2020; Hogendoorn et al., 2021). Some ostensibly adaptive statutory planning programmes are otherwise restricted to preventative measures that reduce physical exposure to established climate risks at the expense of fostering the local innovation and associated resilience of constituencies. Consider the widespread strategy of government organisations to engineer solutions in response to physical environmental threats and the defensive logic it espouses, which detaches SES use from SES function, by prioritising efficiency

over resilience (see e.g., Brown, 2021; Garmestani et al., 2020; Penn et al., 2016). This often sees adaptive governance confounded with models of 'good governance' (Chaffin & Gunderson, 2016; Fabinyi et al., 2014) and accordingly, many existing adaptive planning strategies often reflect the limitations of current governance structures, while critically lacking in future development (and prospects) for local communities (Bruckmeier, 2016). These apparent shortcomings expose the underlying institutional tensions in operationalising systemic resilience through continuity/persistence versus reformation and change within variable contexts (Gupta et al., 2010; Pahl-Wostl et al., 2012).

Here, the panarchy system concept is invoked to illustrate the dynamic synergies involved in oscillations of predictable change (stability) and unpredictable change (instability) within socially bound complex SESs that include mandated governance systems (Berkes & Ross, 2016; Chaffin & Gunderson, 2016; Pelling & Manuel-Navarrete, 2011). As a conceptual framework, panarchy is specifically deployed to represent the complexity of evolutionary processes involved in transforming an SES responding to significant social-environmental change (Gunderson & Holling, 2002). By maintaining a focus on process, we can thus appreciate that planning for the deliberate transformation of complex SESs requires moving beyond single strategies and practices towards a continuum of developing 'transformative literacy, agency and governance' in many forms and within many contexts (Bruckmeier, 2019, p. 325). Necessitating interdisciplinary and participatory approaches in both policy and practice, the role and function of transformative governance structures is compelled to flex strategically from 'sovereign control and regulation' to 'enable and facilitate' (Brown, 2021; Wardekker, 2021). Here, the distributed polycentric governance arrangements conceived by Elinor & Vincent Ostrom (1990-2010) in the rationalised resource allocations of common goods involving public, private and civil society is recalled alongside deliberative governance modes (Fleuß, 2023; Thiel, 2023).

2.6.3 Transformative Agencies : Opportunity & Innovation

Implicit within transformative modes of adaptive governance is the agency attributed to local communities to proactively engage in strategic planning and self-governance through avenues of organised collective action (Berkes & Ross, 2016; Magis, 2010). Local self-governing institutions already have an established association with the sustainable local management of natural common pool resources (Dietz, 2003; Ostrom, 2010). But, as a growing number of empirical studies signal the importance of informal networks for building (a broader definition of) resilience, there is a recognised need for flexible policy frameworks to accommodate customary structures and their associated agencies in the implementation of transformative strategies (Agrawal, 2010; Amaru & Chhetri, 2013; Wamsler & Brink, 2015) .

The extant grassroot organisations and informal groups that typify many rural communities are strategically positioned to both monitor and respond to social-environmental change as these changes manifest within their everyday activities and practices. A body of studies discuss local-scale communities addressing incremental changes through incremental adaptations, involving practical experimentation and innovation (Berkes & Ross, 2016; Bremer et al., 2024). Many

adaptation strategies (and associated policy interventions) are focused on what can be achieved locally as a result. Indeed, in many rural communities, where government resources may be particularly limited, local organisations are already intentionally involved in implementing or strengthening interim adaptation strategies (Amaru & Chhetri, 2013). In some cases, adaptation is achieved as a secondary benefit to the primary activities of a particular interest group, such as through ecological restoration or water allocation projects (Loos et al., 2023; Wamsler & Brink, 2015).

Cross-scale social networks (i.e. communities of practice) then provide opportunities for contributing knowledge of local adaptations to affiliated groups that may simultaneously inspire collaborations of future innovations and experimentation – including across higher governance levels, or by transferring insights to other localities. Consider, for example, how the lessons learned by a resident Coastcare group focused on a particular beach might be transferred to groups elsewhere on the Coromandel, and beyond, through the shared networks and organisation of field-scale operations. At a community level, social resilience and an associated capacity to learn and transform, is strongly influenced by the actions and interactions of its constituent/ component organisations being nested within a panarchy of connected scales (Berkes & Ross, 2016). Accordingly, exemplars of locally co-ordinated adaptation efforts can be constrained or even undermined by counter policies (practices) circulating within higher level systems of governance (regional, national or international). In the absence of governing support from higher levels, local initiatives can lack the necessary resources and political legitimacy to bring about systemic change, which may in turn compromise social cohesion (Helfgott, 2018). Chaffin & Gunderson observe that these underlying tensions are brought to light in contexts of environmental crisis/shocks or political tipping points (Chaffin & Gunderson, 2016).

At such critical junctures, transformational adaptation may be commandeered through the agency of innovative leadership capitalising on strategic windows of opportunity (Berkes & Ross, 2016; Chaffin & Gunderson, 2016; McGowan & Westley, 2021). Here, scholars draw from the inherent agencies of individuals and groups to self-organize under the leadership of vested individuals. A pertinent example from Sweden reports on environmental interest groups orchestrating structural changes in governance systems to effect a strategic redirection of a coastal wetland in ecological crisis – Kristianstads Vattenrike Biosphere Reserve (Olsson et al., 2006). There, a charismatic local leader was instrumental in legitimising the ecologically significant wetland landscape as a social outlay within higher levels of governance, involving investment in networks of local specialist interest groups through the creation of a strategic bridging organisation. This case is often cited as emblematic of adaptive governance in its bridging of levels to create a new inclusive polycentric arrangement centred on equitable stakeholder participation (Berkes & Ross, 2016; Olsson et al., 2006).

In another scenario from the Gulf of Bothnia in Sweden, a Coastal Ring Organisation (CRO) was conceived by resident locals networking in objection to an EU conservation statute (Natura 2000) being designated on their homelands (Sandström, 2008). This case is discussed by Cleaver & Whaley as an example of institutional bricolage, since the CRO was essentially reformed from a

customary residential organisation. In this case, transformation of the SES was socially motivated to elevate traditional land stewardship over external management controls. To this end, the national legislative framework was tactically navigated by skilled members of the CRO to advance its legitimisation (and influence) across extended networks, that included national universities and international NGOs (Cleaver & Whaley, 2018). In this way, key players were instrumental in exploiting the affordances of political windows of opportunity to advance their stand against an international intervention by forging an alternative trajectory for the SES.

While incentivised by different triggers, both examples from Sweden – in representing a highly formalised established governance system - involved substantial cross-level social reformations in order to achieve positive outcomes for localised SESs (Berkes & Ross, 2016; Olsson et al., 2006). Initially, both cases required the leadership of key 'system entrepreneurs' acting as 'brokers' in the linking of ideas to resources alongside the priming of social networks for critical windows of opportunity (Antadze & McGowan, 2017; Westley et al., 2013). Through accompanying shifts in enabling authority and resource flows, Westley reasons that SES can be capacitated to foster innovative solutions to ongoing change (Westley et al., 2013). As such, processes of transformation imply a critical engagement with the temporal co-ordinations of human-environment systems (Bremer et al., 2024; Gan & Tsing, 2018).

Thus, the inherent plurality and plasticity of contemporary institutional arrangements are seen to offer multiple openings to inciting transformative change (Frick-Trzebitzky et al., 2017). But in the relative capacities of actors to creatively access and mobilize resources towards particular ends, Cleaver and Whaley caution that institutional transformation will not always produce equitable benefits (Cleaver & Whaley, 2018). Emphasising the contingencies of human agency and associated limits to social action, a socially informed view of systemic resilience likewise suggests an emergent social process through which change is negotiated or resisted within complex social-environmental situations that make up everyday experiences (Brown, 2021; Ungar, 2021). At the same time, there is as much acumen involved in the recognition and navigation of key windows of opportunity within which to transform an SES as there is in creating them (Folke et al., 2010; Westley et al., 2013). The failure of some SESs to transform, through adept social experimentation and learning at key junctures, is likely to result from this lack of critical insight and will typically manifest in maladaptive strategies over time (Olsson et al., 2006). This includes in the ability of local government to learn from unexpected 'disaster' events as much as recover from them (Wardekker, 2021).

An ANZ based study of rural SESs found that a collective sense of place additionally played an important role in overcoming socio-economic and political barriers during processes of transformation. Particularly in the context of the iconic Fjordlands of ANZ's South Island, Chappin et al (2012) discovered a common 'stewardship' logic towards local landscapes from amongst a diverse range of stakeholders, which critically enabled them to take a long-term perspective in the collective planning of SES interventions. In each of the four case studies, the transformation process was locally generated and co-ordinated through a polycentric process of governance, steered by key leadership (Chapin et al., 2012). Alternatively construed as a 'place based alliance',

high quality (versus high-level) leadership is increasingly recognised as a driving force of governance collaborations involved in SES transformations. Furthermore, innovations in governance and planning are conceived as the function of place-based and issue-driven practices, rather than adhering to the generic principles of 'best practice' or 'good governance' (Wolfram, 2016).

2.6.4 Multisystemic Resilience Thinking

With much uncertainty remaining around the social determination of SESs, the adaptive panarchy system model offers, at very least, a conceptual framework by which to comprehend the dynamic interdependencies of complex social-biophysical relations across scales of space and time (Berkes & Ross, 2016; Chaffin & Gunderson, 2016; Folke et al., 2010). We can also appreciate how small scale social interventions - likely involving informal shadow organisational networks - may spark the potential for systemic transformation at larger scales. But a truly holistic multisystemic resilience perspective additionally requires thinking beyond specific ecological or social dimensions (Brown, 2021). It is on this premise that locally scaled ongoing adaptations to changing seasons, including in response to unseasonal biophysical phenomena, could contribute local resilience to changing climates, while underscoring opportunities for social transformation triggered by extreme events (as potential windows of opportunity). It is with this specific dimension of resilience that this thesis engages. As a manifestation of larger patterns of climate cycles, seasons contribute to a multisystemic perspective of an SES, while concurrently spanning social and ecological systems across time and space. A focused engagement with the seasonal adaptations of local organisations may thereby offer promising avenues through which to explore a potential capacity for socially generated transformations – when confronted with multisystemic evidence of environmental change – within common terms of reference embodied by a relational sense of place. In this way, we might link understandings of community resilience with dynamic concepts of place and organisations - as emerging from continuous processes (Brown, 2021).

At an institutional level, some scholars advocate for process-based explanations of dynamic institutional development and change as constitutive of complex multilevel governance scenarios involving state, private and civil society actors in climate adaptation (Dryzek & Pickering, 2017; Patterson et al., 2019). Within interactive framings of governance, the traditional distinctions between institutional typologies, based on historical, rational choice and sociological orientations become blurred, alongside their associated 'logics' (of history, consequence and appropriateness) in navigating the relative forces of endogenous and exogenous change. Patterson's suggestion that reflexive 'ad hoc' approaches to adaptive governance may productively contribute to institutional development (and resilience) in difficult circumstances, additionally borrows from an institutional bricolage approach advanced through critical institutionalism, notably by Cleaver & de Kooning (2015). Drawing on a systems-theoretical perspective, Barbehön, promotes an experimental approach to effecting transformative governance through deliberative policy designs that are temporally aligned with accelerating social-environmental change over the inherent conservatisms and associated time-lags of pursuing resilience (Barbehön, 2022).

For other theorists, it is the sharing of interdisciplinary knowledges at the intersection of complex human-environment systems that is fundamental to understanding and navigating processes of change and transformative adaptation (Bruckmeier, 2016; Fabinyi et al., 2014; McGowan & Westley, 2021). In following an interdisciplinary approach, we can draw on relational theories of material practices across space and time to better understand the expanded social dynamics of processes of human-environmental endurance and change - including as a result of policy interventions (Shove, 2022b). As an alternative approach to processes of institutionalism, we can engage with institutional logics to explore the situational contexts of emergent hybrid social arrangements associated with processes of transformation - alongside the inherent shifts in values and meaning resulting from the formalisation of adapted practices and policies (Gümüsay et al., 2020; Shove, 2022a, 2022b). Here, political systems and associated policy cycles are ultimately construed as cyclical processes that draw from past experience in order to make plans for the future and although perpetuated by conservatisms are equally open to opportunity and change (Barbehön, 2022).

In his 2015 critical review of emerging transformation concepts - including those generated by social practice theory alongside socio-technical systems and social human-environment systems - Giuseppe Feola found complex dynamic systems models widely open to interpretation and representation (Feola, 2015). In all models, however, the discontinuities, ruptures and thresholds associated with multi-level processes of system change are consistently perceived as emergent cycles and phases (as opposed to linear trajectories) - (Feola, 2015). Consequently, complex dynamic multisystemic models have continued to inform resilience scholarship, alongside an increasing focus on building resilience into base levels (Brown, 2021; McGowan & Westley, 2021). A multi-level governance perspective equally provides opportunities for adaptation 'breakthroughs' involving experimentation and innovation. And on this basis, we can conceptually draw parallels with processes of transformation, conceived through Lefebvre's politically-sensitive spatio-temporal rhythms, by understanding the contexts within which pioneering self-organisation and innovative adaptations might transcend the everyday, from which to reflexively appraise the potential for revolutionary transformation of existing systems across temporal and spatial scales (O'Brien, 2012).

2.7 Conceptual Synopsis

Having led the reader through the bodies of literature that have contributed to its framing, I summarise below the conceptual landmarks that have provided orientation to carrying out my research. As core concepts that ontologically and epistemologically bounded the research, they have likewise guided the methodological and analytical approaches taken.

2.7.1 ***Seasons in time & place***

From a starting point of understanding seasons as socially constructed frameworks, derived from the variability of annual rhythms in nature, we can appreciate how geography predicates seasonality across the globe. The human-environment relations that are implicit in the situated experience of seasons are an additional source of local variability and interpretation. Involving the

anticipation of annual seasonal transitions alongside an expectation for irregularity within this framing, seasons are seen to exhibit both constant and variable traits.

When understood, through cultural geography, as an emerging process in a constant state of becoming, dynamic relational concepts of place are likewise associated with inherent variability and conflict. It is in this context that seasons are variously known and understood, notably through the phenomenological experiences afforded to 'locals' practically engaged in the (explicit and tacit) exercise of embodied human-environment relations. As well as contributing to a mutual understanding of seasons, the collective pursuit of routine activities and practices gives meaning to organised groups - their associated networks and communities - from which a sense of place is derived, alongside its constitutive social arrangements. This situational framing of seasons is contrasted with their generic representations as fixed schedules of regulated calendar time.

Tensions between socially contrived linear clock time and 'natural' cyclical time are likewise exposed in the multiple rhythms of modern society that engage individuals on a daily basis. Here, the temporal regulation of capitalist society is pitched against the synchronic oscillations of environmental rhythms. But the routine enactment of everyday practices are linked to changing seasons and climates through a temporality of place, involving unique co-ordinations of human-environment relations in and over time. Situated seasonal knowledges are thereby framed by memories of past events in anticipation of future patterns. This explains why the global rhetoric of projecting climate change into the future is typically devoid of meaning and context for many local communities experiencing the localised effects of changing climates within the present.

*2.7.2 **Social-cultural dynamics***

With social-ecological interactions implicit within a relational conception of place that also embodies a (phenomenological) human-in-environment dwelling perspective, we also need to account for the social-cultural complexity of contemporary society and its local manifestations. From an institutional perspective, the cornerstones of social, political and economic orders are seen to provide both regulation and structure to a diverse modern society, while also being portrayed in a constant state of flux. This apparent paradox is explained by structuration theory in which the reproduction and maintenance of social orders is achieved recursively alongside progress and change, through the embedded workings of human agency across space and time. Here, organised practices (and their associated logics) present opportunities for change, within broader cultural schema. The agency attributed to unique combinations of individuals with diverse social-cultural biographies enhances opportunities for organisational innovation and change through situated practices, informed by past experience and guided by future aspirations.

On this basis, my research engages with concepts of institutional logics in offering an holistic conception of the dynamic relations operating between the micro levels actions of agents carrying out sets of practices within established macro institutional orders, through a focus on the diffusion of logics in time and place across social fields. With the hybridization and combining of logics accounting for organisational heterogeneity beyond symbolic institutional orders, logics are associated with a dynamic potential for change involving distributed forms of agency within

unique contexts and networks of social praxis. The seasonal awareness of an organisation or group is thereby mediated by unique configurations of institutional logics and the practices from which they are derived. The interinstitutional distribution of logics between levels additionally provides a dynamic connection between operational grassroot organisations with higher levels of policy and governance.

2.7.3 Processing/ Locating Change

In contemplating the persistence of core institutions in a world that is constantly changing, institutions are seen by some theorists to evolve beyond the lifespans of individual agents, through an enduring kinesis involving perpetual rhythms of meanings, prescriptions and participation. In this way, institutional rhythms may act as orientating devices to individual agents in reconciling their own uniquely experienced 'timescapes' within the temporal patterning of broader societal contexts.

Within organisation studies, the strategic co-ordination of social rhythms through a process of entrainment is traditionally related to optimising the performance and associated viability of an organisation in the context of operational challenges. It is only recently that organisational scholarship, with its core focus on productivity, has contemplated entrainment to changing environmental rhythms or 'pacers' in order to persist. At the same time, the strategic requirement for and process of entrainment is critically dependent on the adept monitoring of temporally attuned agents. In the context of rapidly changing climates, strategic organisational processes of entrainment are acutely challenged by the complexity of dynamic relations and rhythms involved with reference to both historical and future dimensions of patterns and events.

Territorial space is alternatively construed as a material manifestation of institutional processes. Within this framing, processes of institutionalism (and associated logics) are critically linked with relational theories of contested places alongside social practices. With time and space construed by Lefebvre as socially co-constitutive, their confluence as everyday rhythms also implies a practical coupling with environmental rhythms (including seasonality). Routine practices are seen as dynamic processes associated with difference (versus mundane repetition) and thereby explaining why no two moments, days or seasons are experienced exactly the same.

Consequently, it is at the intersection of social activities with more-than-human rhythms that enhanced understanding of social processes are sought. In the context of environmental governance, this includes consideration of the power distributions associated with different types of embedded agency, alongside the politics of governance and their material consequences for situated practical knowledges. Such a focus on local manifestations of institutions (logics) and their culturally premised material aspects presumes ethnographic methods to study the dynamic layered complexity of social relations that comprise a community alongside a material sense of place.

In putting rhythms at the centre of social analysis, the ambitions of Lefebvre's Rhythmanalysis to understand the inherent potential for social transformation promotes an interdisciplinary

approach to document and analyse the dynamic complexity of time and space in everyday life. With both seasons and climates variously contributing to the rhythms of social life as well as to local and global forces of social-environmental change, my research specifically engages with an interdisciplinary rhythm analytical approach.

2.7.4 Accommodating Change

The capacity in nature for species to adapt (and ultimately evolve) through environmental change provides the basis of theorising for social adaptation in response to changing climates. Rather than being construed as acquiescence, social adaptation is therefore associated with community resilience in the collective ability of a population to thrive under conditions of uncertainty and adversity.

An integrated human-in-nature framing of adaptive capacity is grounded in system resilience - depicted as complex dynamic social-ecological systems (SESs). An SES perspective renders nested cycles of adaptation within a cross-scalar panarchy arrangement. Widely critiqued for its deficit representation of social systems - most notably in the absence of power and political dimensions - the adaptive cycle (and its nested configurations) nonetheless depicts key opportunities for difference and innovation in effecting strategic responses to social-environmental challenges.

In order to accommodate the social diversity of contemporary society, many adaptive governance scholars advocate a broadly institutional approach to formulating and implementing strategic responses to social-environmental change across levels. Involving local organisations and groups as key stakeholders and innovators, the focus of much adaptation planning remains at the local level where the effects of changing climates are directly experienced. Here, locally initiated seasonal adaptations to seasonal variability are considered formative to building community resilience to changing climates. However, it is becoming increasingly apparent that the response to ongoing/incremental environmental change requires the evolutionary transformation of SESs, if not society as a whole, through systemic structural changes involving all levels.

The institutional challenges of social transformation are underlined by the inherent tensions between construing resilience as persistence versus change. Whereas a panarchy system is seen to oscillate between predictable and unpredictable change as part of an ongoing process of evolutionary transformation, many formal environmental governance institutions are inherently wired to maintain the status quo through control and regulation. Adaptive governance otherwise requires an holistic, flexible anticipatory and participatory approach that is orientated towards future developments in the context of uncertain change.

With the greatest levels of flexibility and innovation afforded to the emergent self-organizing agencies of local grassroot organisation (in responding to social-environmental challenges) the panarchy perspective elucidates how an SES can be alternatively transformed from the ground up. The conditions for transformation are therefore highly contextual, while necessarily engendering the resource inputs of higher levels of governance. An ability to recognise and act on critical windows of opportunity for transformation is likewise credited to situated, networked,

temporally aware agents and leaders. At the same time, an agents ability to draw upon and co-ordinate resources towards a strategic transformation will not necessarily generate equitable benefits across an SES. Case studies of transformed SESs in ANZ (see Chapin et al., 2012) suggest that local stewardship derived from a shared sense of place may be a factor in reconciling the otherwise opposed interests and agendas of stakeholders in adaptive planning. I will expand on this potential of local place-based stewardship within my research, alongside situated perceptions of seasonality.

The seasonal dimension of social-environmental change otherwise fosters an interdisciplinary approach at the intersection of human-environment relations in contributing an additional cycle to the multisystemic conception of SESs. In concurrently accounting for social dimensions, the holism of the institutional logics model is sympathetic to SES models. While already providing for more-than-human relations in its contextual framing, the dynamic complexity of the inter-institutional system provides for distributions of agency across levels in order to account for endogenous change. As we have seen, one of the potential routes to inciting broader societal transformation is for change and innovation to be locally generated through the routine performance of organised practices at the grassroot level. As relationally based processual system models, both SES and ILs are thereby attendant to the inherent rhythmicity of place as much as its potential for change.

2.7.5 ***Theoretical Approach***

In the process of crafting a distinct conceptual framing to my research from the core threads identified above, I engage constructs of seasonality, as a paradigm of extended human-environmental relations from within contemporary understandings of places in process. In the context of changing climates, physical seasons are seen as dynamically linking local weather patterns to global climate systems, while the rituals of seasonal calendars and agendas structure human activities and experiences in space and time the world over. Tendered as temporal frameworks spanning continents, seasons are seen to offer shared orientation to processes of social-environmental change across a range of physical and social settings. Amidst remotely modelled projections of rapid global change, the research then considers how seasonal frameworks might provide divergent communities with tangible references to local experiences of changing conditions both in and over time.

Drawing on existing theories of social practice, my inquiry is premised on the seasonal activities and experiences of rural coastal conservation networks independently responding to local manifestations of social-environmental change in the context of a strategic district-wide adaptation planning project. Involving the intersecting rhythms of social, biological and physical systems (SES) across scales, the relative capacities of voluntary grassroot conservation groups to respond to perceived imbalances, as they manifest, is based on having a routine practical engagement with their host environments. In line with the social spatial theories of Henri Lefebvre, self-organised local volunteer groups are seen here to respond to perceived imbalances in SES functions and are therefore pre-disposed to adapt to changes therein, while the roles of

local governments, as institutions of the state, include maintaining the status quo through regulated activities.

Providing a practical relational basis for distributed organisational arrangements and agencies across levels from grassroot environmental stewardship initiatives to Council policies, institutional logics are seen to reflect the diverging interests and governance agendas of contemporary communities alongside their associated sense of place. Perceived as part of an integrated dynamic SES, the ongoing adaptations of locally embedded organisations to environmental variability - as exemplified in the current research through situated seasonal conservation practices – is anticipated to capacitate resident groups with a degree of adaptive resilience in the context of ongoing/incremental change. Compared to the strategic planning for future change being remotely modelled and prescribed by governments through community adaptation pathways in ANZ, local adaptation to changing climates is thereby seen here as a fundamental issue of timing. Where central and local governments are strategically invested in planning for future scenarios of accruing change without recourse to local experiences of the present, the missed opportunity to reconcile top-down and bottom up perspectives in negotiating the critical transitions of local communities through long-term environmental change may well result in maladaptive responses.

The opportunity to observe, at depth, the adaptive workings of grassroot coastal conservation groups over successive seasons, in parallel with the strategic development of a community-based coastal adaptation pathways project on the Coromandel Peninsula, endows my research with unique insights into organised processes of change. Specifically, this timing has allowed me to consider how the temporal arrangements of governance organisations and groups affects how they respond practically to local environmental change, while concurrently exploring how such groups might be re-configured as multi-temporal adaptive governance collaborations.

Building on this theoretical framework, I align rhythmanalysis and phenomenological approaches in conducting my broadly ethnographic empirical research, with the objective to relate and evaluate the practical embodied experience of seasonality to organised responses to changing climates involving environmental conservation. While both approaches have been previously engaged in studies of social-environmental change, including specifically in coastal contexts, I engage rhythmanalysis here as a phenomenological method by which to explore patterns and changes in organised seasonal practices in and over time.

In the following chapter I will briefly set out the relevant social-political and physical geographical landscapes of the Coromandel Peninsula, and the Kūaotunu Peninsula within this, in which my case-study research is located, before outlining the design and associated methods of my field-based research in Chapter 4.

CHAPTER

03

CONTEXTUAL CONSIDERATIONS

Having introduced the focus of this research, and the conceptual lenses that sharpen that focus, this chapter introduces the Kūaotunu study site(s) on the Coromandel Peninsula. The aim is to provide a rich description of this location, and particularly its seasonal climate and formative cultures, both as background for understanding how the research was carried out (Chapter 4) and for contextualising the research findings (Chapter 5). Starting from an overview of the prevailing weather and climatic conditions that contribute to definitions of seasonality on the Coromandel Peninsula today, I outline an historical account of the local Maramataka calendars first developed by Indigenous iwi to mark the relative timings of early subsistence practices in ANZ. The holistic foundations of a *Mātauranga Māori* world view, and *kaitiatikanga* principles within this (explained below), are then considered alongside postcolonial framings of environmental conservation under contemporary governance systems.

The legislative frameworks that currently provide for adaptation planning from national to local scales are identified in the context of scenarios of changing climates on the Coromandel Peninsula (and Kūaotunu) and the formative histories that have shaped current human-environment relations as much as contemporary landscapes.

3.1 Prevailing Climates

Here, I provide an overview of the climate and associated seasonal weather patterns that broadly characterise ANZ, with a particular focus on the Coromandel Peninsula in its location on the east coast of the North Island. Much of this information has been sourced from the National Institute for Water and Atmospheric Research (NIWA), based on statistically modelled and observational data, including with a consideration of climate change[11].

As a small mountainous land mass at the meeting of oceans within the South Pacific, the climate of ANZ is variable. Distinctions between its North and South Islands are influenced by the tropics to the north, and Antarctica and the southern ocean located to the south. West to east variations across both islands result from the modifying effect of the Southern Alps and the mountainous ranges of the North Island (NI). These mountain ranges interact with the weather systems carried on the prevailing westerly winds, generally resulting in wetter conditions in the elevated western portions of both islands, and a drier east coast. With climatic zones ranging from subtropical in the upper half of its North Island to subantarctic in the alpine ranges of its South Island, the weather systems of ANZ are strongly influenced by its topography and surrounding oceans. Because of the physical complexity of its landforms and their relative exposure to oceanic influences, much of ANZ's weather is highly microclimatic. Looking at the Coromandel Peninsula's own microclimate, the Coromandel range that stretches like a spine along the peninsula creates a fractal of this west/east divide, with pockets of wetter weather on the western peninsula, and drier conditions in the east. And while most urban areas receive between 600 -1,600mm rain a year, this can increase to more than 5,000mm within elevated ranges.

[11] www.niwa.co.nz

On average, most of ANZ receives at least 2000 sunshine hours annually. Mean annual temperatures of 16°c in the North Island are based on relatively small deviations between summer and (mild) winters. But in spite of being classified as a moderate climate overall, there is an inherent unpredictability to local weather across ANZ and its associated seasonal fluctuations.

Although conventionally attributed (in line with a European heritage) with four equally phased seasons, being: summer (December-February), Autumn (March-May), Winter (June-August); Spring (September-November), this distribution of seasons does not correspond with the climate actually experienced across ANZ. The Waikato region in which the Coromandel is located, is described as a sub-tropical climatic zone with warm humid summers (averaging 22-26°C) and mild, albeit wet and 'unsettled' winters (averaging 12-17 °C). The extended summer-autumn period can also be unsettled, with tropical (cyclonic) storms associated with high winds and heavy rainfall approaching the Coromandel from the north-east-east. The onset of these subtropical high-pressure systems in the NI is additionally associated with strong equinoctial winds during springtime as the prevailing westerly winds abate (Chappell, 2017)[12].

3.2 Global Climate Systems

While the prevailing westerly winds and sub-tropical influences are somewhat variable in their timing and immediate effects across ANZ, the broader climate is also subject to pronounced manifestations of global climate systems, notably the El Niño-Southern Oscillation (ENSO). El Niño, with La Niña, refers to opposite extremes of the ENSO cycle, when major changes in the Pacific atmospheric and oceanic circulation occur (www.teara.gov.nz). The oscillations between phases, which alternate approximately within a decadal cycle, have an effect on seasonal weather patterns in ANZ. In El Niño years, stronger or more frequent winds are experienced from the west in summer, which can lead to drought in east coast areas, including the Coromandel, and more rain in the west. In these years, winter heralds colder weather from the south, while spring and autumn bring a combination of strong south-westerly weather. La Niña tends to north-easterly winds and wetter conditions in the North Island, including the Coromandel, and an increased likelihood of tropical cyclones. While statistically ENSO accounts for less than 25% of the year-to-year variation in seasonal rainfall and temperatures across ANZ, its effects can be locally marked (Chappell, 2017). The South Pacific Convergence Zone (SPCZ) and Madden-Julian Oscillation (MJO) are other globally-scaled climate systems active within the Southern Hemisphere, that interactively influence seasonal rainfall patterns across ANZ and cyclone genesis within the Pacific, (Diamond & Renwick, 2015). In this way, we can see how the cycles of Coromandel Peninsula's weather and seasons are influenced by intersections of broader, global climate systems with ANZ's local topography and seascapes, and the rhythmic phasing of these dynamic relational systems.

[12] NIWA Report : The Climate and Weather of the Waikato Region, P.R. Chappell, 2017

3.2.1 *Changing Climates*

There is a significant body of research into projections of globally changing climates and their impacts on ANZ (see Ch.11 Australasia in IPCC, 2023). And while there are many uncertainties in global climate modelling, it is already established that some effects, specifically increases in land temperatures, have risen more slowly in ANZ than in continental areas (MfE, 2018[13]). Attributed by NIWA scientists to the moderating (or lag) effect of its surrounding oceans, patterns of extreme weather are otherwise expected to manifest before changes in mean conditions (MfE, 2018). Changes are already in evidence through incrementally hotter summer temperatures, alongside the frequency of storm events in some locations within ANZ, including the Coromandel. With 2022 recorded as the hottest year since records began in 1909, ANZ has experienced a net 0.9^{o}c temperature rise over the last hundred years (data.niwa.co.nz). In the last few decades, the Coromandel Peninsula has endured a succession of meteorologically extreme storm events or 'weather bombs' including as back-to-back cyclones within the summers of 2023 and 2018. Significant weather events have been reported approximately every ten years in ANZ dating back to 1968 (data.niwa.co.nz). In accordance with IPCC reporting for Australasia, ANZ is projected (with medium confidence contingent on emissions trajectories) to experience increased rainfall intensity and snowfall, alongside intensifying storm events including with less frequent tropical cyclones of greater severity in the coming years (IPCC, 2023).

3.3 Calendar Cultures

Reflective of its dual cultural status resulting from European colonisation in the 1890's, ANZ identifies with two calendar systems. Although the lunar-solar Gregorian calendar is the official keeper of annual time that aligns ANZ with other countries worldwide, the *Maramataka* is the Indigenous *Māori* lunar calendar, co-ordinating stellar months with lunar phases. While the Gregorian calendar is an enduring form of globalised knowledge applied liberally across the globe, *Maramataka* were uniquely developed by the sub-tribes (*iwi*) of *Māori* to be highly situational.

3.3.1 *Gregorian Calendar*

Now recognised as the international standardisation (ISO 8601:2004) of synchronised dates and representative clock time across the globe, the Gregorian calendar originated in Europe in the 1500's as a later 'correction' to the Julian calendar (as the original solar calendar approximately following the annual revolutions of the sun). Instituted by Pope Gregory XIII, the Gregorian calendar was deployed as a political instrument of the church to align Easter with the spring season, while promoting Catholicism (Moyer, 1982). Although based on 12 months (approximating to lunar cycles) and involving recalibrations through the introduction of a leap year every four years (specifically in order to track with the seasons) the Julian calendar ultimately managed to lose accuracy (and credibility) over time. At that time, the month of February marked

[13] Ministry for the Environment 2018. *Climate Change Projections for New Zealand: Atmosphere Projections Based on Simulations from the IPCC Fifth Assessment, 2nd Edition*. Wellington: Ministry for the Environment.

the end of the year. The introduction of the Gregorian calendar allowed for a more accurate alignment with the fixed timing of solar solstices and vernal equinoxes in order to keep time (and seasonal production) on track. In the process, January became the first month of the year in Europe's mid-winter. Such a framing of the year beginning, 'reborn', as an awakening from the darkest and coldest period of the year has a long cultural tradition in Europe, and in other cultures worldwide, including for *Māori*.

The superimposition of the Gregorian calendar in ANZ, on the opposite side of the globe, has resulted in an mid-summer (January) positioning of the New Year for New Zealanders, combined with Christmas within an extended summer holiday. For many, this mid-summer year's start feels 'anomalous', for the year to 'begin' when both ecological cycles and social activities are already in full-swing. Amongst those of European descent, there has been an interesting tradition to hold 'mid-winter Christmas dinners', in part to break up the monotony of eventless winters in ANZ - harking back to traditions of the year-start emerging from the depths of winter. Based on European experiences, the Gregorian calendar references to four distinct meteorological seasons - often apportioned to three Gregorian months. But, as Trenberth has noted, this is poorly fitted to the astronomical basis of seasonality that distinguishes the Pacific Isles from that of continental Europe (Trenberth, 1983). With summer and winter seasons broadly orientated to the solstices within the Pacific, *Māori Maramataka* additionally denoted the seasons with other astronomical markers, including the vernal equinoxes.

A British-born New Zealander is also credited with introducing the concept of 'Daylight Savings' to western society (in the late 1890's), and is still upheld in ANZ. Intended to maximise on the productivity of daylight hours in transitioning between winter and summer seasons, the loss and gain of an hour twice a year, and its associated interruptions of natural circadian rhythms, have seen variable levels of public support, reflected in its proposed abandonment in Europe.

*3.3.2 **Maramataka***

The global applications of the Gregorian calendar are contrasted with the *Maramataka*, which provides a locally specific framework to mark time by stellar constellations and lunar phases, whereby months are uniquely identified by specific stars appearing with the new moon. Developed through the relationships of *iwi/hapū* with their respective *rohe*, the *Maramataka* embodies the wisdom and knowledge of ancestors (tupuna) who used the moon and stars to guide their daily activities and rhythms of life (Harris et al., 2013) (Hikuroa, 2017).

Unlike the Gregorian calendar, the *Maramataka* is not fixed and static, but when actively in use, it was dynamically experienced and lived through generations (Hikuroa, 2017). This notably involved practitioners intuitively making ongoing intercalations of days/nights as required for the timing of subsistence activities of harvesting, fishing and cultivation, based on a developed understanding of natural cycles (rhythms) and their evolution (Harris et al., 2013; Hikuroa, 2017). Rather than simply providing a reference for time, the *Maramataka* provided a framework for actively producing local knowledge within the *Mātauranga Māori* worldview. As evolving frameworks, *Maramataka* represent sophisticated instruments by which *Māori* understand and

comprehend the universe, the natural world (including humanity's place within it) and to test, share and pass on that knowledge in and over time (Hikuroa, 2017).

While primarily divided into warmer summer and cooler winter phases, the *Māori* year also recognised spring as '*Koanga*', the 'digging' season, and autumn as '*Ngahuru*', for cultivation and harvesting practices (Best, 1922). Summer and winter were personified as *Raumati* and *Takurua* respectively, with Raumati overseeing food production on land and *Takurua* presiding over the ocean harvests. Stars were additionally referenced to both foretell and mark the variable yields of approaching seasons, while the *Te ao Māori* new year of *Matariki* commenced with the appearance of the first new moon after the Pleiades or Reigel constellations were first seen at dawn over the eastern horizon in June/July (Best, 1922). Since *Maramataka* were highly localised, many of these Maramataka used by only small populations have been lost over time. Nationally, however, there has been a renewed interest in recent years in the moon phases of the *Maramataka* and their relevance for rediscovering *Māoridom* in a contemporary universe.

In 2022, the Labour government officially declared *Matariki* a public holiday, in a significant recognition of *Mātauranga Māori* culture in ANZ. As the *Māori* New Year, (*Mātahi o te Tau*) *Matariki* traditionally provided the opportunity for people to gather and reflect on the passing year, to honour the dead, celebrate the present, and to plan for the future. In a *Mātauranga Māori* conception, *Matariki* thereby provides critical orientation towards observations of the natural world and its relational rhythms.

3.4 Conservation and Kaitiakitanga

The diverse climates and landforms that define ANZ have also provided for its unique biophysical attributes, involving a rich diversity of plant and animal species, with high levels of endemism (Brown & Penelope, 2016; Myers et al., 2000). In global terms, the relatively recent arrival of humans to the shores of ANZ contributed to the burgeoning biodiversity that greeted its discoverers, originally by wayfaring Polynesians between 1200-1300 CE and subsequently by Europeans in the 1700's. Following rapid extinctions of a number of plant and animal species on both occasions, the human occupation of ANZ is subsequently associated with evaluations of lost natures, followed by social adaptations that have engendered particular values towards environmental conservation (Logan, 2016).

Early Māori society adjusted to the environmental conditions in which they discovered ANZ, by developing their own customary system of values and practices embodied within the principles of '*tikanga*' for protecting special places and species, alongside human welfare (Mead, 2016). *Māori* existence was sustained by a careful balancing of human activities with natures systems. *Kaitiakitanga* then defines the kinship connection between humans within their natural world that is inherent to a *Mātauranga Māori* world view of reciprocal relations, as the premise to dynamic practices of environmental stewardship. A *kaitiaki* is a guardian/keeper, while the suffix '*tanga*' denotes preservation, conservation and protection.

Customary practices, including use of *Maramataka* to guide the timing of planting and harvesting further contributed towards maintaining the balance between communities and nature. For activities such as hunting birds, gardening and fishing, this ensured that resources were managed sustainably (Carter, , 2019; Hikuroa, 2017). Other common practices of *kaitiakitanga* included harvesting only what was needed and according to the seasons, alongside the use of temporary prohibitions through local *rāhui*.

The colonisation of ANZ by European settlers, some 600 years after Polynesian *Māori*, was associated with widespread exploitation of its natural resources, including through farming, fishing, quarrying and logging of its native timber. As one of the largest and longest growing conifer tree species in the world, Kauri poles were particularly valued by Europeans for boat and building construction, leading to the widespread extraction logging of Kauri forests, notably from the Coromandel forest ranges.

Concerns for the excessive rate of Kauri logging emerged as early as the 1860's in ANZ society but in spite of a few forest remnants being given protection status as reserves in the 1900's, logging was not legally halted until over a hundred years later in 1985. With approximately 60% of the Coromandel now protected as conservation forest estate, Kauri forests are slowly regenerating. This is compared with approximately 30% of ANZ's total land area being under public protection, which is comparably high by global standards (Logan, 2016). Although administered by a dedicated government Department of Conservation (DOC), nationally instituted conservation practices and cultures are distinguished from those of indigenous *Māori* in fundamental ways.

Foremost, and consistent with Westernised thinking, the environment has long been objectified as a societal experience within ANZ culture, as opposed to seeing humans as a component part (McNeill, 2016). This, in turn, has allowed for the historic exploitation of key resources, including Kauri timber, and its subsequent rise to 'iconic' status in contemporary conservation initiatives, alongside that of the endemic flightless 'Kiwi' bird (by which New Zealanders are also informally identified internationally). Conservation cultures have thereby evolved from a need to protect nature from exploitative human activities. As the focus has shifted over time, from protecting individual species to conserving ecosystem functions, there has been a parallel shift in preserving representative ecosystems and landscapes as 'frozen in time', including through the targeted exclusion of introduced plant and animal 'pest' species within otherwise intact representative habitats.

Environmental legislation has developed apace with the preservation of ANZ's iconic landscapes and natures while continuing to promote a utilitarian relationship with the wider environment through managing its provision of ecosystem services or primary resources. Informed by global approaches to environmental management, the sustainability principles introduced through the Resource Management Act of 1991 were followed by updates to include the principles of biodiversity. But ANZ is also distinguished with a legacy of local management originating from its Public Reserves and Domains Act of 1881. Arising as a practical means of licencing local publics to administer local nature reserves for 'charitable, educational and recreational purposes', local

input has remained an enduring feature of protected areas management in ANZ (Logan, 2016). These historical arrangements have concurrently provided for an ongoing legacy of grassroot conservation initiatives within ANZ.

Settlements relating to the Treaty of Waitangi through the Waitangi Tribunal have otherwise given redress to the role of *Māori* interests in local environmental management in recent years (Logan, 2016). As well as returning crown lands to their indigenous *iwi/hapū*, this has additionally involved legal status being assigned to the distributed values of the Wanganui River and Urerewa Ranges as living entities in their own right. In reflecting an accommodation of *Māori* cultural interests within western legal systems, these watershed designations also highlight the intrinsic value of dynamic social-ecological systems inherent to a *Mātauranga Māori* perspective, that may also prove invaluable in responding to the ongoing effects of social-environmental change.

3.5 Adaptation Planning & Governance

The formal recognition of and response to the projected impacts of global climate change within ANZ were originally proposed under a Labour government at the turn of the millennia. Drawing from existing international examples, including from the UK Climate Change Act, the original Climate Response Act (2002) had two principal purposes: firstly in addressing the reduction/mitigation of changing climates through emissions targets and secondly, in providing a legal framework for the adaptation of ANZ society to the (locally experienced) effects of climate change (Section 3.1). Within a highly evolving international field, the Climate Response Act remains the key piece of legislation guiding the response to climatic change within ANZ. Notable developments include in the establishment of a cross-party Climate Change Commission (CCC), comprised of national experts, to oversee the national climate change response. The 2019 (Zero Carbon) Amendment Bill set five year emissions budgets for ANZ in line with its commitments to the international Paris Agreement in 2015 to cap global temperature rises to within 1.5^{o}c by 2050. The first National Adaptation Plan (NAP) was drafted in 2022 to cover a six year implementation period, to be reviewed every two years (by the CCC) accompanied by a parallel assessment of climate impacts and risks every six years.

Other relevant legislation includes the 1991 Resource Management Act (RMA) currently undergoing reforms launched through the previous (Labour) government. While the structure of the updated RMA was to include a new Climate Change Adaptation Act (CCA), alongside development of the new Spatial Planning (SPA) and Natural and Built Environment (NBA) Acts (drafted in 2023) this has not eventuated under the new government. Instead, their own RMA amendment Bill is due to become law in mid 2025. The NBA was to introduce new environmental outcomes and national direction for addressing natural hazards and climate change, while the SPA was to require regional planning to provide for both emissions reductions and natural hazard risks in anticipation of the local climate impacts. The New Zealand Coastal Policy Statement (NZCPS, 2010) was introduced under the original RMA (1991) to address the management of the coastal environment as nationally significant. Accordingly, the NZCPS advocates a precautionary approach

in areas where coastal resources are potentially vulnerable to climate impacts and is concurrently being updated alongside ongoing RMA reforms.

With locally scaled adaptation planning assumed to fall to local government, section 93 of the Local Government Act (LGA, 2002) sets out the required framework under which local authorities must prepare Long Term Plans (LTP) as a comprehensive statement of intentions for a 10-year period. Section 101B then requires local authorities to adopt an infrastructure strategy identifying any significant issues for the next 30 years, and the principal options for managing those issues. The infrastructure strategy must also outline how a local authority intends on managing its assets, in particular, to provide for resilience and the management of risks relating to natural hazards.

In the meantime, the Ministry for the Environment (MfE) has provided some direction to developing community-level responses to coastal hazard risks by outlining a Dynamic Adaptation Policy Pathways (DAPPP) approach within its Coastal Hazards and Climate Change Guidance for Local Government (Bell et al., 2017). Providing a basis for local governments to support the adaptation of coastal communities to the climate risks, alongside managing council assets and services, Adaptive Pathways (APs) are designed to navigate change in a context of uncertainty. Originally developed as a tool for facilitating stakeholder engagement, specifically in adapting water management in the Netherlands, AP planning has evolved from engineering-based applications extended to coastal hazards (Cradock-Henry et al., 2023; Haasnoot et al., 2013). The application of the DAPP model in coastal adaptation planning for sea level rise and coastal erosion in ANZ, is largely experimental. Not least this is because the DAPP approach advocated by MfE is founded on comprehensive public participation in the process. As a politically young country, frameworks for community engagement in planning are somewhat less established in ANZ, compared to long-standing practices of public participation in European democracies such as the Netherlands (Cradock-Henry et al., 2023).

The AP approach has nonetheless provided the basis of a number of coastal community adaptation plans in ANZ in recent years, initiated by regional and/or local councils in collaboration with local communities. Notably, this includes the district-wide adaptation planning carried out by Auckland and Thames-Coromandel councils as well as independent community-led initiatives. In an updated version of the Coastal Hazards and Climate Change Guidance report prepared earlier this year (in February 2024 by MfE) the importance of effective monitoring frameworks are highlighted in order to be able to effectively track change, including through contributions of citizen science groups, with which to 'augment' council monitoring. Peripheral to government-based guidelines and policies, NGOs, notably the EDS (Environmental Defence Society) and CLC (Climate Leaders Coalition) are making independent contributions to driving climate legislation through their own practices and research agendas. In the case of the EDS, this is from an environmental protection perspective, with a strong coastal focus, while the CLC represents leading initiatives within the business community across ANZ.

Relatedly, although there is a general expectation that Local Governments should lead adaptation planning at the community level, current legislation lacks a clear mandate on respective roles and

responsibilities, including how both planning for and the implementation of local adaptation is to be funded across levels and sectors (Lawrence et al., 2015; Lawrence et al., 2024). Support from central government in facilitating technical advice alongside an appropriate allocation of resources, is otherwise considered by Local Government bodies as fundamental to local adaptation planning involving affected communities. Meanwhile, work by current government departments (specifically MfE and the Treasury) on developing an Adaptation Framework setting out how the costs of adaptation will be distributed between private and public agents is already underway. In the meantime, and without a clear way forward, local governments remain significantly challenged in their delivery on climate adaptation planning and implementation in ANZ.

3.6 Time and Tides of the Coromandel Peninsula

'The Coromandel, renowned for its pristine beaches, misty forests and laid-back vibe, is one of New Zealand's most popular holiday destinations……With a mountainous interior cloaked in native rainforest and more than 400 kilometres of dazzling white sand beaches, it is rustic, unspoiled and relaxed'- 100% Pure NZ (grassroot.newzealand.com).

The Coromandel Peninsula is a spectacular mountain-to-sea landscape, located on the east coast of ANZ's North Island (*Figure **2***). With approximately 400km of coastline boasting a beach for every day of the year, its elevated interior native forest range is primarily in conservation estate. Renowned as a tourist destination accompanied by a high second-home ownership of its beach settlements, the Coromandel's permanent population incorporates alternative lifestyles as well as intergenerational farming families and enclaves of multiple indigenous *iwi (Māori* tribes). The Kūaotunu Peninsula, located on the Coromandel's eastern seaboard, captures all of these elements as a peninsula within a peninsula as the focused location of case studies for the current research.

Locals typically associate seasons on the Coromandel with a dramatic swelling of its base residual population over the peak summer months, through an influx of visitors. Lured by its natural attributes, and prior to the interruptions of Covid-19, the Coromandel typically experienced peak summer holiday populations of up to four times its residential base population of 32,000 year on year (Brunsdon & Olsen, 2021). But beyond the pervasive gaze of tourists and holiday-home owners, the Coromandel Peninsula is also renowned for its creative and eco-based 'life-stylers' that are drawn to the relative remoteness and abundant natural resources of the Coromandel. The investment of permanent residents in a Coromandel 'way of life' has spawned a myriad of grassroot environmental conservation groups supplementing its large conservation estate. Physically, the steep interior topography of the peninsula affords an encounter with the coast for almost every visitor - or at the very least - in the journey involved in accessing interior sites. With permanent settlement otherwise predominantly located within the coastal margin and its abutting foothills, the coastal environment is inescapably part of the everyday life or lifetime experience of a Coromandel resident or traveller. Facilitated by increased personal wealth and the associated mobilities of contemporary society, the general marketing of the Coromandel as a

natural playground (or 'recreational nature' - Johansen et al., 2021) has additionally fuelled domestic tourism alongside international interest.

In a partial mirroring of nature, the Coromandel's east coast has also served as meeting point between cultures, stemming from the first 'encounter' of indigenous *Māori* by European explorers (Captained by James Cook) landing in Mercury Bay in the late 1700's. From its early subsistence settlers through to the holiday home ownership that has become the currency of Coromandel's beaches today, an increasing diversity of New Zealanders maintain a formative relationship with its ostensibly natural coastlines (Peart, 2009).

The Coromandel's eastern seaboard is a particular vestige of contending social interests and values that extend back to its original discovery and subsequent settlement by Polynesian *Māori* around 1300 (and ensuing tribal conquests). Initially providing landing sites to early Polynesian wayfarers, the harbour environments associated with the Coromandel's east coast provided abundant resources from both land and sea as well as refuge from human conflict. The subsequent colonization of the Coromandel by Europeans from the 1800's led to competitive exploitations of its land-based gold and Kauri[14] timber resources through to the 20th century. More recently, the marine resources of the wider Hauraki Gulf surrounding the Coromandel have been commercialised through a burgeoning aquaculture industry contending that of seasonal tourism, in conjunction with swelling residential development (including as second homes). The subdivision of marginal intergenerational farmlands within the coastal environment is a key part of these developments, with plantation forestry maintaining the steep interior fringes. As documented by Paul Schneider, in his extended ethnographic research on the wider Coromandel, a diversity of views, values and perceptions are represented on the peninsula, manifest in alternative cultures, interests and socio-economic demographics (Schneider et al., 2020). Tensions between private land ownership, custodian rights of iwi and public amenity are commonplace in coastal settlements throughout the district, perpetuated by its colonial histories.

As the focus for the current research, the Coromandel Peninsula is particularly vulnerable to the predicted impacts of climate change, specifically facing scenarios of rising sea-levels, ocean acidification and amplified coastal erosion. With substantial implications for its primary marine aquaculture industries and tourism as well as for its coastal populations, the local Thames Coromandel District Council (TCDC) was formerly subversive on confronting climate change as a local issue. Notably, this has been suggested through its highly publicised dismissal (and subsequent litigation) of the 2017 Local Government Leaders' Climate Change Declaration (CCD) that is otherwise subscribed by 65 local authorities within ANZ[15]. Inscribing 'responsive leadership' through an holistic approach, the declaration sets out a collective commitment by territorial authorities (local governments) to responsibly and reflexively respond to the ongoing issues of climate change, through working collaboratively with constituent communities alongside central

[14] Kauri = *Agathis australis,* a podocarp forest tree, native to ANZ, that is amongst the tallest and longest growing trees in the world.

[15] https://lgnz.co.nz/our-work/publications/local-government-leaders-climate-change-declaration-2017

government. A locally championed campaign involving high school children and a formalised Hauraki Coromandel Climate Action (HCCA) group was ultimately successful in challenging the inertia of TCDC to acknowledge the CCD through the High Court in 2020.

> *'We're lucky to have some of the most beautiful and pristine beaches in New Zealand, if not the world, on the Coromandel, that's why we've adopted an ambitious programme to work with all stakeholders to manage the effects of climate change'* TCDC – Shoreline Management Pathways Project (SMPP).

In spite of an apparent reluctance to politically engage with the broader issues of climate change governance, TCDC subsequently commissioned the development of a Shoreline Management Pathways project (SMPP - launched in 2019) designed to provide non-statutory policy documents as a 'route map for decision makers to transition sustainably from the present into the future'.[16] While a number of other Councils in ANZ have embarked on similar adaptation scoping projects, TCDC was notable in being the first local authority in ANZ to commission a collaborative approach to comprehensive district-wide adaptation planning based on the DAPP model. Critically designed to accommodate collaborations with local *iwi*, the project divided the district's coastline into physically discrete coastal compartments, represented by appointed panels, involving two selected community members alongside key stakeholders in a three year engagement process. Implemented by international specialist environmental engineering consultants working alongside TCDC, their reporting of local Coastal Adaptation Plans (CAPs) was published towards the end of 2022 with a fragmented consultation process during the Covid-19 pandemic.

'The process will involve taking account of the aspirations and concerns of TCDC's diverse communities and working with stakeholders to identify risks, so that decisions being made now contribute to a longer-term vision for the whole area'. TCDC - SMPP

At a grassroot level, coastal communities on the Coromandel's east coast have been variously involved in dune restoration initiatives since the 1980's. Originally undertaken in partnership with Waikato Regional Council (WRC) local dune restoration efforts are now championed through Coastcare - Tiaki Takutai, representing collaborations between regional and local Councils involving the Department of Conservation (DoC) and local *iwi*. Essentially co-ordinating volunteer activities around the monitoring, maintenance and protection of local beaches, Coastcare activities are variously instituted within the beach communities of the Coromandel's east coast.

While continuing to be locally administered, Coastcare initiatives collectively draw on the support, guidance and expertise provided through the Coastal Restoration Trust of NZ (CRTNZ) in their commitment to restoring beaches as a first line of natural defence against coastal erosion and rising sea levels, as much as conserving their inherently significant ecological values. Alongside its development of the SMPP, TCDC has become heavily invested in the promotion and facilitation of local Coastcare initiatives on the Coromandel's east coast beaches in recent years. A provisional engagement with local Coastcare groups in the context of the broader SMPP consequently

[16] SMP Scoping Report, January 2020

grounds an exploration of seasonal rhythms and representations from within a diversity of organisations associated with the performance of beaches as discrete public open spaces.

3.7 Kūaotunu : A peninsula within a peninsula

In its location on the Coromandel's eastern seaboard (*Figure **2***) the Kūaotunu Peninsula captures all of the aforementioned elements as a peninsula within a peninsula. With its succession of niche north-facing sandy beaches, becoming increasingly remote along the winding gravel Black Jack Road leading to its eastern extent, the Kūaotunu Peninsula is a popular retreat for many urban-based second-home owners and visitors. From a total permanent population of less than 1,000, many more visitors are accommodated within the Kūaotunu Peninsula during the peak summer season, alongside a core residency that includes a high proportion of retirees.

Extending between the strategic resources of Whangapoua Harbour, to the west and the larger Mercury Bay (Te-Whanganui-a-Hei*)* to the south, the bountiful natural resources attributed to the Kūaotunu Peninsula were originally highly compelling to travelling *Māori*. Then exclusively accessible by canoe, it is likely that the early occupations of Kūaotunu by *Māori* were highly seasonal. In addition to its plentiful seafood and hunting game, the eastern extent of the peninsula was also found to be rich in a tool-making basalt that was industrially extracted by *Māori* from the Tahanga quarries within the hills behind Opito Bay (Moore, 1976). In the context of these historical stakes, local Māori 'tribes', including Ngāti Hei, Ngāti Huarere and Ngāti Tamaterā all share in longstanding claims in the Kūaotunu Peninsula, with numerous archaeological sites, including a number of prominent *pā* sites located around the peninsula today.

With the arrival of Europeans, the ports of Coromandel and Mercury Bay were the focus of pioneering settlements, on opposite west-east coastlines, as part of an expanding Kauri logging industry. Although latterly contributing to the timber industry, Kūaotunu was initially colonised on the back of a discovery of a substantial gold reef (the infamous Try Fluke) on the steep hillside spurs located behind today's Kūaotunu Village in the 1880's (Simpson, 1955; 1988). At the peak of its gold mining boom, Kūaotunu reportedly supported two hotels, along with a range of supply stores, two churches, a post office, library, schools, and a racecourse (located on the flats immediately behind its dune beach), while the discovery of commercially mineable gold also significantly established basic road access to the peninsula (Simpson, 1955; 1988).

About two decades prior, the Whangapoua forest area became the focus of contending claims between Europeans and local *iwi* as part of a rapidly developing Kauri logging industry. During this time, Whangapoua saw timber mills established on the western shores of the upper harbour, alongside commercial wharf facilities to ferry shipments of timber onto Auckland. Peaking in the first decade of the 20th century, by the 1920's the Whangapoua hills 'where the noble stands of forest had grown, were now cut-over wastelands' (Lay, 2009). Although much of the secondary growth native forest that has regenerated around the Whangapoua harbour since this time is now approximately 100 years old, this is a fraction of the 2,000 year potential lifespan of the primary Kauri trees that were felled by pioneering European settlers.

An interim discovery of gold within the hills behind the headwaters of the Whangapoua harbour catchment in the 1890's led to the concurrent development of the Opitonui valley, and Te Rerenga at its base, to accommodate extensive mining operations and facilities. Since the land had already been cleared by Kauri logging activities, the establishment of mining facilities and associated settlement at Opitonui - Te Rerenga was practically facilitated, along with shared use of the Whangapoua wharf with timber milling. But after the ore yields ultimately proved unprofitable, gold mining was promptly ceased in the early 1900's.

With the simultaneous expiration of both gold mining and Kauri logging from the Kūaotunu Peninsula, there was an exodus of settlers and associated dismantling of facilities in the lead up to the Great Depression of the 1930's. Thereafter, redundant lands were primarily utilised for marginal farming operations, with sections of the steeper hillsides established as plantation forest by the Forest Service in the wake of World War Two (Lay, 2009). The wider societal struggles during this period reportedly fostered a communal spirit between local landowners at Kūaotunu, including between descendant families of indigenous *iwi.* But by the 1960's, with increasing leisure time and ongoing immigration, the Kūaotunu Peninsula was newly rediscovered by 'outsiders' through recreational use of its beaches by visiting publics and successively subdivided into the coastal holiday settlements that have continued to intensify (both in density and capital value). The sealing of the gravel road providing access to Kūaotunu from Whitianga and Coromandel, around the turn of the current century, has further accelerated the rate of development of its beach settlements through to the present time.

Thus, within the relatively brief historical timeframes of its colonisation by Europeans, the Kūaotunu Peninsula has experienced successive onslaughts of its natural resources, each being associated with significant social and environmental change. With reference to its transformational mining and milling histories, local author, Graeme Ley, observes: 'The word 'conservation' was almost meaningless, having no application in late Victorian New Zealand, where nothing was allowed to stand between the desire to convert natural resources into capital gain' (Lay, 2009). This mindset came at great cost to Kūaotunu's indigenous *Māori* populations, with Ngāti Huarere the only *iwi* to have retained residency on the peninsula through legal subdivision of their family lands occupying the foothills of Whangapoua. As part of their restorative advocacy for the wider Whangapoua Harbour catchment environment, the descendant families of Ngāti Huarere Trust are concurrently focused on building working relations with Whangapoua's contemporary occupants, which include commercial forestry and fishing operations alongside fluctuating populations of beach residents.

With the gradual regeneration of its bush to beach habitats alongside a growing interest in nature conservation generally within ANZ, the Kūaotunu Peninsula has spawned a range of grassroot conservation initiatives. These notably include the Kauri 2000 project, which was initiated in 2000 with the vision of planting 2000 Kauri trees to supplement the natural regeneration of Kauri within local forests and has since been extended to other locations around the Coromandel. Project Kiwi

has facilitated the re-establishment of endangered native North Island Brown Kiwi[17] to privately owned forest located on the southern slopes of the Kūaotunu Peninsula, while becoming a centre of national excellence for Kiwi rehabilitation.

In direct retaliation to its past, Kūaotunu also hosts an active anti-mining group (KAMAG) which was established in the 1980's in response to renewed external interest in mining gold within the Kūaotunu hillsides. After successfully stalling prospectors at that time, KAMAG continues to monitor for fresh attempts to mine the Kūaotunu and the wider Coromandel.

Consistent with the rapid intensification of Kūaotunu's beach settlements for residential development, there has been a focus amongst some residents on the protection and restoration of beach dune and associated wetland habitats in addition to its native bush. While originally initiated by Kūaotunu residents in direct collaboration with the WRC's coastal scientists in the 1980's, local dune restoration activities are now largely championed through Coastcare under the co-ordination of TCDC. And while Coastcare are seeking to extend their restoration activities to coastal wetlands, Kūaotunu currently hosts two independent wetland conservation groups. Although wetlands would originally have featured behind each of Kūaotunu's beaches, only Otama and Rings Beach have retained ecologically significant wetland habitats supporting endangered wildlife. Whangapoua Harbour and Optio Bay are traditional 'food bowls' of seasonally available shellfish, while the wider waters of Mercury Bay are fished both recreationally and commercially for larger game. With residential development extending immediately behind the dune systems of Kūaotunus' beaches, Optio Bay hosts the longest beach, spanning approximately 4km, while Rings Beach is only half a kilometre in length. Over time, the intensification of residential development has inevitably altered the dynamic profiles of active beach and dune systems in their natural cycles of erosion and accretion. In fact, Matarangi settlement - in flanking the eastern shores of the Whangapoua Harbour mouth - is located on a broad sandspit that would otherwise be shifting continuously.

There are many relations at play within from this cursory overview of the Kūaotunu Peninsula as a holiday destination, aquaculture hub, conservation-artists retreat, ancestorial lands, intergenerational farms and so on, all being uniquely experienced within the everyday lives of its discrete communities. The high levels of environmental engagement afforded by the peninsula, as a place in process, are also associated with distinct power geometries sustained through the institutional arrangements of capitalist society. Home ownership on the Kūaotunu Peninsula is increasingly afforded to a relatively narrow population demographic as a result.

But because of the immediacy of the threat, there is no doubt that the everyday lives of core coastal communities could be changed dramatically by extreme hydro-meteorological events, alongside incremental change, not least through their relations to home, work, recreation or culture. As such, the coastal environment provides an important site for exploring local experiences and perceptions of climate through past narratives, present practices and future

[17] Kiwi = Native flightless birds that are endemic to ANZ and frequently used as cultural symbols of ANZ

imaginations. It is hoped that seasonality and seasonal rhythms may shed further light on these social-ecological issues through the seasonal practices and organisational adaptations already in place, as well as offering pathways towards future innovations and change.

Conceived in this way, individual beaches locate the field of proposed research both physically and methodologically by providing comparable portals through which to explore the intersecting flows, intensities and frequencies of diverse organisational practices over the course of a calendar year. Concurrently, the rhythmic phenomena associated with natural beach processes are also accounted for in the more-than-human materialities of place relations that are relevant to understanding both seasonal and broader temporalities of environmental change (Jones, 2011) (Kothari & Arnall, 2020). As noted by Sarah Pink, the ways humans and non-humans, local and global, visible and invisible components are co-implicated in the processes through which place is constituted, 'invites us to consider how the experiential and the political intersect in the process of change' (Pink, 2012, p. 8). The comprehensive ambitions of the SMP project, in ostensibly formulating a community-based manifesto to climate change, significantly links local coastal processes to discourses of global change, while exposing the contending intersections of experiential knowledges, values and meanings in the political ecologies at play within beaches as places.

Several relationships are to be explored within this conceptualisation of seasons as paradigmatic of complex human-environment interactions, with a potential ability to influence collective action (or hostility) towards negative forces of environmental change, including climatic. Here, networks of resident conservationists are assumed to share in direct concerns with environmental change, while being simultaneously influenced through their practical relations with other local and remote organisations-institutions both within their everyday lives as well as over the course of a calendar year and from one year to the next. The co-ordinations of intersecting rhythmic relations are effectively distilled within the key lines of inquiry structuring the research design and its related methodologies as set out in the following Chapter 4.

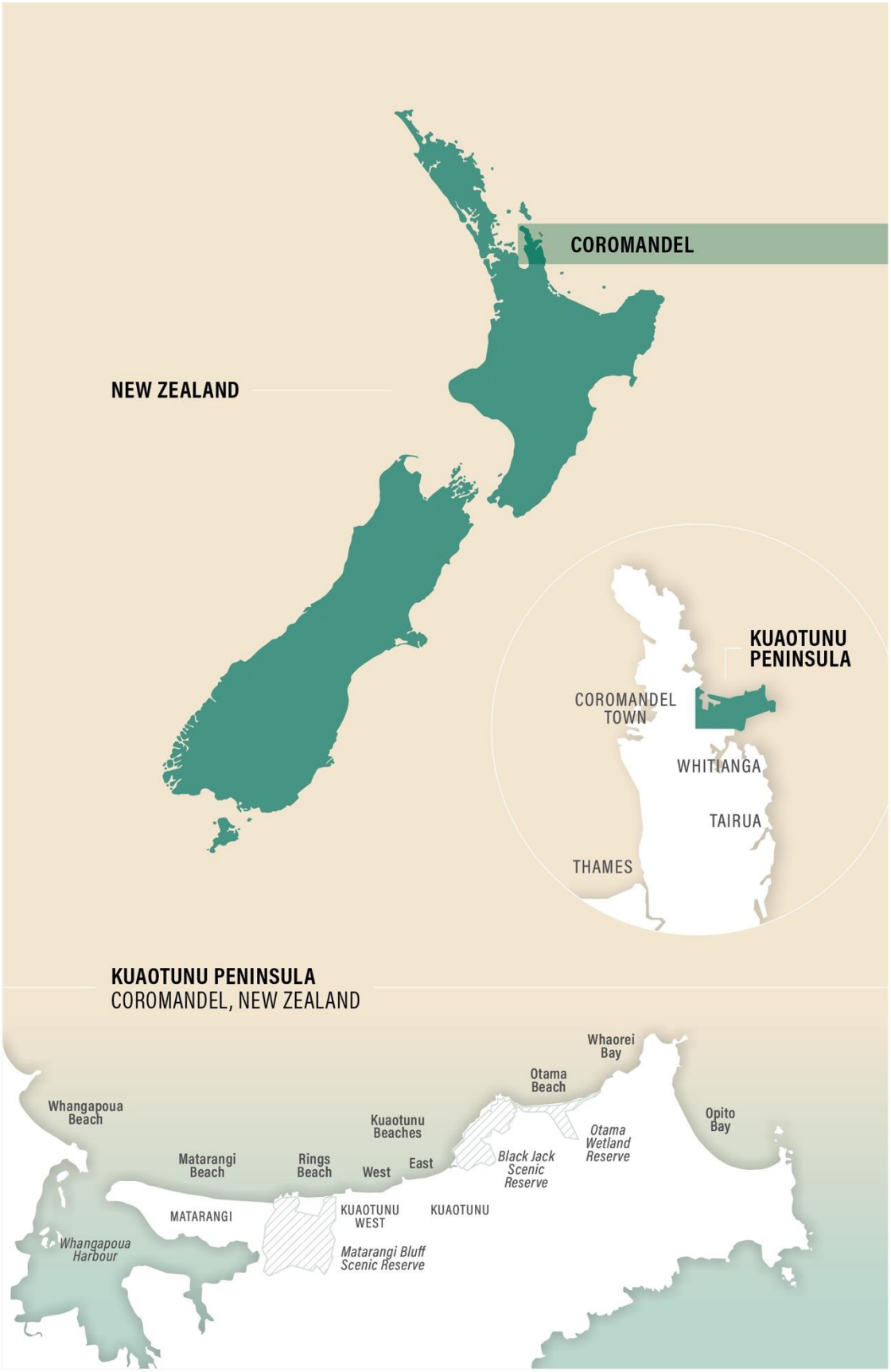


Figure 2 – Kūaotunu Peninsula Location and Context

CHAPTER

04

RESEARCH DESIGN & METHODOLOGY

4.1 Research Paradigms & Theories

In the previous Chapter 2, I outlined the organising themes and framework of sensitising concepts that guided how I went about addressing the research questions. Having outlined key attributes of the Coromandel and of the Kūaotunu Peninsula as the location of my research within this in Chapter 3, the current chapter proceeds to detail my particular approach to the empirical research alongside the selection of participant case studies and associated methods of implementation. The methods have been designed according to the conceptual framework in order to make phenomena visible (or sensible) for their analysis in addressing the research questions.

4.1.1 Outlining the Methodological Approach: Ethnography as Rhythmanalysis

Methodologically, the empirically based research is broadly grounded within a qualitative social science approach. Defined by Denzin and Lincoln as the study of 'routine and problematic moments and meanings in individual's lives' (Denzin & Lincoln, 2000) qualitive research aims to generate a rich understanding of phenomena (Duara et al., 2018).

More specifically, phenomenology – as rhythmanalysis - is employed here as a relational approach to studying institutional-organisational cultures and practices, utilising mixed ethnographic methods to apprehend people's everyday experiences. Phenomenology provides the basis of understanding the entanglements of embodied human relations within the world, through practices, as effected through rhythmanalysis. While a phenomenological approach is congruent with ethnographic research methods into lived experience, the elusive task of rhythmanalysis, as a research method, invites further methodological innovation and experimentation (Lyon, 2019). Dakka and Smith (2019) in their comparative study of student campuses within a UK university, endorse rhythmanalysis as offering 'a more nuanced, versatile and embodied approach to the study of everyday life'.

Here, the study of rhythms is considered intuitive to the seasonal focus of the research and its engagement with the fluidity of rural (coastal) temporalities and spatialities (Johansen et al., 2021; Kothari & Arnall, 2020). For the purposes of this research, the concept of rhythms is used relatively synonymously with temporalities, insofar as temporalities are rhythms of motion and change. The potential of rhythmanalysis to capture the relative intersections (assemblages) of human-environment relations in accounting for both the human and more-than human elements of seasonality is important in this regard (Krause, 2013). In accommodating a range of temporalities and frequencies, rhythmanalysis provides for an exploration of seasonal cycles in the context of everyday lived experiences and practices, and against the extended trajectories of broader (global) environmental and social change, like climatic change.

When engaged through social practice, intersections of institutional rhythms provide potentially potent insights into processes of transformative change and innovation (Blue, 2019). While a focus on everyday practices is profoundly political, a focus on rhythm additionally facilitates a critique of the cultural, economic and affective dimensions of time and place. This, according to Dakka & Smith, is the 'intellectual purchase' of Lefebvre's rhythmanalysis project as 'a praxis capable of

translating the complexity of articulations in their simultaneity, materiality and nuance' as a tool to both anticipate and effect change (Dakka & Smith, 2019). In this way, rhythmanalysis can be employed as 'a tool of analysis, not just an object of analysis, with implications for social planning and policy' (Lyon, 2019, p. 38).

As a research strategy, rhythmanalysis has been widely used to study place, requiring methods that are specifically sensitive to detecting the dynamism of polyrhythmic constellations associated with variable situations. As my rhythmanalysis work engaged explicitly with an ongoing local government project to devise adaptive Shoreline Management Pathways, the research was at once descriptive and interventionist, seeking as it did to contribute to this ongoing governance process. Though true to its original political activist origins, this is a prototype application for a performative rhythmanalysis of organisational arrangements, agendas and practices in the political context of changing seasons and climates.

Acknowledging its experimental orientations, the execution of the research is broadly conceived of the four components identified below:

a) ***Conceptualisation*** *of the relationships between organisational practices, place experience, cultural representations of seasons and how they might differ within variant physical and institutional settings to affect local adaptive-transformative capacity and innovation.*

b) ***Empirical description*** *of the organisational practices and seasonal representations observed, illustrated and narrated within situated case studies relative to how participants alternatively interpret and make sense of changing seasons and climates within broader social-environmental settings.*

c) ***Analytical interpretation*** *of seasonal patterns and relations identified through organised activities within and between participant groups, while concurrently highlighting their alternative experiences of seasonal change from one year, and one place, to the next alongside their relative responses.*

d) ***Critical evaluation*** *of how organisational cultures and practices variously mediate an awareness of local seasons and climate and how this might influence the broader capacity of communities to take timely adaptive-transformative action.*

While these facets could also be read as sequential phases in a standard piece of research, this study progressed iteratively through a dialogic back-and-forth between empirically experiencing and describing the seasonality of coastal conservation activities and the battery of concepts that (in concert) helped me, as a researcher, make sense of what I was observing. Over the four years of this research, I cycled through stages (a) – (c) over several iterations, revising my conceptualisation and methods as I went.

Part of this process also involved reflecting on the evolving interpretations of seasons with participants over the course of the research. This included through a focused group workshop (FGW) that I hosted with invited participants at the culmination of my fieldwork as part of its interactive mode. Involving representatives from local government, the research was intentionally designed to facilitate knowledge and understanding of seasonal change from

amongst participant groups in the context of district-wide adaptation planning by the municipality.

4.2 Case-Study Selection & Strategy

Enabling the focal depth of analysis necessary to address my research questions, I chose to conduct the research with a limited set of organisational case studies, as 'units of analysis' from within a geographically bounded setting. In providing for in-depth and multi-faceted explorations of complex phenomena in their real-life settings (Mills et al., 2010) the case-study approach is instrumental to the open-ended nature of the qualitative inquiry. The use of multiple case studies specifically provides for both similarities and differences to be identified within and across individual cases, in extending the depth of analysis pertinent to the research question (Stake, 2006). Multiple methods generating multiple sources of data for analysis are also synonymous with a case study approach (Stake, 2006; Yin & Campbell, 2018). And since the place-based focus of the research is centred around explorations of local organisations within comparable physical and institutional settings, both participating groups and their specific beach contexts are effectively contributing analytical dimensions to the empirical research.

4.2.1 ***Study Site Selection***

My case studies comprise a series of environmental conservation initiatives uniquely associated with proximate beach settlements extending along the northern coastline of the Kūaotunu Peninsula (as presented in *Figures **3-9***). In spite of their relative proximity, each of the beach settlements are distinguished by unique physical and social-cultural profiles that are expanded in more detail within the descriptive accounts provided in the following Chapter 5. And as set out in the previous Chapter 3, these participant groups are situated within the broader institutional settings of Coromandel district, while being part of the wider field of environmental conservation.

In establishing a comparative basis to studying the seasonalities of conservation practices across different organisational and physical contexts, I was able to explore commonalities alongside differences between the operations of participant groups. Comprising a core set of groups that I worked with over the course of a full calendar year (and beyond) my case studies specifically included a dedicated dune restoration group: Kūaotunu Dune Care Group (KDCG); Rings Beach Wetland Group (RBWG); Mercury Bay Environment Trust (MBET) and the Otama Reserves Group (ORG). In striving to represent the range of Kūaotunu beach communities, my research was extended by a second set of organisations, including Rings Beach Residents, Opito Bay Ratepayers Association (OBRA), Matarangi Coastcare and Ngāti Huarere ki Whangapoua Trust (NHWT), with whom my involvement was limited by the relative infrequency of their activities and/or a somewhat delayed recruitment. Representatives from formal organisations, including local Council (TCDC), regional Council (WRC) and the Department of Conservation (DoC) were variously participant at different stages of my research in order to institutionally contextualise my findings. The following considerations were thereby taken into account in the selection of case studies:

A key aspect was the shared, yet distinct physical geographies that the organisational cases provided. Without attempting to be replicative of the wider Coromandel, the Kūaotunu Peninsula is nonetheless geographically conceived as a 'peninsula within a peninsula'. Projecting approximately 15km and extending 6km across, the Kūaotunu Peninsula incorporates a series of six sandy beaches along its northern coastline that are variously associated with settlement enclaves (*Figure **2***). Defined by a series of intervening rocky headland points, the sequence of beaches intimate at the natural rhythms of coastal processes at play along this northern shoreline - in its direct exposure to the Pacific Ocean. Sand dunes are a common feature of Kūaotunu's beaches and integral in securing a natural 'backstop' to the active zone of coastal processes that are manifest along the composite coastline from Opito Bay through to Whangapoua Harbour.

Discrete beach settlements thereby provide comparable portals through which to explore the intersecting flows, intensities and frequencies of diverse organisational practices over the course of a calendar year. Concurrently, the rhythmic phenomena associated with natural beach processes are also accounted for in the more-than-human materialities of place relations that are relevant to understanding both seasonal and broader temporalities of environmental change (Jones, 2011; Kothari & Arnall, 2020). Here, the diversity of Kūaotunu's beach catchment environments are variously attributed as natural resources, with this diversity materially shaping their physical form both over time and from one year to the next. As noted by Sarah Pink, the ways humans and non-humans, local and global, visible and invisible constituents are co-implicated in the processes through which place is constituted, 'invites us to consider how the experiential and the political intersect in the process of change' (Pink, 2012, p. 8).

A second consideration was the status of environmental conservation groups (ECGs), with particular attention to how they are self-organised, and defined by place (as a key focus of this study). While the Kūaotunu Peninsula is strategically associated with nationally collaborated Coastcare initiatives (see below) the relative investment in Coastcare activities varies significantly between beach communities. Being largely reliant on the external co-ordination (and resourcing) of Councils for periodic planting and maintenance events, most local Coastcare 'groups' draw participants from independent grassroot environmental conservation organisations alternatively associated with individual beach settlements. Concurrently, the scenic nature-based attributes of the Kūaotunu Peninsula are championed by a number of independent grassroot environmental initiatives. This includes the pioneering Project Kiwi, which founded efforts to protect the Brown North Island kiwi population resident on the Coromandel and Kauri 2000, representing a concerted effort in restoring Kauri trees to the interior bush of its mountain-to-sea profile.

The Waikato Coastcare partnership - Tiaki Takutai[18] (formerly Beachcare) involving collaborations between the Coastal Restoration Trust NZ (CRTNZ) with local and regional councils, alongside DoC, Iwi and local rate-payers associations is practically affiliated with TCDC. With appointed Council representatives essentially co-ordinating volunteer activities around the monitoring, maintenance and protection of local beaches, Coastcare activities are variously instituted within the beach

[18] https://waikatoregion.govt.nz/services/regional-services/river-and-catchment-management/about-rcs/beachcare/

communities of the Coromandel's east coast. A provisional engagement with local Coastcare groups, in the context of the broader SMP project, consequently grounds an exploration of seasonal rhythms and representations within a range of organisations uniquely associated with the performance of beaches as discrete public open spaces.

A third consideration was the organisational heterogeneity of local communities, where my intent was to apprehend the complexity of seasonal temporalities in modern society, characterised by diverse institutions-organisations and groups. In addition to hosting tourism, the Kūaotunu Peninsula additionally supports a number of resident artisans, which include a local knifemaker, jeweller, film collective, coffee roasters and a boutique brewery. A local surfing contingent established Luke's Kitchen & Cafe in 2009, providing a social hub for locals and visitors alike in the heart of Kūaotunu village. Collectively, the communities of the Kūaotunu Peninsula may be considered archetypal of a diversified 'alternative' Coromandel community, with its organisational articulations providing a comparable basis with which to research situational seasonalities. This incudes in its diversity of resident *iwi/hapū*. Ngāti Hei (of the wider Mercury Bay area), originally lay claim to the Kūaotunu Peninsula, with many features of their settlement stronghold still evident within the landscape. Descendants of Ngāti Tamaterā are also represented at Kūaotunu, alongside Ngāti Huarere, occupying the foothills of Whangapoua with *kaitiaki* over the harbour.

A fourth consideration was the relative timing of the research at an important juncture when some conservation initiatives are critically rethinking their role in wider coastal management. The SMP project advanced by TCDC in response to actual and projected changes within the coastal environment (of erosion, flooding, biodiversity loss, stresses to infrastructure and so on), effectively provides the research with a '*spatio-temporal event*' (Massey, 2005, p. 130) in which to situate configurations of organisational cultures, materialities, practices and knowledges in process. This place-event is a 'a moment within power-geometries', in this case relating to the contending claims on the natural resources of the Coromandel's coastal environment. Alternatively conceived as a performance of staged practices, (Dirksmeier & Helbrecht, 2008) the reproduction of the coastal environment, including as public open space as well as social and ecological habitats, involves a diverse cast of characters, materialities, values and meanings (Woods, 2010).

A fifth practical consideration was that the Kūaotunu Peninsula was within manageable driving distance from where I live. The relative proximity of 1.5 hours driving to the site enabled me to be regularly present in Kūaotunu over the course of the research period, in order to participate in activities throughout the year. A final consideration related to situating this particular study within the wider research context of the CALENDARS project. Here, the environmental focus of participating institutions-organisations provided a comparative basis with parallel research being conducted within a city arboretum/arboret in Bergen (Norway) as well as post-doctoral research carried out elsewhere on the Coromandel. Specifically, these parallel research streams have provided a reference for shared conceptual thinking around seasons and institutions (Bremer et al., 2021; 2024; 2019) and institutions as well as an exploration of methodological approaches in the early stages of the research.

WHANGAPOUA BEACH

LANDSCAPE CONTEXT

Gently curving N/E facing sandy beach of almost 2km long extending between Motuto Pt and Te Rehutae Pt – to the west of the Whangapoua Harbour entrance. The Pungapunga Stream drains into the ocean at the northern end of the beach, associated with a flat cultivated wetland area, with the main Whangapoua settlement is located on the flats extending behind the beach. The rural township includes a local café/shop, public toilets and fire station. Bush settlement extends into the foothills flanking the beach and western harbourside, with a public campground located at the head of the harbour road junction.

SETTLEMENT & DEMOGRAPHICS

A popular holiday/tourist destination with the secluded New Chums Beach (Wainuiototo Bay) located to the north-east of Whangapoua. Created by subdivision in the early 1960's, the existing settlement includes a large portion of semi-permanent (second home) owners and an estimated permanent population of 120 (Statistics NZ, 2023). The Whangapoua foothills remain the residential base of descendants of Ngāti Huarere, whose rohe originally extended from the interior ranges, to offshore Mercury Islands and through to Kūaotunu before being pushed back by migrating tribes.

ENVIRONMENTAL INITIATIVES

- Coastcare
- Ngati Huarere ki Whangapoua Trust
- Mana Manu Trust
- Whangapoua Reserves Committee (RRA)

LOCATION

MATARANGI BEACH

LANDSCAPE CONTEXT

A populated sandspit of 1km wide extending approximately 4km across the eastern mouth of the Whangapoua Harbour. Incorporating areas of mature pine plantings, the contemporary development of Matarangi as a residential settlement features a golf course and airstrip – both located towards its western extent. The north-facing spit is contained to the south by a marshy inlet of the Whangapoua Harbour, while the main Matarangi beach confronts the Pacific Ocean to the north.

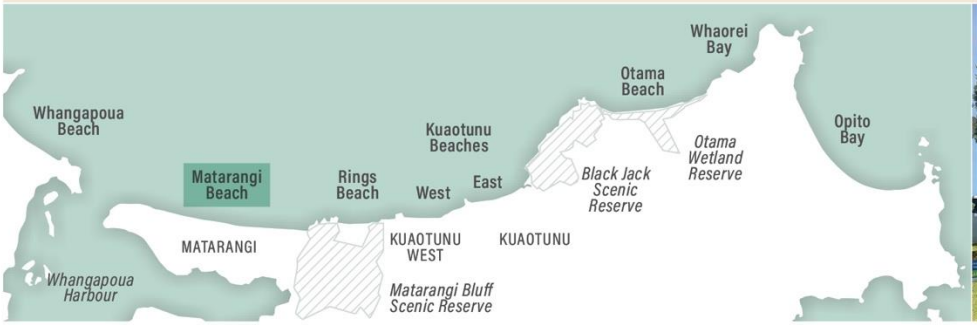
SETTLEMENT & DEMOGRAPHICS

Developed as a contemporary 'resort' settlement in the 1980's, Matarangi includes a golf course and airstrip alongside cafes/restaurants and shops. Largely populated by retirees, Matarangi is home to an estimated 620 permanent residents and is therefore the biggest settlement on the Kūaotunu peninsula.

ENVIRONMENTAL INITIATIVES

- Coastcare/Matarangi Beachcare
- Matarangi Reserves Committee (RRA)

LOCATION



RINGS BEACH

LANDSCAPE CONTEXT

Small enclave of traditional baches extending behind the small beach at the western extent of the no-exit Bluff Road beyond Kūaotunu West. The 0.5km sandy beach is flanked by rocky headlands, incorporating the Matarangi Bluff Scenic Reserve (DOC) to the east. Backed by a bush-clad basin topography associated with the Waiari Stream to the south, a spring fed wetland sitting at its base is visually concealed from the beach settlement located to its north.

SETTLEMENT & DEMOGRAPHICS

Discrete beach settlement almost exclusively comprised of traditional bach-style homes to a closed community of around 30 residents - approximately one third of which are permanent retirees. Because of its small size and lack of public facilities, Rings Beach is less visited by tourists, although hosting a number of invited guests over the peak summer season.

ENVIRONMENTAL INITIATIVES

- Rings Beach Wetland Group
- Coastcare
- Rings Beach Residents

LOCATION

KŪAOTUNU WEST BEACH

LANDSCAPE CONTEXT

The original bach settlement extends along Bluff Road from its junction with SH25 (Kuaotunu-Wharekaho Road) while the beach continues eastwards along SH25 to Quarry Point. Around 1.5km in length, the curvature of the sandy beach is 'interrupted' midway by the Pitoene Stream, which also defines the eastern extent of settlement. The inland flats, which incorporate the Kūaotunu Motor Camp holiday park are otherwise flanked by rural land holdings, while residential development continues on the bush-clad foothills that provide a backdrop to the western half of the beach.

ENVIRONMENTAL INITIATIVES

- Kuaotunu Dune Care Group (KDCG)
- Kūaotunu Backyard Trappers
- KEA (Kuaoutnu Environment Action)
- Coastcare

SETTLEMENT & DEMOGRAPHICS

Defined by a large proportion of second home owners, incorporating exclusive holiday homes extending into the foothills behind the western end of the beach, the frontal flats include more modest baches alongside leasehold sites within the campground. Residential development has continued without main services as a satellite to the main Kūaotunu (East) Village with the combined population of both settlements estimated at 260 (Statistics NZ, 2023)

LOCATION

KŪAOTUNU EAST BEACH

LANDSCAPE CONTEXT

Defined by the prominent coastal Blackjack bluffs to the east and Quarry Point to the west, Kūaotunu East beach is closely aligned with the main highway of SH25 for the majority of its 1.5km length. With public boat ramp access provided off the rocky outcrop of Quarry Point, the village of Kūaotunu East is otherwise associated with the junction of SH25 with the local Blackjack Road that provides access to the eastern end of the peninsula. The centre of Kuaoutnu Village is located on the floodplain flats of the lower reaches of the Kūaotunu River before it flows into the ocean.

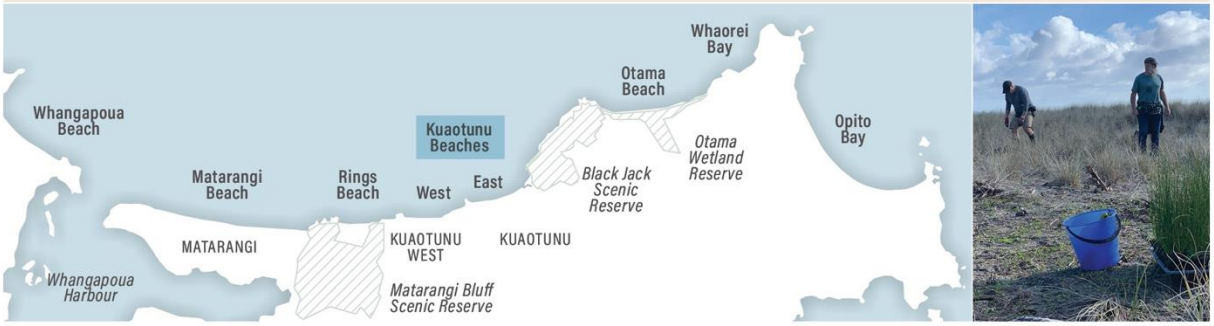
ENVIRONMENTAL INITIATIVES

- Kuaotunu Dune Care Group (KDCG)
- Kūaotunu Backyard Trappers
- KEA (Kuaoutnu Environment Action)
- Coastcare

SETTLEMENT & DEMOGRAPHICS

Established as a 'boomtown' following the discovery of gold-bearing reefs in the 1890's, Kūaotunu has remained the social 'heart' of eastern Kūaotunu. Offering a local shop/takeaway, restaurant/ café, casual hairdresser and therapeutics, Steiner Kindergarten, Library, Tennis Courts, Community Hall and Fire station, Kūaotunu is well-appointed for its size (260 permanent residents in conjunction with Kūaotunu West). Houses range from modest traditional bach-style beachfront residences to architectural showcases, spanning the eastern end of the beach.

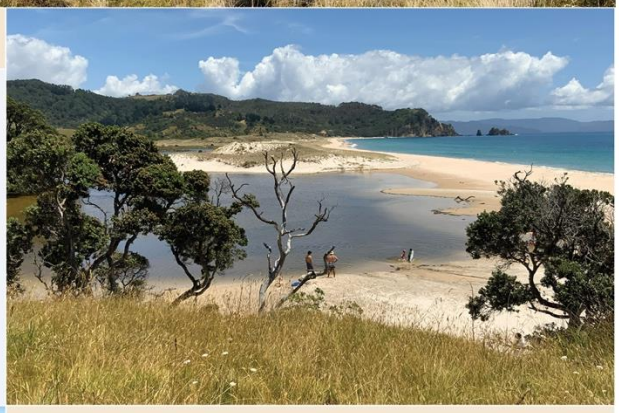
LOCATION



OTAMA BEACH

LANDSCAPE CONTEXT

Otama is distinguished by its expansive bush-to-sea catchment landscape associated with the Otama River at the eastern end of the peninsula. With minimal settlement located on Otama Beach Road at the eastern end of its 2km long beach frontage, Otama is distinguished by the profile of its substantial dunes backed by its coastal wetland reserve. The Otama River basin landscape is otherwise flanked by medium-large rural Lots extending from the foothills through to SH25, which include commercial forestry production.



SETTLEMENT & DEMOGRAPHICS

As the smallest physical settlement on the Kūaotunu peninsula, Otama beach is home to only a handful of permanent residents, with a balance of second home owners. The larger rural lots located towards the western end of the beach include permanent residents engaged in varying scales of rural production/ lifestyle activities. With the closure of the campground in recent years, there are limited places to stay for visitors and no public services.

ENVIRONMENTAL INITIATIVES

- Coastcare
- Otama Reserves Group
- Project Kiwi

LOCATION

OPITO BAY

LANDSCAPE CONTEXT

In its location at the eastern end of the Kūaotunu peninsula, Opito Bay is distinguished by its gently concave north-easterly orientation and 4km of sheltered sandy beach frontage. Exclusively accessed via the gravelled Blackjack road, Opito Bay is relatively developed with approximately 300 residential sections. It is flanked at both ends by rural pasture lots, which incorporate Optio Pa historic reserve at its eastern end. Plantation forestry also distinguishes the foothills towards the eastern end of Opito Bay. Historically, these foothills were a wealthy source of Tahanga basalt used for Maori toolmaking throughout the north island. Opito has a rich archaeological history associated with this industry as a result, as well as serving as a rich food bowl and fortress for early settlers.

SETTLEMENT & DEMOGRAPHICS

With a majority of holiday homes, there are less than 20 permanent residents at Opito Bay and limited public facilities. Originally grown from the subdivisions of two farms in the 1970' after becoming a popular camping destination during the 1960's, Otama is today an exclusive destination for second-home owners and holiday visitors alike. An assortment of beach homes extend along the beach road and more recently into the forested foothills to the west.

ENVIRONMENTAL INITIATIVES

- Coastcare
- Opito Bay Ratepayers Association (Environmental Group)

LOCATION

4.2.2 ***Participant Recruitment***

Provisionally, I sought to work directly with representative Coastcare groups on the Kūaotunu Peninsula, alongside key Council representatives (from TCDC and WRC) and DoC. Following provisional meetings with Council's Coastcare co-ordinators, acting as key informants, I saw the practical orientation of Coastcare groups around beach maintenance and coastal restoration activities as providing key opportunities to observe the seasonality of locally organised practices intersecting with those of Councils and DoC. My expectation was that extended networks of informal grassroot environmental initiatives would be subsequently revealed through my primary engagement, with Coastcare, as a form of purposive snowball sampling (Tracy, 2013). Since local 'Coastcare' operations were invariably championed through resident environmental groups, this effectively expediated my introductions to grassroot initiatives within individual beach communities, initially by participating in locally scheduled Coastcare planting/maintenance events. As well as revealing the co-ordination of local conservation activities for individual beaches, the networked interactions between locally orchestrated social groups, including residential Ratepayers Associations, recreational clubs and tourism ventures, provided additional insights into how these abutting social worlds affected local conservation work. Some key events, such as annual planting days, often drew additional support from local residents that were not routinely engaged in organised conservation activities, while some committed participants were observed to contribute across conservation initiatives on the Kūaotunu Peninsula.

Facilitated by its geographical containment and intensity of social networks, the snowball 'sampling' approach, involving personalised recommendations and introductions was particularly appropriate for engaging with the composite beach communities of the Kūaotunu. As the research progressed and I became increasingly interested in how temporalities were co-constituted in self-organised groups, the ethnographic work came to centre on the independent grassroot initiatives associated with individual beach communities, as the core case-studies, with externally organised Coastcare activities periodically recruiting from these existing groups and their local networks (see *Tables* ***1*** and ***2*** below for an overview). New primary contacts were established through this process, albeit over a briefer duration, while there were also some changes in group representations over the course of the research, due to people either moving away from or into Kūaotunu. Of the 45 participants I actively engaged with over the course of my research, 7 individuals from different groups acted as primary participants. My original points of contact, were 'self-appointed' individuals who would voluntarily continue to keep me informed of their group activities – including after I had exited the field!

While a more targeted approach was required for engaging with local *iwi*, I was informally introduced to representatives from Ngāti Hei, Ngāti Huarere and Ngāti Tamaterā through the course of my research. This facilitated an extended engagement with Ngāti Huarere, while giving representation to the Whangapoua beach settlement located on the opposite shores of the Whangapoua Harbour to the Kūaotunu Peninsula.

ORGANISATION	WHANGAPOUA	MATARANGI	RINGS BEACH	KŪAOTUNU	OTAMA BEACH	OPITO BAY
Department of Conservation	●	●	●	●	●	●
Waikato Regional Council	●	●	●	●	●	●
Mercury Bay Environment Trust	●	●	●	●	●	●
Thames Coromandel District Council	●	●	●	●	●	●
Project Kiwi			●		●	●
Otama Reserves Group					●	
Rings Beach Wetland Reserves Group			●			
Kūaotunu Environment Group		●	●	●		
Kuoatunu Dune Care Group				●		
Matarangi Coastcare		●				
Opito Bay Ratepayers Association (Coastcare)						●
Coastlands Native Plant Nursery	●	●	●	●	●	●
Mana Manu Trust Whangapoua	●					
Ngati Huarere ki Whangapoua Trust	●	●				
Ngati Hei	●	●	●	●	●	●

Table 1 – Networks of Coastal Conservation Organisations Operating on the Kūaotunu Peninsula

4.3 Research Methods and Tools Selection

While working exclusively within a qualitative approach, I designed the research to draw on multiple modes of data collection. This involved methods that are common to the broader CALENDARS Project, as well as those that are specific to my discrete research focus within this. The selection of research tools set out below have been specifically tailored to the research questions, the concepts, and the methodological approaches that framed this research, while maximising the opportunity to capture rich in-depth data in collating different dimensions of everyday life from a phenomenological perspective (Bennett, 2014). From a rhythmanalytical perspective, this methodological plurality was also aimed at capturing a multiplicity of rhythms through alternative approaches. While the intention was not to validate my findings through

replicable data sets (Flick, 2014) the alternative sources of data did help me to identify and elucidate important patterns and relations within and between case studies – as discussed further under Section 4.5. Employing a suite of methods equally afforded me an inherent flexibility to adapt my inquiry to the evolving arrangements of research engagements within the field, including through relationship building with participants (Vigurs & Kara, 2017).

Following a series of informal meetings and site visits to Kūaotunu, conducted as part of scoping the feasibility of my proposed research towards the end of 2020, my choice of methods has equally been informed by the practical arrangements (and limitations) of case studies. Since the field research was extended over successive calendar years, this importantly includes a consideration of the anticipated tolerances and expectations of research participants. At the same time the varying dynamics of participant groups also allowed me to experiment with using different combinations of methods at different times, while concurrently maximising the opportunities for participants to reflect on their contributions, including alongside other participants, over the course of the research. A summary of participating groups can be found in *Table **2*** (at the end of Section 4.3) along with the associated suite of methods employed with each. Full summaries of group (*Table **4***) and participant profiles (*Table **5***) are located at the end of this chapter.

Fundamentally, the interpretative phenomenological approach that formed the basis of my research was unable to rely solely on narrative accounts of the seasonal practices undertaken by participants, instead requiring alternative creative methods with which to reveal and disclose tacit and embodied dimensions of ways of knowing through practice (Bennett, 2014; Dakka & Smith, 2019). Importantly, the group focus of my research required composite methods that would not separate individual experiences of conservation activities from their socially organised contexts. In the context of changing seasons, a phenomenological orientation to how things appear alongside their social meanings involves exploring the relationship between individuals within shared 'lifeworlds' through an interplay of objective-subjective experiences and observation-interpretation. Here, the lifeworld methods developed in the phenomenologically orientated research of Karin Dahlberg advocate for iterative combinations of observational and narrative data (involving social groups) alongside existing theories (Dahlberg & Dahlberg, 2020). Methods of participant observation, involving my practical engagement with participating groups were consequently combined with narrative accounts, while experimenting with the visual, timelining and walking interview techniques described below in various combinations. Seeing rhythms as 'architectures of narratives, sensations and embodiment', (Edensor & Holloway, 2008) likewise invites an extended range of qualitative research methods in the elucidation of rhythms. Building on Lefebvre's idea of the human body performing as a 'metronome' for the registration of rhythms, Dawn Lyon frames the body as 'an autoethnographic and metronomic device' for observing rhythm in the practices and performances of others (Lyon, 2019, p. 45). But in recognising the limitations of an observing body to absorb and translate multiple rhythms, Dakka and Smith (2019) equally confirm the importance of combining diverse methods in order to be able to adequately capture the varying scales, temporal registers and physical locations of

rhythmic activities. As complex rhythmic phenomenon, involving both social and environmental dimensions across time and space, the lived experience of seasonality extends beyond the embodied practices of individuals within their everyday lives. In the context of globally changing climates, the exploration of local experiences of changing seasons through organised conservation practices necessitated extended methods of observational-narrative data collection and analysis in order to accommodate these scalar dimensions. This accords with the plurality of methods deployed in the rhythmanalysis studies noted previously being tailored to their specific focus.

4.3.1 ***Participant Interviews***

From formal interviews closely structured around a pre-set of questions to informal narrative interviews based around the personalised accounts and stories of respondents, interviews traditionally form a key premise of qualitative social research methods (Tracy, 2013). For my research purposes, I employed a range of semi-structured interview formats focused on eliciting narrative accounts, in order to provide contextual detail and verification to experiential data obtained through observing participants routinely engaged in organised practices (Knott et al., 2022). As a companion method to field observations, interviews formed an important component of my research strategy, involving topical conversational lines of questioning that were common to the CALENDARS Project research, while being tailored to my case studies, and to some degree evolved at different stages of the fieldwork. The range of interview templates used for different participants/groups are provided within *Appendix **B**.*

While individual narrative interviews were often used at a first or one-off meeting with key participants in a neutral setting, group member interviews were also used over the course of a sustained engagement with case-study organisations. Interviews with representatives from formal agencies, including TCDC, WRC and DoC were employed towards the end of the fieldwork cycle, in order to be able to structure appropriate questions of interviewees, based on fieldwork experience and insights gained prior.

In all cases, participants were provided with background information on the CALENDARS Project through a link to the project website, alongside an information sheet produced specifically for my PhD research (*Appendix **C***). I additionally provided participants with an overview of the key topic domains that would structure the discussion beforehand (listed below). This was particularly important in recruiting participants to focus group meetings, where local organisers needed to be able to convey the purpose of the session to prospective attendees:

- *Round table introductions, covering biographical and ideological connections with Kūaotunu/ Coromandel and subject organisation*
- *General understandings of seasons and seasonality both in ANZ/Coromandel and locally within Kūaotunu*
- *How the calendar year is typically planned and organised around the seasons – including socially/ culturally as well as practically for specific organisations*

- *Exploring 'typical' seasonal observations and practices and any changes associated with seasonal patterns and 'markers'- specifically related to personal/group activities*
- *Future perspectives and planning for change*

It is important to note here that the broader topic of 'Climate Change' was not broached directly through my line of questioning with participants, which was strategically left to develop through consideration of their practical experiences and observations of seasonal changes in the field. Consistent with the phenomenologically aligned approach the research follows, I was specifically not wanting to bias participants with 'pre-loaded' interpretations of their seasonal experiences, while allowing for changing climates to be raised by them (or not) under future perspectives and planning for change.

In line with the ethics code applied to the CALENDARS project (see section 4.7) participation consent forms were required to be completed by all participants before documenting interviews, the transcripts of which were routinely offered to interviewees for review – although most declined. Interviewees were additionally invited to fill in calendar templates as a reflexive tool for individuals on the back of interview discussions – as discussed further in the details provided below (4.5.1).

4.3.2 ***Narrative Interviews***

As well as 'making present' individual life experiences in a particular time and place (Abbott & Sapsford, 1998; Schiff, 2012) storied narratives also have generic properties that reflect shared cultural conventions alongside personal evaluations (Brannen, 2013). In the events of changing climates, local narratives are increasingly seen as offering self-reflective insights to narrators and thereby potentially contributing towards collectively responsible participatory actions (Lejano et al., 2013; Paschen & Ison, 2014).

In order to access their personalised accounts of changing seasons and seasonality in the context of locally organised ECGs, key individuals from participating groups were interviewed using a narrative format. Selected individuals were either primary members of local ECGs, or key representatives from larger groups, with particular insights to contribute. For smaller groups, I interviewed up to three participants at once as well as three interviews conducted with pairs (see *Table **3***). Since most participants were also resident on the Kūaotunu Peninsula, interviewees were able to draw from their everyday lives in reflecting more broadly on seasons. Interviews were conducted at local locations of participants choosing, most typically over coffee in the local Kua Kawhe café (literally the social hub of Kūaotunu village) and occasionally within people's homes. Settings were intended to promote a comfortable informality to the interviews, alongside a respectful balance of power between interviewer and interviewee (Braun & Clarke, 2013; Lareau, 2021). If hosted at a private residence, I would typically provide some home baking - by way of a *koha*– and especially for group interviews, which, as noted by Lareau, initiates a reciprocity that is foundational to the interview exchange (Lareau, 2021).

Typically lasting for approximately one hour - all interviews were audio-recorded with permission. Although broadly structured around common topic domains, narrative interviews were equally guided by the reflections of individual participants (Paschen & Ison, 2014). At their conclusion, participants were shown selected samples of calendars from around the globe and invited to take away the 'Our CALENDAR' tool template. Pre-paid return courier postage was provided with the Calendar templates for participants to submit these back to me in their own time.

4.3.3 Focus Group Member Discussions

While working with some groups over a sustained period of successive seasons, I took the opportunity to 'canvas' group members collectively in a focus group setting at key junctures. Usually, this followed extended periods of observing core members of a particular group, with whom I had become familiar. Comprising between 5-10 participants, these focus groups were conducted at nominated places of residence, with refreshments provided. Sessions were typically co-ordinated through a primary participant/group leader and either held in conjunction with a routine social event or as a pretext for an informal social gathering. In addition to the obvious efficiencies involved in conducting a shared session, involving participants in the planning process ensured that a social focus was retained. Not only were members already associated and therefore assumed to be at ease in informal discussions, but the residential setting was intended to be both familiar and comfortable to participants. While there was clearly the potential for imbalances between individuals in the social dynamic of different groups, this was effectively 'normalised' by how the group typically functions and therefore revealing in and of itself. Within this setting, I was the obvious 'guest' and therefore able to avoid unfavourable power dynamics with participants from the outset, while also accepting that my presence was likely to influence some internal aspects of the group dynamics.

Originally developed as a participatory research technique to bridge local knowledges with science, focus groups are aimed at collecting data through group interactions on emerging topics (Nyumba et al., , 1996; O. Nyumba et al., 2018). An obvious advantage of the focus group format is the ability to identify shared views and values from amongst participants, particularly as it relates to the core function of a particular group within a particular setting. By the same token, it is also possible to identify where there are differences of opinions between individual participants and how these are negotiated and justified through their collective sensemaking (Cameron, 2005; Wilkinson, 1999). Focus groups thereby involve multiple sources of data from individuals, the group, and the interaction between the two (Cyr, 2019). Working to a similar structure for the group exchange as for individual interviews, I found that focus member groups initially required more probing with opening questions, while discussions became more sustained as sessions progressed through the key topics. In this way, my researcher role shifted from interviewer to moderator, while allowing me to observe the critical interactions between participants over the course of discussions (Nyumba et al., 2018). In a few cases, focus group discussions identified members with a particular experience or knowledge of seasons that I was able to follow up through either individual interview or practical observation. The 'Our CALENDAR' templates that were offered to all participants at the end of focus group sessions were additionally intended to

provide individuals with the opportunity to reflect on their personal experiences of seasons on the back of the group discussions.

4.3.4 ***Formalised Representative Interviews***

Focused conversations with individuals representing a formal government organisation or agency, such as the local municipality (TCDC), regional council (WRC) or ministerial department of conservation (DoC) were structured around standardised sets of questions – only partially varied by the different remits of these organisations relative to my research. Representatives from these organisations were neither resident nor occupationally based on the Kūaotunu Peninsula and therefore had a level of removal from local beach communities. And since it was more difficult for them to 'narrate' the seasonality of conservation activities at Kūaotunu through everyday experience, the narrative interview framework was poorly fitted to these interviewees. Instead, extended questions were alternatively developed from the common topics, identified in section 4.3.1 above, in order to explore the relationship of the representative organisation with environmental conservation activities on the Kūaotunu Peninsula and the resulting knowledge and experience of seasons and seasonality associated with *this (Appendix **B***). For this reason, formalised interviews were mostly performed towards the end of the fieldwork cycle, informed by the insights from practical observations of local ECGs conducted prior. Focus groups likewise offered participants the opportunity to reflect, alongside others, on their evolving perceptions and interpretations of seasonality as part of the co-produced research process.

4.3.5 ***Focus Group Workshop***

By way of 'bookending' my extended time in the field, I had originally planned to hold a focus group workshop with key representatives from participating groups as an opportunity to collectively reflect upon changing seasons on the Kūaotunu over the course of their engagement with my research. In the event, the Focus Group Workshop (FGW) was timed in the wake of the successive summer cyclones of 2023 and thus provided a key opportunity for participants to reflect on their direct experience of a significantly anomalous summer season.

The workshop was attended by 15 people, representing environmental initiatives from across Kūaotunu's beaches, alongside TCDC and the WRC, and was held in Kūaotunu on the afternoon of Wednesday 26th April 2023 between 2-5pm. Broadly structured around capacitating the role of local ECGs in adaptation planning on the Kūaotunu Peninsula, the workshop sought to expand upon addressing the second part of my research question. This was facilitated through a focused conversation method specifically designed to access 'group wisdom' (Stanfield, 1997/2000) in responding to trigger questions. Conducted in two parts; the first half of the afternoon session was run as a focused conversation around what 'summer' 2023 had taught local groups about change. The second half of the session went onto explore with participants how local ECGs work with change. Utilising techniques I had learned from external training in public facilitation, both the planning and summary notes from the workshop event are provided in *Appendix **D***. In this exercise, it was the written and graphic material generated by participants at the workshop that provided the data for subsequent analysis. To this end, the workshop was specifically designed to

capture this information, including through a graphic 'wave' analysis, used to identify the current, past and future planned activities of local groups, in the context of locally adverse 'undercurrents'.

With the timing of the workshop following in the wake of the publication of the SMP project reporting by TCDC at the end of 2022, it provided a pivotal moment for participants to willingly reflect on adaptation through their recent experiences of the summer cyclones of 2023. Specifically, this created a rare opportunity for grassroot initiatives to share collective (as well as disputed) issues and concerns with government agencies in a neutral setting designed to facilitate equitable contributions. In the absence of representatives from DoC[19], the workshop conversations were generally constructive, if not conclusive, in the candid sharing of knowledges. In this way, the session was seen as contributing to processes of knowledge co-production in the context of local adaptation planning. Although sometimes contested, the processes of generating co-produced knowledges are otherwise associated with building capacity, social networks and sustainable actions in the local contexts of social-environmental challenges (Bremer & Meisch, 2017; Klenk et al., 2017; Moallemi et al., 2023).

As the culmination of my fieldwork, the workshop also provided a key opportunity for primary participants to draw on their seasonal knowledges cultivated through an extended research engagement process. Although involving large investments of time, the workshop was generally appreciated by attendees. For my own research purposes, the workshop provided confirmation of many of the shared agendas and contested issues confronting local ECGs alongside presiding Council authorities in the context of social-environmental change.

*4.3.6 **Participant Observation***

The observation of participants within their institutional-organisational field of practice was a fundamental premise of my research. By shadowing (Gill, 2011) participants in their routine organised activities, I was able to observe both the conscious (explicit) and sub-conscious (tacit) aspects of situated conservation knowledges they drew on, alongside that of broader place experience, values and meanings. In her phenomenological perspective, Julia Bennett refers to observational accounts as obtaining a 'sideways' perspective of participant lifeworlds, which she likens to the wings of a theatre stage (Bennett, 2014). Although comprising an altered perspective (and expanded depth of field) to that of the general audience, the 'play' can still be appreciated and understood by the participating observer within the wings. In providing this alternative perspective, complementary phenomenological methods can thereby provide scaffolding to verbal accounts (Smith et al., 2021).

*4.3.7 **Volunteer Participation***

Since the routine practices of grassroot environmental initiatives on the Kūaotunu Peninsula are centred around activities occurring at varying frequencies and durations and involving volunteers with variable levels of commitment, this created a relatively easy entry point for my periodic

[19] Although DoC tactically declined representation at the workshop – as discussed later within the research findings in Chapter 6

participation. By actively partaking in conservation activities alongside participants, I was able to establish a reciprocal exchange through my genuine contribution to the task at hand, while observing others engaged in shared practices. In this way, my own experience formed part of my observational insights, as much as my actions had consequences for the field I was studying (Zahle, 2012). It is important to acknowledge here that the skills associated with my professional background (as a Landscape Architect/Ecologist) inevitably helped me to gain acceptance into this field, by asserting my credibility amongst project managers within Councils and DoC.

My volunteer participation in local ECGs has involved a core set of case-study organisations with which I worked consistently for the duration of my research, alongside a secondary set of organisations with whom I worked periodically during the course of my fieldwork (as previously identified in Section 4.2.1). Consequently, my techniques of participant observation and recording have varied with these different forms of engagement. At the same time, the combination and sequence of volunteer activities I have participated in over the course of my fieldwork has enabled me to both observe and experience the periodicities and rhythms of conservation practices on the Kūaotunu Peninsula over the course of a calendar year.

The conservation practices in which I routinely participated, revolved around restoration planting and maintenance of public reserves that are variously comprised of beach, bush and wetland habitats. This has included winter planting events and monthly maintenance weed/pest removal operations within groups; routine trapline runs with individuals - involving re-baiting, replacing and maintaining traps; and the cyclical collection and propagation of native seedlings. While partaking in these activities alongside regular volunteers, I was actively observing the 'scene' as a whole, alongside the individual practices and interactions of participants and myself. Typically lasting between 2-4 hours, sessions were documented by recording my observations within a standardised table template immediately afterwards (see *Appendix **E**).* When either a morning tea or barbecue ('sausage sizzle') 'event' were provided as part of the planting/working bee, these social interactions were included as part of my observations. Once I had become familiar to participants as an effective member of their group, I found people voluntarily updating me with their latest observation and insights into seasonal phenomena, while they became accustomed to being 'observed'.

4.3.8 ***Walking Narratives***

Originally conceived as a form of 'walking interview', I typically observed individuals from core environment groups during their routine trapline runs. Deploying a 'GoPro' camera (attached to myself), I have found this method to be particularly suited to the objectives of my research. Widely espoused within phenomenological and place-based empirical studies (Evans & Jones, 2011; Ingold, 2008) the walking interview generates and captures recollections of emplaced experience, through direct reference to the landscapes in which they are conducted. As well as observing participants first-hand as they are engaged in the practice of clearing animal pest catches and resetting traps, I was also able to surveil them practically engage in and transition through a familiar place. The slow walking pace of trapline operators is particularly revealing of the

particularities of the immediate environment and to changes that may be occurring therein. Observing alongside participants (and often assisting with tasks) I was also able to reflect on the environmental conditions, while being able to chat informally with participants about what they are doing, seeing and feeling in the context of seasonal change. Typically a fortnightly or weekly practice, trapline operations afford a key opportunity for participants to routinely monitor environmental change on several levels, including through the composition of their pest catch, changes in the local flora and fauna and track environment as well as through ambient weather conditions.

With trapline work usually a solitary practice, this method of participant observation afforded me a key opportunity to explore the tacit dimensions of environmental change alongside participants from a range of locations on the Kūaotunu Peninsula. With animal pest trapping a common practice amongst conservation initiatives, I was able to engage in selected trapline runs from a range of participating groups. Trappers have also been part of some focus group interviews, which either precede or follow the routine trapline run. This allowed me to focus walking conversations in the field with participants on the particularities of the practice and place in the context of environmental change, rather than homing in more specifically on seasons. The spatial specificity of trapline narratives consequently adds layers of contextual detail (meanings and connections) over that of sedentary interviews with individuals or groups (Evans & Jones, 2011).

4.4 Monitoring the Social Context

As a supplement to my ongoing fieldwork on the Kūaotunu Peninsula, I concurrently tracked local, national and international events of relevance to my research during the last four years in which to contextualise my findings. This has included monitoring for public community events as well as developments in national/international governance and legislation.

4.4.1 ***Community Events***

Over the course of my research, there have been a selection of events I have attended with specific relevance to environmental activities and practices on the Kūaotunu Peninsula. These included several public meetings in relation to the SMP process convened by TCDC, as well as a locally initiated inaugural Environmental *Hui* for Kūaotunu, hosted in May 2021 by local resident Ratepayers Associations. Public sessions were also held in Whitianga in July 2021 addressing the state of the Hauraki Gulf, and specifically the wider Mercury Bay seaboard in the aftermath of the local scallop *rāhui* imposed by Ngāti Hei in Summer 2020. My records of these events have specifically provided me with further insights into the local politics surrounding environmental initiatives on and around the Kūaotunu Peninsula as well as revealing and reinforcing some of the key values and contentions involved.

4.4.2 ***Local Media***

Local media, including printed publications and online resources, have additionally furnished me with further context and commentaries on local conservation issues and initiatives of direct

relevance to my research on the Kūaotunu Peninsula, considered in the context of national strategies and developments. *The Mercury Bay Informer* is a weekly newspaper covering the wider Whitianga area, while *The Seagull* is put out quarterly by the Kūaotunu Peninsula community. Online newsletters published by TCDC have also been casually monitored throughout the course of the project.

4.4.3 Autoethnographic Observations

For the duration of my time in the field, I kept an open diary to document personal observations of the changing seasons alongside a timeline of events. In addition to the changes I personally noted in my routine visits to the Kūaotunu Peninsula, I also made a note of changes I observed from my rural home base in the Kauaeranga Valley, in Thames. While acknowledging their different contexts, this record has been instructive to reconcile with the observations of participants collected during fieldwork, in revealing both similarities and differences in the microclimatic variations between the different coastlines and beach environments within this.

4.4.4 Document Review

A number of relevant documents have been published during the course of my research, including by TCDC as part of their SMP project process as well as new government reports and legislation relating to climate change adaptation and mitigation policy (covered in Chapter 3). Several of the groups I worked with have also commissioned their own independent reports that have been reviewed as part of my research (identified in *Table **6*** Chapter 5). These reports have been considered in the context of changing discourses about environmental and climate change on the Coromandel Peninsula specifically, but also at national and global scales.

4.5 Data Documentation

I drew on a range of research methods, which recorded and documented data in alternative formats. Rather than introducing inconsistencies between the research findings, the relative sources of data are designed to substantiate my findings through their 'triangulation' (Denzin, 2012; Flick, 2014). This methodological-data triangulation is specifically intended to 'produce knowledge at different levels….by extending that made possible by one approach and thus contributing to promoting quality research' (Flick, 2018, p. 23).

4.5.1 Calendar Template

An 'Our CALENDAR' template was originally designed and developed to capture the reflections of individual participants following narrative interviews. Loosely based on circular calendar templates, versions of the 'Our Calendar' template have been developed for the CALENDARS research in both ANZ and Norway. A range of sample calendars from around the world were typically shown to participants, for an appreciation of the diverse ways in which people perceive seasonality, before inviting them to take the calendars away to fill out on in their own time. Although formatted as a standard circular calendar, the calendar templates are otherwise designed to be creatively customisable by individuals. Provisional pilot runs of the calendar

template, conducted with early research participants in ANZ in 2020, proved promising and led to the refined design of the 'Our CALENDAR' template by professional design communicator Edgar Melitao – based in Thames (*Appendix **F***).

Ultimately, the calendar templates were designed as a creative tool for participants to reflect on both their perceptions and experiences of seasons and seasonal change. As well as potentially providing additional details to what was discussed in an interview, the template invites participants to reflect upon the sequences of seasonal phases, phenomena and events over the course of the calendar year, including when the year typically begins and ends. The standard format of the 'Our CALENDAR' template allowed for submitted calendars to be considered alongside one another in the identification of key themes.

In reality, I received very few CALENDAR templates back from participants, with the majority citing time constraints, while others were simply not interested in undertaking the task, and as such they have not formed part of my analysis. I reflect further on this abandoned method in section 4.8.

4.5.2 ***Audio Recordings***

It is standard practice for narrative interviews to be captured in audio recordings requiring participants consent. All narrative interviews were recorded as such in order to be digitally transcribed through TRINT[20] into text versions for my analysis. Since the digitally transcribed interviews required proofing in all cases, this step became a provisional stage of my analysis, in which I was required to re-listen to interviews, while ensuring the accurate documentation of what was said. In order to remain unidentifiable within the publication of my results, interviewees were assigned pseudonyms. Completed transcripts were then offered to participants for their review/comment prior to being finalised. Although most participants declined this opportunity, internal screening was an organisational requirement for all interviewees representing statutory agencies.

4.5.3 ***Visual Record***

A photographic record of each of the beach environments involved in the study was maintained from fixed photo-points covering my calendar years of fieldwork. I also took photos of each of the key sites associated with specific ECGs, alongside photographic records of the volunteer activities I have been directly involved in and thereby documenting participants engaged in various restoration activities (presented within Chapter 5). While most participants were agreeable to being photographed for the purpose of my research, I have tried to avoid using direct photos of individuals in my research, unless they have been directly provided to me by the subject. Video footage from trapline interviews has provided both a visual and audio record of this particular practice for analysis and interpretation. Although this provides a more detailed record of walking interviews, the logistics of storing and transcribing these interviews was unduly labour intensive.

[20] TRINT – an international automated transcription software programme used by CALENDARS

ORGANISATION	INTERVIEW	TRAPLINE	FOCUS GROUP	WORKSHOP	VOLUNTEER PARTICIPATION	OTHER	DETAILS
Ngati Huarere ki Whangapoua Trust	3					x2	• Attended two archaeological inspection surveys at Matarangi and Opera Pt – Whangapoua Harbour
Mercury Bay Environment Trust	2			2	6	x1	• Regularly attended weekly nursery volunteer mornings • Native seed collection
Rings Beach Wetland Reserves Group	2	3	1				
Rings Beach Residents	3		10		1	x2	• Annual dune planting day on Queens Birthday • Attended New Year's Brunch
Kuoatunu Dune Care Group	2		8	1	6		• Regularly attended monthly working bees and periodic planting events
Otama Reserves Group		3	5	1	2	x2	• Periodic participation in planting days for wetland and recreational beach reserves • Attended initial meeting with WRC for presentation of Wetland Restoration Plan • Attended wetland planting planning day with WRC
Opito Bay Ratepayers Association	2				2		• Annual dune planting days
Otama Coastcare					2		• Dune plantings at the eastern end of the beach
Matarangi Coastcare				1	1		• Single annual planting event with local school
Kūaotunu Environment Action	1			1			
Mana Manu Trust	1			1			
Thames Coromandel District Council	2			2		x6	• Attended local SMP public participation meetings • Attended mini coastal conference hosted by TCDC
Coastlands Native Nursery	1					x1	• Attended seed collection workshop
Waikato Regional Council	2			1			
Department of Conservation	1						

Narrative Interviews
Walking Trapline Interviews
Group Interviews (Participants)
Focus Group Workshop (Invited Attendees)
Volunteer Participation
x2 Other Events Held

Table 2 – Summary of Participant Organisations and Associated Research Methods

4.5.4 *Field Observations*

All of my field methods were supplemented by hand-written notes documenting key conversations or observations from my visits to Kūaotunu in a journal format covering the duration of my research. Notes made during narrative interviews, or focus group meetings, capturing observations that are otherwise unable to be conveyed within an audio recording were also referred to alongside interview transcripts as part of my analysis. For my practical participation in organised conservation group activities, I created a standardised template with which to record key features of the event, including environmental and social variables such as numbers of participants, time of year and weather conditions, alongside key conversations. The photographs I would typically take at these events would additionally serve as visual prompts to my subsequent data analysis.

4.5.5 *Data Management*

All data was stored on a password protected computer, with identifiable data (video and audio recordings, and photos) stored on a hard-drive in a secure location, separately from the meta-data of research participants. At the conclusion of the project, sensitive data (e.g. not including anonymised transcripts and field notes), was stored on a double encrypted data storage at the University of Bergen, where the CALENDARS project was hosted.

4.6 Analysis & Evaluation Frameworks

Yielding diverse types of data, from narrative transcripts to practical field observations and video footage, the range of methods I employed required a customised framework of analysis. On one hand this multiplicity of data offers rigour to the research by identifying congruences between different sources. Consistency is also required across the acquisition of data as a basis to establishing patterns and relations within cases, while enabling reliable comparisons to be made between case-studies. At the same time, alternative types of data may also be understood and interpreted in relation to one another, such as with the use of photos in participant observation and video footage of walking interviews (Pink, 2006). An analysis of rhythms supported by multiple methods equally provides a parallel means by which to apprehend different spatio-temporal practices simultaneously without necessarily valuing or giving priority to the dominance of one rhythm over another. The phenomenological approach taken additionally demands the triangulation of data sources in order to be able to capture (and reconcile) the subjective and intersubjective experiences of research participants beyond narrative accounts (Eberle, 2014).

In broadly combining an experientially-orientated rhythmanalytical approach with an interpretative phenomenological method of analysis, I have sought to integrate my richly layered data sources in an in-depth exploration of how organised conservation groups make practical collective sense of their lived experiences of seasons on the Kūaotunu Peninsula. Drawing on the Interpretative Phenomenological Analysis (IPA) method developed by Jonathan Smith, and colleagues in the 1990's (Smith et al., 1999) the key tenets of this approach have been applied to the evaluation of my own research data. Specifically, IPA is focused on elucidating the personal

meanings and sense-making attached to individual experiences and how they impact a person's identity and place within their social world (Smith et al., 2021). Consequently, IPA has an idiographic focus, while concurrently allowing a comparative basis of analysis between both individuals and groups.

With its origins in psychology, IPA is increasingly employed in diverse social research settings and is particularly suited to exploring experiences of change associated with particular phenomena (Smith et al., 2021). With the primary method focused on the interpretation of narrative interviews and associated texts, IPA is distinguished from other thematic analyses in the reflexivity required by the researcher in interpreting the subjective experience of participants, otherwise known as 'double hermeneutics' (Smith et al., 2021). IPA has additionally been adapted to accommodate participant observation, conversations and focus groups as sources of data. With Smith inviting creative flexibility in both its applications and methods, IPA, like rhythmanalysis, has emerged as an experimental approach in the social sciences in recent years.

Though critics of IPA (see Giorgi, 2011; Sousa, 2014) argue that subjective phenomenological experiences cannot be comprehensively understood and objectively interpreted by researchers, IPA nonetheless offers a starting point for systematically undertaking phenomenological analyses. Because of its psychological origins, it is also contended that IPA fails to fully account for either social-cultural and political contexts of individual accounts of the phenomena being studied. And this is a criticism commonly levelled at the phenomenological approach more generally. By concurrently drawing on the rhythmanalysis approach tendered by Henri Lefebvre, my analysis is specifically orientated to the social-cultural nature of my research questions, supported by the group focus of my research design and methods.

Drawing on multiple-methods to gather experiential references of seasonal temporalities, rhythms and relations in conservation group activities, I have fashioned an IPA method involving a Template Analysis (TA), by which to 'structure' both my analysis and findings. Although typically a coded form of thematic data analysis, involving *a priori* themes, I specifically used the TA format also developed within psychology – by King (1998) to organise emergent empirical themes, using direct quotes from narrative data, from which to engage with conceptual themes, alongside patterns and connections within and between data sets. With my original research questions providing the basis of *a priori* themes within the TA, they have provided a deductive framework to my analysis from which to inductively derive emergent and conceptual themes. Here, the TA approach allowed me to accommodate and organise diverse sources of data in responding to my open-ended research questions, while concurrently revealing important patterns and relations between data sets. Broadly following the steps originally identified by Smith et al. (1999; 2022) for IPA, my analysis enables a reflexive consideration and comparison of supplementary field observations, both within and between case studies, from which to substantiate subordinate themes, patterns and relations as well as highlight the inherent idiosyncrasies of place-based cases, as set out in the process followed below.

The contextually nested case-studies on which my research is designed to provide for a comparative evaluation of data obtained between adjacent beach communities on the Kūaotunu Peninsula, effectively highlight differences and commonalities in their constituting processes and practices in a relational understanding of seasonal rhythms in time-space (Krehl & Weck, 2020). This process-centred approach to drawing comparisons relies on a thickness of case-studies from which to be able to offer inferences as insights, rather than seeking to establish generalisations (Blatter & Blume, 2008; Robinson, 2016). A recent example is offered in the comparative rhythmanalysis of contemporary student life within discrete campuses within a university in the UK by Dakka & Smith (2019).

The complementary use of multiple data sets provided a context to individual verbal accounts, with the use of multiple, group and focus interview formats foregrounding social-cultural variables. At the same time, the trust and familiarity that was established with participants over the extended course of my participatory research assisted in my 'bracketing' of personal biases and subjectivities in the interpretation of resulting data (Smith et al., 2022). Because of the progressive accumulation of different data types over the course of my research, my analysis was an ongoing process. The research design has likewise involved participants reflecting back on their own interpretations of seasons throughout the course of the project in a co-construction of contextualised data derived from a methodological sequence of observed practices, narrative accounts and focus group discussions.

Analysis of the research data otherwise proceeded through an iterative process of reflecting on both the methods employed and the emergent findings in the context of conceptual theories and researcher subjectivity (Flick, 2014). In this way, the analysis of data formed an integral part of the intuitive research method I followed.

4.6.1 ***Process of Analysis***

While broadly following through the sequence of steps outlined below (adapted from Smith et al., 1999; 2022), the IPA/TA process has involved an iterative process of review and reflection in moving between steps for a single case, across data sets and between case-studies. So that while narrative interviews have provided the framing of the analysis, this has been conducted in conjunction with supplementary data sources from the research field.

STEP 1: Transcribe Interviews

From the range of interview formats previously described, interviews were digitally transcribed using TRINT software common to the CALENDARS Project. The initial digital text record was then reviewed and edited by myself, for each transcript, alongside replays of the original audio recordings. In this way, the process of reviewing transcripts provided me with the opportunity to provisionally scope for their thematic content in the context of the broader interview structure and flow.

STEP 2: Read & Review Transcript

Reading and re-reading text transcripts, either in part or full, is an important process of familiarisation with content for IPA, in order to be able to subsequently infer experiential meanings by reading 'between the lines' of participant statements (Smith et al., 2022). While facilitating an immersive focus on participant perspectives, these initial readings of transcripts, in conjunction with the audio record, allow the researcher to reflect on the tone and emphasis (as well as significant pauses) used to make specific points by participants, in adding layers of detail to the interpretative analysis. For the analysis of group interviews, this was an important stage in identifying agreement/disagreement in statements in the context of group dynamics.

STEP 3: Initial Noting

Once familiar to the researcher, texts are provisionally notated with exploratory comments that are the premise to identifying empirical themes alongside patterns, connections and relations within the data. In my case, I was guided here by the *a priori* themes of my research that had structured my interview format and provided the framework for my subsequent template analysis. These themes included local perceptions of place alongside understandings of change in the context of temporal rhythms and social-environmental relations, with seasonality being the key phenomena under investigation. As a first step in the identification of empirical themes, my exploratory comments were colour coded alongside highlighted sections of text.

STEP 4: Identify Empirical Themes

After reviewing my provisional notes alongside highlighted text, empirical themes were compiled by importing key quotes into an Excel template that formed the framework of my subsequent review and analysis (*Appendix **G***). The identification of empirical themes within *a priori* themes was a highly iterative process that became more refined with the analysis of subsequent cases. At the same time, it was important to maintain the unique characteristics of individual cases by preserving references to the experiences of individuals and their associated meanings. It was therefore necessary for me to be able to continually access and review key quotes in the context of developing their thematic frameworks within the template format. This was achieved through use of Excel spreadsheets, which allowed me to continuously update and compare cases.

STEP 5: Derive Emergent Themes

Through the process of compiling empirical themes under *a priori* 'headings', emergent themes are made apparent through connecting patterns and interrelationships within the data (Smith et al., 2022). Emergent themes are effectively derived from groupings of empirical themes into broader categories within single cases and therefore represent an important distillation of the data. In my case, it was at this point that I was able to summarise the key themes that emerged from compilations of quotes. As for the identification of empirical themes, emergent themes are continuously reviewed and refined through the addition of cases, while simultaneously accounting for non-conforming data.

STEP 6: Review & Compare Data Sets

The identification of emergent themes through IPA, alongside my written summaries of narrative accounts, provided the key juncture to review and compare these findings with supplementary forms of data, primarily derived from field observations. Here, my field journal, in conjunction with participant observation and photographic records, were reviewed alongside the emergent themes and patterns derived from multiple accounts for specific case-studies.

STEP 7: Summarise Case Themes & Characteristics

Following the identification of emergent themes, brief written summaries were prepared for each narrative account as a basis for comparing across cases and data sets. Capturing the unique characteristics of each case, these accounts specifically recorded non-conformities within the data alongside the patterns, relations and connections that contributed to the identification of social-environmental rhythms within and across data sets.

STEP 8: Compare & Contrast Case Studies

Through an iterative process of comparing and contrasting emergent themes associated with individual cases, larger superordinate themes are identified by the grouping of themes across cases. As the penultimate step in the IPA process, these overarching themes then provided the framework to the subsequent interpretation and evaluation of my research findings, directly supported by illustrative quotes in verbatim. In moving beyond the identification of findings, superordinate themes may additionally lead to the generation of conceptual themes specifically developed to elucidate connections and patterns established within and between cases. Here, the template framework I used for my analysis facilitated the identification of social-environmental relations and rhythms within and across cases, while preserving the unique characteristics of individual accounts. The relations identified in the social-cultural kaleidoscope presented at the end of Chapter 5 (Figure 18) are derived from these findings.

STEP 9: Evaluate & Substantiate Findings

In the final step of the iterative analysis process, the resulting themes, patterns and relationships generated within and between data sets are summarised and critically evaluated in the context of the original research questions and their framing theories, which I present within Chapter 6.

4.7 Ethical Considerations

The CALENDARS Project received full ethics approval from Massey University's Human Ethics Committee, (ref. Southern B, application 19/56) at the end of 2019, ahead of my PhD candidacy. This importantly provided for my limited engagement with local *iwi* as part of my research process. I subsequently considered the principles of the Massey University Human ethics Code in the context of my proposed PhD research, for which I was granted Low-Risk approval by the HEC at the end of 2020.

The broader CALENDARS project, of which this PhD research forms a part, is founded in the co-production of seasonal representations through collaborative engagement with participating organisations. The collaborative basis of the broader project fundamentally seeks to establish mutual benefits for participating groups in facilitating their evaluation of seasonal representations as a basis to adapting to future change. While the project received full ethics approval from Massey University's Human Ethics Committee (HEC) Southern B application 19/56) through to 2023, I have independently considered the principles of the Massey University Human Ethics Code in the context of my discrete PhD research within *Appendix **H***. With a professional background in Landscape Architecture, a key distinction of my research is the practical volunteer time that I have been able to contribute to the activities of participating environmental conservation initiatives. As well as providing valuable labour to local conservation initiatives, an awareness of my professional background has made participants generally receptive to constructively engaging with my research on this basis. Equally, the environmental focus of local conservation initiatives arguably pre-disposes this select genre of participants to be specifically interested in the broader framings of the research.

How to approach managing the effects of predicted climate change on the Coromandel's coastal settlements is already being independently investigated by Council through its SMP project. Consequently, local environmental groups were partially pre-disposed to engaging with the research. In all cases, more than one actor was involved in representing a group, while providing for greater autonomy amongst research participants in representing both their organisational and personal lives. The nature of the research specifically avoids the potential for either physical or psychological harm to participants through its direct activities. At the same time, the research recognised that some participants may have expectations for tangible outcomes that go beyond the scope of the immediate project. Consequently, the background information provided to participants included clear statements of expectations, which were verbally reinforced in preliminary discussions with participants prior to their recruitment. As a matter of protocol, I sought to meet informally with prospective participants early on in the engagement process. Designed to ensure that participants have sufficient background information from which to base their decision to participate in the research, or not, these meetings also provided the opportunity to establish the commitments and expectations of both parties (the participant and the researcher). The suite of standardised consent forms, and associated protocols produced for the CALENDARS project were also utilised for my research. Consent Forms were required to be signed by all participants for each format of interview conducted for my research. Samples of the information provided to participants, including consent forms and background information to the project are provided within *Appendix **C**.*

My engagement with representatives from the local Council (TCDC) were likewise borne out of an established 'credibility' from my professional working life. While my research has specifically avoided my working directly with former 'colleagues' from within TCDC's resource management planning divisions, I was latterly made conscious of how I interpreted and subsequently 'represented' the relative roles of TCDC in the relational conflicts that form part of my critical

analysis. This potential conflict of my research agenda with my (ongoing) professional interests has been specifically addressed within the transparency of research protocols I have maintained in my dealings with TCDC. Since gaining prior 'clearance' to undertake my research, involving representation by TCDC from both the acting CEO and relevant department managers, I have continued to provide Council with informal updates over the extended course of my research. My subsequent interviews with Council employees have been screened by both interviewees and Council's Communications Teams in order to ensure that the data obtained will do no harm as representations of TCDC. In providing the basis to my analysis, I have been equally careful to ensure that I am accurately reporting the commentaries provided by all participants in the representation of actual and perceived relational conflicts within the beach communities of the Kūaotunu Peninsula. Here, the interventionist aspirations of my research have also provided participants, including representatives from TCDC, with the potential to share in the benefits of insights provided by the research – including through participation in the FGW.

4.8 Methodological Reflections

In critically reflecting on the qualitative methods and process of analysis selected for my case-study based research on the Kūaotunu Peninsula, I make several observations below, compiled over the course of my research. Mostly, these relate to practical issues I encountered in conducting the fieldwork - some of which were unique to the particular circumstances of my research. I have also noted those aspects of my experimental methods that worked particularly well. These are rounded out with a reflection on the contribution of my personal and professional attributes to my field researcher role. This is followed by a consideration of the key limitations of my research in Section 4.9.

- Originally expecting my field observations and associated reporting to provide the primary basis of my phenomenologically orientated research, it was the narrative interviews, compiled from both individual and group accounts that became central to my interpretative analysis. Specifically, the data derived from interviews, including group and walking formats, provided the main comparative basis for seasonal accounts both within and between case-studies as well structuring the analysis. At the same time, the process of establishing myself as a trusted field volunteer within a particular group membership, by which to observe their shared practices, effectively 'paved the way' for enlisting participants in subsequent interviews as both individuals and groups. The combined approaches of field observations and narrative accounts were thereby seen as an accruing complementary process of participant engagement - while concurrently generating multiple perspectives within and between groups.

- Although contributing layers of detail and rigour to the analysis and subsequent interpretation, the multiple methods of data acquisition involved a reasonable amount of administrative co-ordination. Because most planting/weeding events were held outdoors, groups would frequently organise or change scheduled events spontaneously around the (local) weather – at times making it difficult for me to line activities up in order to be efficient in my travelling to Kūaotunu from Thames. My travel to site was further complicated by periodic road closures around the

Coromandel coastline - resulting from seasonal/unseasonal weather events over the course of my fieldwork.

AGENDA & OPERATIONS	MEMBERSHIP	KEY ACTIVITIES
NGATI HUARERE KI WHANGAPOUA TRUST **Trust**	Established in 1998 by returning descendants to represent the interests of Ngāti Huarere in all aspects of holding mana whenua and mana moana over the Whangapoua Basin for 700 years.	
An appointed environmental representative actively monitors activities within the wider catchment of the Whangapoua Harbour acting under the Māori stewardship principles of kaitiakitanga to advocate for its wellbeing.	Whakapapa (descended from) Ngāti Huarere	• Environmental monitoring • Landowner/manager liaison • Advocacy and representation
MERCURY BAY ENVIRONMENT TRUST **Trust**	Evolving from the conservation activities of a local educational programme based in Whitianga, the MBET was formalised around 2019.	
Supplying native plants to coastal, riparian/wetland and bush restoration projects in and around the Mercury Bay area, MBET are a key partner with Coastcare – as well as co-ordinating the local Whitianga Coastcare group with Council.	Governed by non-participating trustees, the Trust employs two full-time employees and is otherwise made up of a range of local volunteers that variously participate in its nursery operations alongside Whitianga based Coastcare.	• Native seed collection • Native plant propagation/supply • Restoration projects • Coastcare coordination and participation
RINGS BEACH WETLAND GROUP **Incorporated Society (2019)**	Formed in 2008 on the back of three local environmental champions who discovered the wetland while restoring a walking track through the neglected Matarangi Bluff Scenic Reserve (DOC) that encloses Rings Beach.	
With the early discovery of endangered native Fernbirds (mātāta) and more recently NI Brown Kiwi (Apteryx mantelli Okarito) occupying the wetland basin, the group has maintained a focus on animal predator control through extensive trapline operations within the 270-hectare scenic reserve. Large-scale planting occurred between 2010-2017, involving Kauri 2000, in the wake of extensive weed clearance operations with the removal of wildling pines ongoing.	The core membership comprises a group of dedicated trappers that routinely maintain their own lines on a weekly/fortnightly basis. Additional events are held for group weed removal/ planting bees, while individuals work to remove weeds on an ongoing basis – including as part of trapline maintenance operations.	• Predator traplines • Weed control • Wildling pine removal • Native bush/wetland planting • Track maintenance
RINGS BEACH RESIDENTS **Informal Resident Collective**	A residential collective comprised of the 'closed' community of Rings Beach who routinely work to maintain their cherished beach environment and formed one of the original beachcare groups on the Coromandel.	
Conservation activities are organised and undertaken by individuals or groups from within the residential collective on an 'as-needed' basis. Most residents participate in annual planting days as part of Coastcare and are self-managed to keep weeds under control. Since the formalisation of the RBWG, residents no longer get involved in wildling pine removal or animal pest control.	All permanent and semi-permanent residents are part of the informal residential collective at Rings Beach, through which all conservation activities relating to the beach are facilitated – alongside social activities and events.	• Weed control • Coastcare-facilitated planting • Surveillance • Coastcare

Table 4a– Summary Profiles of Participating Groups

AGENDA & OPERATIONS	MEMBERSHIP	KEY ACTIVITIES
KŪAOTUNU DUNE CARE GROUP **Incorporated Society (2022)**	Championed by a new leader of a revived Coastcare group at Kuaotunu over 2020/21 the KDCG became an independent society in 2022 with a dedicated committee and resident volunteers.	
Continuing with the support of Coastcare, the Kuaotunu Dunecare Group works to restore and protect beach dunes and their inland extension for the 3km spanning East and West Kuaoutnu. The group has developed a zoned coastal management plan for Kuaotunus beaches that they follow, while concurrently supporting applications for external funding. The KDGC routinely meets fortnightly/monthly either side of the Christmas season to carry out maintenance and planting operations in working through this plan.	Run by a committee of 6, the KDCG are assisted by a core group of regular residents for maintenance/ planting works, while calling upon the wider community for larger events/operations. Recently setting up predator traplines, the group also works in with Council and external contractors to get the job done.	• Predator traplines • Weed control • Native dune planting • Dune management planning
OTAMA RESERVES GROUP **Incorporated Society**	Instigated by a core group of residents concerned about the management neglect of their ecological 'backyard', the ORG was established in 2016.	
With an aspiration to restore a 'bush to beach' ecological corridor within the Otama River catchment, the operations of the ORG cover four public reserves (under DOC and TCDC) incorporating beach dunes and bush habitat alongside the Otama wetland as their main focus. Operations include extensive trapping to protect the endangered wildlife (specifically native birds) associated with the wetland and beach habitats, wetland/riparian planting and associated weed control. Collectively, these reserves comprise an area over 144 hectares that the group is working to enhance and connect.	From its small pool of residents, the ORG is comprised of a core committee of 11 founding members who are regularly supported from both within and outside of Otama for key volunteer activities/events.	• Predator traplines • Weed control • Wetland hydrology • Native bush/wetland planting • Track maintenance • Monitoring/surveillance • Archaeological protection • Management planning • Stakeholder liaison
OPITO BAY RATEPAYERS ASSOCIATION **Incorporated Society**	Established in 1995, the current OBRA is made up of a largely semi-permanent resident committee, with a strong focus on maintaining the Opito Bay environment.	
The co-ordinated operations of the OBRA are based around six aspirational pillars covering: marine protection, weed and pest eradication, water quality, community culture & stakeholder relations. Their work has notably included championing the Mercury Bay scallop rahui in collaboration with Ngati Hei, along with annual ratings for cleanest beach through Sustainable Coastlines NZ.	With a current committee of 8 representatives overseeing environmental activities at Opito Bay, there are a core group of permanent residents that regularly maintain traplines, supplemented by regular visiting second-home owners. Beach cleanups and planting events are timed to maximise on the participation of part-time residents during public holidays or weekends.	• Predator traplines • Weed control • Beach cleanups • Native bush planting • Track maintenance • Monitoring/surveillance • Wildling pine removal • Management planning • Stakeholder liaison

Table 4b– Summary Profiles of Participating Groups

- While the intention was to have reasonably consistent sets of data across case-studies, the different operating conditions, timings, inter-personal relations and practical limitations associated with my engagement with case-study groups necessitated the development of alternative approaches over the course of the fieldwork. The diverging formats of data yielded by diverse modes of data collection involved variable investments of time to collate and corroborate

within my analysis. Specifically, video recordings of trapline interviews of over 2 hours and focus group workshops involving up to 10 participants were both associated with lengthy analyses. But with focus group interviews providing unique insights into the collective sensemaking of seasons by a particular group, this data formed a key component of my research findings. Trapline interviews were likewise important in revealing many tacit dimensions of seasonal practices with particular individuals through highly personalised accounts. In future I would plan to make better allowance for both of these methods within my phenomenologically-orientated ethnographic research design.

- With retirees making up the majority of participants, not everyone was readily contactable via email. This sometimes made the co-ordination of interview meetings, and group interviews in particular, a little harder. Retired second-home owners were specifically difficult to 'pin down', while retirees generally would often take 'leave' of Kūaotunu for extended weeks at a time. By the same token, retired participants were exceptionally generous with their time engaging with my research – including in extended conversations over many cups of coffee!

- My involvement in ecological restoration projects for much of my professional life made me comfortable to be out in the field working with volunteer conservationists on a range of tasks from collecting and propagating seeds to planting, weed control and pest trapping. At times, I had to 'unlearn' some of these tasks in order to be able to 'relearn' them through the specific ways of a particular group. I also believe that this aptitude, along with my personal profile as an educated 'middle-aged' white female immigrant, was a compatible 'fit' for most of the groups I worked with. As a resident of Thames, I was regarded as an 'outsider' to Kūaotunu, but a local to the Coromandel, which likewise granted me with a level of acceptance that might have been harder to earn had I come from further afield. Not unexpectedly for the Coromandel, I made several connections through volunteers I met on various projects – including with a couple of retired Doctorates. It was also affirming to learn that once I had stopped participating in the routine activities of core groups at the end of my fieldwork, people continued to ask after me.

- Although the focus group workshop was designed to 'bookend' my field research, many of the conversations it inspired could easily have been extended into another session and particularly in the context of the ongoing development of the SMP project. In this way, I found it quite difficult to effectively 'exit' this ever-evolving research field – in spite of the ample data I had amassed by this time!

- Of the three *iwi* with custodial associations with the Kūaotunu Peninsula - Ngati Hei, Ngāti Huarere and Ngāti Tamaterā - I was fortunate to be able to formally engage with representatives of Ngāti Huarere ki Whangapoua in the later stages of my research. While informally holding conversations (*korero*) with representatives of both Ngāti Hei and Ngāti Tamaterā during the course of my research, it is important to recognise that the perspectives contributed by Ngāti Huarere are unable to be taken as representative of the other *iwi*. Although sharing in the *Mātauranga Māori* worldview, my informal conversations with representatives from Ngāti Hei in particular suggest that their customary seasonal knowledges are highly unique. Noting that the depths of these

insights are additionally dependent on how information has been handed down through its generations as well as how they might be applied in the modern contexts of the Kūaotunu Peninsula, the knowledges shared with me by Ngāti Huarere are highly contextual.

PARTICIPANT PSEUDONYM	GROUP	AGE RANGE (YEARS)	ETHNICITY	RESIDENCY	ASSOCIATION	OCCUPATION
Laura	ORG	65+	European	PT	35yrs	Retired
Beau	ORG	65+	European	PT	35yrs	Retired
Phil	ORG	45-55	European	FT	30yrs	Working
Jill	ORG	65+	European	FT	42yrs	Retired
Sam	ORG	65+	European	PT	15yrs	Semi-retired
Mark	ORG	45-55	Mixed	FT	20yrs	Working
Vaughan	ORG	65+	Mixed	FT	30yrs	Retired
Kent	KDCG	65+	European	FT	30+yrs	Retired
Alec	KDCG	65+	European	FT	40+yrs	Retired
Joan	KDCG	65+	European	FT	40yrs	Semi-retired
Aaron	KDCG	55-65	European	FT	2yrs	Working
Pippa	KDCG	55-65	European	FT	2yrs	Working
Kerry	KDCG	65+	European	FT	2yrs	Retired
Abbey	KDCG	65+	European	FT	2yrs	Retired
Jude	KDCG	65+	European	FT	30yrs	Retired
Jock	RBWG	65+	European	FT	25yrs	Retired
Jane	RBWG	65+	European	FT	30yrs	Retired
Cate	RBWG	65+	European	FT	20yrs	Retired
Shelly	RBWG	55-65	European	FT	15yrs	Semi-retired
Dan	RBWG	55-65	European	FT	30yrs	Semi-retired
Geraldine	RBR	65+	European	FT	40yrs	Retired
Arabella	RBR	65+	European	PT	40yrs	Retired
Marcus	RBR	65+	European	FT	40yrs	Retired
Judi	RBR	65+	European	FT	60yrs	Retired
Warren	RBR	65+	European	FT	60yrs	Retired
Sean	RBR	55-65	European	PT	30yrs	Working
Daman	RBR	65+	European	PT	25yrs	Semi-retired
Ruby	RBR	65+	European	FT	25yrs	Retired
Ross	RBR	65+	European	FT	25yrs	Retired
Dawn	RBR	55-65	European	PT	35yrs	Working
Willa	NHWT	45-55	Māori	FT	35yrs	Working
Lewis	NHWT	65+	Māori	FT	60yrs	Retired
Dale	NHWT	65+	Māori	PT	40yrs	Retired
Clive	OBRA	55-65	European	PT	30yrs	Working
Pete	OBRA	55-65	European	PT	30yrs	Working
Vince	KEA	55-65	Māori	FT	40yrs	Working
Pat	KEA	55-65	European	PT	30yrs	Working
Kit	MBET	65+	European	PT	25yrs	Semi-retired
Alice	MBET	25-35	European	PT	5yrs	Working
Kim	MDBG	65+	European	FT	25yrs	Retired
Mae	MMT	55-65	European	FT	30yrs	Working
Joy	CNPN	45-55	European	N/A	30yrs	Working
Matt	KAMAG	55-65	European	FT	30yrs	Working
Joe	Coastcare	65+	European	N/A	40yrs	Semi-retired
STATUTORY REPRESENTATIVES						
Tara	TCDC					
Jesse	TCDC					
Adam	WRC					
Ali	WRC					
Sara	WRC					
Ava	DOC					

Table 5– Summary Profiles of Individual Participants

4.9 Research Limitations

While striving to minimise inherent limitations within the research through the design process, it is important to acknowledge the theoretical boundaries of its scope, alongside practical considerations. These have been listed out under the four bullet points below.

- Most obviously, the set timeframes of the PhD research tenure did not allow for tracking of seasonal adaptations (and acclimatisations) within participating groups beyond a couple of years. While this timeframe was known at the outset, my theories of acclimatisation were developed over the course of the research, informed by observations from the field. Concurrently, I was able to extend my field observations over a couple of years, owing to periodic interruptions to my fieldwork resulting from both recurrent outbreaks of COVID-19[21] and personal circumstances. This extended timeframe critically allowed me to capture the local experience of the summer cyclones of 2023 on the Coromandel with research participants in a focus group workshop session in May 2023.

- The multi-modal methods of interviews and observation that I utilised with various combinations of participants during the course of my research had the potential to create inconsistencies in my findings. At the same time, my choice of method was also dictated by the circumstances, such that I needed to use walking interviews when accompanying participants along traplines. Or, that it was convenient to interview a group in someone's private house on the back of a working bee – with cake and coffee provided! By ensuring a range of modes were employed to engage with participants from each case-study group, in conjunction with core lines of questioning for all interview formats, I was able to maintain a level of consistency across groups. I was otherwise able to establish myself as a familiar 'trusted' non-resident participant.

- The Kūaotunu Peninsula was specifically selected as the study location for my research because of its diverse representation of local environmental initiatives. Although this is not considered unusual for the Coromandel, which is known for its 'alternative lifestyles', the environmental ethos that underpins the stewardship logic that I attribute to resident groups may be somewhat overrepresented on the Kūaotunu Peninsula. Similarly, my engagement with Ngāti Huarere, as returning resident *iwi* on the Kūaotunu Peninsula, provides a limited perspective on *Te Ao Māori* worldviews on place-based seasonality, which is understood to be highly specific to local *hapū*. These cultural differences, alongside the political conflicts that were evident across beach communities, likewise suggest that the selected ECGs I worked with are unable to account for common perceptions of or responses to local social-environmental change. Rather, they provide a version of events, with a potential to contribute to future adaptation planning at the community level.

[21] The coronavirus disease 2019

- Added to the above point, the relative affluence attributed to coastal home ownership on the Kūaotunu Peninsula is associated with a relatively narrow retirement population demographic that is not necessarily representative of coastal communities located elsewhere in ANZ.
- With the onset of the global COVID pandemic coinciding with the start of my PhD candidacy, I was fortunate that the main year (August 2021) of my fieldwork was impacted by a relatively brief three weeks of national lockdown in ANZ. However, it is fair to say that for a few participants, which included a majority of retirees, there was a reluctance to engage in my research on the back of this second wave of COVID-19 for ANZ. During this time, I purposely managed my interactions with participants to ensure that meetings occurred either outdoors, or by myself wearing a hygiene face mask.

CHAPTER

05

DATA ASSIMILATION & ANALYSIS

This chapter presents the findings of the case study research into Kūaotunu's local environmental initiatives, organised according to the three secondary research questions. Following its aim to relate and evaluate the practical embodied experience of seasonality to organised responses to changing climates, my three secondary questions have been alternatively addressed through the range of complementary research methods employed with local environmental conservation groups (ECGs), as set out in Chapter 4.

Beginning with a consideration of how seasonality was perceived more generally by participants, the combined responses of individuals and groups has provided a basis to establishing the broader patterns of seasonal rhythms alongside the constituting temporalities of human-environmental relations in the wider context of Kūaotunu. From here, the analysis progresses through an in-depth exploration of how seasons are variously practiced within the ECGs uniquely associated with local beach settlements on the Kūaotunu Peninsula, before extrapolating local understandings of seasonal change and adaptation into the wider institutional setting of adaptation planning and legislation.

Thus, I begin under section 5.1 by 'situating seasons' on the Kūaotunu Peninsula in response to research question (a), by associating local perceptions of seasonal rhythms with a relational sense of place, principally through combined narrative accounts supported by field observations derived from discrete beach settlements. The ways in which seasonality is practically experienced and accommodated by Kūaotunu's ECGs in the context of their parallel understandings of broader patterns of social-ecological change, responds to research question (b) through the reconciliation of my diverse field observations with narrative accounts. The orientations of participant groups to seasonal change and the extent to which their shared agendas are reflected in the local governance of adaptation planning is then considered under 'Apprehending Futures' in response to research question (c), which was substantially informed by focus group discussions and workshops in the context of Council's SMP planning.

Since narratives, in various formats, have essentially structured the analysis of my data, I sought to illustrate research findings using direct quotes from participants. Where a perspective was shared by more than two individuals, this correspondence is noted as *some* (up to one third) *many* (up to two thirds) or *most* (over two thirds), in proportion to the total number of participants (45), or relative to the group under discussion – as stated. *Several* participants is occasionally used to indicate two or more, but less than a third. Here, the intention is to provide an indication of the 'frequency' of correspondence between or within case-studies, rather than quantifying the observed patterns per se. (Braun & Clarke, 2013, pg.262). Findings are otherwise supported by comprehensive photographic records, depicting observations compiled from a calendar year of my participation in the conservation activities of different groups, which are additionally woven into the written account.

Each section concludes with a summary analysis that feeds into the critical interpretation and evaluation of findings presented in Chapter 6, in which the primary research question is ultimately addressed through recourse to its conceptual framings.

5.1 Situating Seasons

Question a) **How are seasonal rhythms constitutive of social-cultural relationships with place?**

In relating seasons to the social-cultural rhythms of place, I begin with sketching out an overview of shared perceptions of the Kūaotunu climate more generally amongst participants and then specifically through the collective field of coastal conservation practices in which they are commonly engaged. This is followed by individual accounts of beach settlements as unique case-studies through which to physically locate relationships between seasonal rhythms and the social-cultural dynamics of Kūaotunu's communities of place. With a focus on local environmental initiatives, the seasonal lifestyles of resident volunteers comprising the core participants of Kuaoutnu's ECGs are then considered in the context of prevailing organisational-institutional cultures and their intersecting temporalities of place.

5.1.1 ***A Kūaotunu Climate***

We are informed by the tourism offshoot of TCDC (from its dedicated website) that '*The Coromandel does not have very distinct seasons'.* Instead, it *'enjoys…year-round moderate temperatures and no particular rainy season'*. In portraying favourable conditions to encouraging year-round visitors into the district, the website goes on to proclaim:

Locals would say that it is summer in the Coromandel for half of the year. It starts in December as the first signs of the Pohutukawa flowers turn the tree-clad coastline a deep crimson. The colours of the New Zealand Christmas tree, heralding the impending start of the long summer holidays….

The Kūaotunu 'locals' that I interviewed generally agreed on the Coromandel being favoured by a milder climate and in their shared appreciation of the unique environment created by local weather conditions associated with the physical landscapes of the Kūaotunu Peninsula. 'This is our *tūrangawaewae*…our special place…and I guess there's not many coasts of New Zealand that are facing due north, so it's very special climatically' - Judi (RBR). The north-facing coastline of the peninsula is also distinguished by its elevated backdrop of bush-clad hillsides contributing to its widely espoused aesthetic appeal, alongside its microclimatic variations: 'The place being a combination of bush and beach – that's just an awesome environment' – Abbey (KDCG). Kit reckoned on temperatures being degrees warmer than on the interior Hauraki Plains where he used to farm.

The climate here is really pretty nice. And we have a ring of hills around us. So, we can have a little microclimate here and be very, very different from the other side of the range – Kit (MBET).

For long-term residents, the Kūaotunu Peninsula is often distinguished by having markedly different wind and rain patterns to Whitianga, (the largest settlement on the eastern seaboard), located only 15km to the south of Kūaotunu village and nicknamed 'Windy-anga'.

A lot of times, it depends on where the winds' coming from - what we're going to get. If we're getting sou'westerly winds here, it's generally, quite fine. If you get an easterly, well then the rain will start coming. Nor'westerly is sort of totally different and the day can be pretty fine as well….So,

*it depends on the wind direction. We're very sheltered in Kūaotunu. We've got the Blackjack (bluff) there, so we don't get the big strong easterly winds as well as other places, like Whitianga….*Kent (KDCG).

An ability to grow tropical fruits and other exotic plants at Kūaotunu was also provided as evidence of its sheltered mild microclimate. 'We can grow bananas here very well. Just look over there and you'll see beautiful bananas, finger bananas, massive big bunches. But you don't grow bananas in a cold climate' – Kent (KDCG). Pineapples, tamarillos, and custard apples were also cited as tropical fruits grown elsewhere on the Kūaotunu Peninsula.

The mild climate was clearly apparent from my visits to Kūaotunu over the course of the year. In my monthly photographic records of its beaches, I noted there was often little discernible difference between 'winter' and 'summer' scenes taken from fixed recurrent reference photo-points (as seen in *Figures **10-12*** located at the end of Section 5.1.1). A key factor in this apparent lack of seasonality is the evergreen vegetation that comprises the native bush in ANZ - as both broadleaf and conifer tree and shrub species. And while exotic deciduous trees are commonplace within the farmed interior landscapes of much of ANZ, they are relatively uncommon around the Kūaotunu coastline. Similarly, most native flowering trees and shrubs have relatively modest blooms. A notable exception are the coastal Pohutukawa (*Metrosideros excelsa*) trees that are commonly associated with Christmas (on the North Island, at least), due to the relative timing of their effusive crimson flower display over the December-January period. In naturally occupying the shoreline of the Coromandel's beaches, the overt flowering of Pohutukawa provides an accessible reference to the onset of Summer for many. Less obvious are the flowering Kōwhai tree (*Sophora microphylla*) and Puapua (*Clematis paniculata*) native Clematis vine that are found more discretely within and bordering Coromandel's lowland bush. The yellow flowering flush of Kōwhai trees, typically occurring between August-October, were traditionally adopted as customary markers or *tohu* of warming summer conditions by many *tangata whenua* throughout ANZ (Mead & Grove, 2001, p. 144). Native Clematis, with a broader flowering phase spanning July to November, would otherwise serve as a precursor to milder temperatures (Best, 1922). And, consistent with European cultures, many Coromandel residents appear to maintain the onset of these subtle native flowering blossoms as a key reference to spring.

So, I wouldn't say I look at the date and tell you it's summer or winter, but when I heard stories of Kōwhai flowering and that's the start of spring, that's more the thing. I notice that a lot of people notice Clematis flowers…when they start to blossom. People driving to Thames always come back to us and say 'I saw the first Clematis flower'. […] And so it seems to be in the New Zealand culture, to be waiting for these things – Alice (MBET).

At the same time, the wider ANZ landscape is also cultivated with many exotic ornamental flowering plant species imported from Europe, the tree blossoms of which (in particular) continue to provide a hybridised reference to seasonal timings. Consequently, some participants, perhaps in upholding the more distinct references to colonial seasons, appear to lament the comparably subtle seasonal cues on the Kūaotunu Peninsula.

We've just come back from Central Otago, down in the South Island, with the blossoms and things. I think that's what I miss here. We don't have a lot of blossoms coming into flower and we don't see the Weeping Willows and things like that….That certainly shows that we're more tropical. Basically, there's an obvious difference – Joan (KDCG).

Plant blossoms have traditionally been tracked by *tangata whenua* as seasonal 'cues', with the relative timing and nature (extent) of flowering and or seeding/fruiting signalling periods of the year, and helping time activities. Passed down from their *tipuna* (ancestors), an associative interpretation of seasonal *tohu* is still inherent within Ngāti Huarere (Whangapoua) today: 'If you see Pohutukawa flowering roundabout September, you know you are going to have a dry Christmas. And if you see them not flowering until late December, you are going to have a wet Christmas' – Lewis (NHWT). Ngāti Huarere also know to specifically look for the endemic old growth Pohutukawa native coastal trees that line the wider Coromandel coastlines, as opposed to the many younger cultivars that have been planted since: 'I usually use the old Pohutukawa trees as a guide, because there are so many hybrids out there now' – Lewis (NHWT).

In the wake of the (then) wettest winter-spring-summer on record in 2022 [22], I noted a delayed flowering of Pohutukawa trees well into December along the Thames Coast, which in previous years of my driving to Kūaotunu, had typically come into bloom during November. It is therefore understood that the flowering of Pohutukawa, as for many other native plants, do not necessarily 'perform' year in year out and that circumstances and conditions are always changing.

Under this mild subtropical coastal microclimate, colonially-held (temperate northern-hemisphere) categories of four seasons are clearly challenged on the Kūaotunu Peninsula. But how then, are annual climatic variations alternatively construed? While one Rings Beach participant (Jack, originally from the UK) maintained that the Kūaotunu climate was more-or-less 'seasonless' most participants still make a fundamental distinction between notions of 'summer' and 'winter' conditions and their relative timing: 'We have a winter, but I don't believe it's that extreme' – Kent (KDCG). While summer is otherwise seen as the prevailing season: 'I think it's a short winter we get here, and summer seems to stretch out' – Alec (KDCG). Coincidentally, the relative timing of short winters in Kūaotunu is approximately consistent with the official four seasons calendar template: 'June, July, August (June, July) is the winter' (as observed at Otama) and often wet, 'when we have to put on our raincoats' - Laura (ORG).

Less clear are the relative timings of spring and autumn, as transitional seasons, which - for some at least - are partially subsumed into the extended timeframes of summer:

We love autumn. But I don't say: 'hey its autumn now', because our summer just rolls on and then suddenly daylight savings changes and its winter. But winter is mild. So, I think that autumn period, which we've always liked, is now an Indian summer' – Kit (MBET).

[22] NIWA : data.niwa.co.nz

And while 'autumn', by this definition, is generally associated with stable conditions in a gradual cooling and shortening of days, 'spring' - as the lead into summer - is conversely associated with unstable weather conditions and turbulence that can include extreme weather events:

Spring is always signified or noticeable because of the winds that we get here. We notice the winds and sometimes the winds can go on and on….So we have this prolonged period of things starting to happen. But I don't think the weather warms here, in particular, it can be well into Christmas. And so that spring period, to me, is just a changeable time that you have to deal with whatever comes along – Kit (MBET).

In recent years, Otama residents recall successive extreme weather events becoming a recurring factor of instability during the transitional 'spring' months leading into summer. This notably included a large storm event hitting Kūaotunu with force in September 2019 and resulting in widespread flooding (see *Figure **21*** section 5.2).

For Ngāti Huarere ki Whangapoua, high winds are also expected to follow winter rains:

You can plant fruit trees usually late May to early July and then, don't plant because they won't have a big enough root system to be able to handle the winds that come through (in October/November). So, we always have massive rainfall here late June through to September, around the equinox, and then we get the high winds. So you've got to plan around those winds too – Lewis (NWHT).

At the same time, many participants did not identify with spring and autumn at all, by maintaining a simple distinction between winter and summer, consistent with indigenous *Māori* concepts of *takurua*[23] and *raumati* (respectively). And just as the changeable weathers of the 'spring' period were regarded an extension of southern winters, by Ngai Tahu (Williams, 2013), here on the Coromandel, a notionally turbulent 'spring' is seemingly bundled with its relatively mild winters in the transition to long summers that are likewise extended by the stable 'autumn' months.

In making few references to the four seasons generally, Ngāti Huarere did not mention either spring or autumn specifically in conversation, while otherwise citing the equinoxes as providing orientation to their calendar year. 'One thing that you can pretty much rely on, regularly, is the equinox' – Lewis (NHWT). And while the customary *Māori* calendar (*Maramataka*) followed a lunar cycle for reckoning time in conjunction with seasons, the timing of the *Māori* New Year *(Matariki*) with the midwinter solstice (in June) provided another key reference to the solar rotation. The official appointment of *Matariki* as a statutory cultural holiday within ANZ[24] since 2022 has consequently provided a welcome calendar event for some. Yet neither Ngāti Huarere (Whangapoua) nor neighbouring iwi, Ngāti Hei (Mercury Bay) acknowledge *Matariki* in this way. 'It's not something that we learned or was passed down to us about *Matariki.* Its more

[23] 'Hōtoke' – denoting 'cold' is an alternative term also ascribed to the winter months

[24] In so doing, ANZ has become the first country to formally recognize and celebrate an indigenous cultural day as a statutory public holiday.

commercialised now - but we are after more of the reality than the romance of it' - Lewis (NHWT). Within Ngāti Huarere at least, there is a reluctant acquiescence to the dominance of the Gregorian Calendar, including in the New Year, in forming part of the Christmas summer holiday for the majority of New Zealanders.

As far as where do we see the calendar? At this stage, we are still dominated by the Gregorian New Year - because of the holiday period. So, to an extent, one still has to work around that; You can't just say 'well I'm not going to celebrate until so and so a time' – Lewis (NHWT).

As for much of the Coromandel's eastern seaboard, summer in Kūaotunu is perpetuated as the dominant 'season' through extended tourism concomitant with a swelling population and sustained levels of busyness. As well as coinciding with warming weather conditions, the tourist 'season' also heralds an alternative 'mode' of living for many resident locals, with a couple of participants associating 'different energies' with summer and winter - Abbey (KDCG): one driven by increasing numbers of people and the other by the 'awe inspiring' forces of nature - Clive (OBRA).

Well, we definitely think about the seasons, because we've had the place to ourselves for the last six months of the year. And then, all of a sudden, now (early December) people are coming to the baches, day trippers are coming. It's getting busy. There's lots and lots of people around, dogs, people on the beach. Its busy, busy, busy – Josie (ORG).

In the peak month of January, which coincides with the statutory Christmas/New Year holiday period in ANZ, visitors to the Coromandel can reach up to four times its base residential population of 32,000[25] and is mockingly referred to as the 'invasion' or 'silly season'. With its diverse selection of discrete (north-facing) sandy beaches, the Kūaotunu Peninsula is evidently a key destination for bach owners and extended family and friends as well as tourists. Until Covid-19[26] put a temporary suspension on international travel (between 2020-2022) the traditional kiwi summer holiday - in being aligned with the calendared break in the school year through to the end of January - was strongly bolstered by international tourism on the Coromandel. With the potential for favourable weather lasting beyond the Easter holidays (in April) this extended tourism 'season' is apparently being pushed out further, while at the same time bringing the definition of the 'summer' period into question:

Well, in the summer, it's the silly season and that's when we get invaded, you know? It used to be quite distinctive. But now that's changed as well. We can have people in the middle of winter now. If it's a really hot weekend – Jude (KDCG).

Perhaps unsurprisingly, there was a tendency amongst some participants to mark the extended summer by the statutory holidays that effectively 'bookend' the warmer weather period – being Labour Weekend (at the end of October) and Easter (during April) in representing the onset and

[25] Peak Population Study – TCDC, Infometrics, 2021

[26] Coronavirus disease (Covid-19) pandemic

conclusion of summer respectively. Accordingly, there is a shared expectation that Labour Weekend will provide the opportunity for the first ocean swim of the summer while the Easter holidays (falling variously in April) are associated with the 'last' swim of the season. In so doing, seasonal swimmers are also able to register changes in meteorological and oceanic conditions from one year to the next.

We often thought, Labour weekend is the start of summer (end of October). And often it would go right through to Easter (April). But now it's sort of a little bit more erratic. But mind you, this last year was just beautiful, I mean, we were still swimming at Easter and Anzac Day (25 April). So right through to almost the beginning of May – Anabelle (RBWG).

While several participants expressed enjoyment in 'sharing' the Kūaotunu and their specific beach environments with family, friends and visitors over the 'summer' - 'It's like sharing a great place with people….It's a beautiful place and they enjoy it' – Sam (ORG) - there is also a shared sense of appreciation for the winter months and the relative seclusion of Kūaotunu beaches.

And that's a beautiful season here too. We get a lot of storms from the east during that time. But I love it. You know, there's always some part of the day we can walk and the waves - sometimes we have surfers. Winter's just beautiful here. And it's just us, really – Josie (ORG).

*Because we love the atmosphere in January – December. We love all of the things that are going on. And you meet people that, you know, come for a holiday and then we say: 'ah they've all gone home!' I put on my nightie, cross the road (to the beach) and have a little cuppa….*Ruby (RBR).

For these residents, the departure of summer visitors from the Kūaotunu Peninsula heralds an exclusive 'season', that is theirs to enjoy. And this is perhaps why other participants cite 'autumn' as a favoured time of the year. It is effectively 'their' summer. One Kūaotunu resident that I spoke with related that the local bush was felt to sigh a breath of relief when the visitors vacate.

But beyond its main summer holiday season, the Kūaotunu Peninsula continues to be visited year-round by part-time residents from varied origins and at ranging frequencies. While it is generally assumed that second-home owners form a component of summer populations at Kūaotunu, there are varying scenarios for how often they might return over the course of the year. While some participants I interviewed routinely visit every weekend or fortnight from permanent homes and jobs in Auckland/ Hamilton or further afield, others might periodically spend the ANZ winter overseas. During the main Covid-19 lockdown in ANZ in early 2020, many second home-owners retreated from city life to their coastal baches in Kūaotunu, with a few reportedly electing to stay on permanently. Consequently, most of Kūaotunu's beach 'communities' are in a constant state of flux and variously engaged with, as well as contributing to, evolving perceptions and understandings of seasonality.

KŪAOTUNU

JULY 2021

***Above and right**: Showing two photo reference points from the mouth of the Kūaotunu Stream at Kūaotunu West. Taken in July – approximately midway through a typical 'winter' season on the Kūaotunu Peninsula on an ebbing tide.*

JANUARY 2022

***Above and left**: Showing the same two photo reference points from Kūaotunu West, taken in January – approximately midway through a typical 'summer' season on the Kūaotunu Peninsula and during a rising tide.*

Figure 10 – Comparative Reference Seasonal Photo-points for Kūaotunu West

OTAMA BEACH

JANUARY 2021

***Above and right**: Showing two photo reference points from Otama Beach taken in January – approximately midway through a typical 'summer' season on the Kūaotunu Peninsula.*

AUGUST 2021

***Above and left**: Showing the same two photo reference points from Otama Beach taken in August – approximately midway through a typical 'winter' season on the Kūaotunu Peninsula.*

Figure 11– Comparative Reference Seasonal Photo-points for Otama Beach

OPITO BAY

JANUARY 2022

***Above and right**: Showing two photo reference points from Opito Bay taken in January – approximately midway through a typical 'summer' season on the Kūaotunu Peninsula.*

AUGUST 2021

***Above and left**: Showing the same two photo reference points from Ōpito Bay taken in August – approximately midway through a typical 'winter' season on the Kūaotunu Peninsula.*

Figure 12 – Comparative Reference Seasonal Photo-points for Opito Bay

5.1.2 ***Conservation Calendars***

For the coastal conservation groups I worked alongside in Kūaotunu, there is an alternative orientation to the year, based around the seasonal timings of environmental conservation/ restoration projects and their associated maintenance and monitoring regimes. Dune restoration plantings are a key component of coastal conservation projects. Because of the shifting nature of sand dunes at the active interface of land and sea, their periodic planting with specialist native dune plants, serves to 'stabilise' the active dune system as a natural buffer to wave action. The supply of native dune plants to ongoing restoration projects at Kūaotunu is met by a specialist coastal plant nursery (CNPN) based out of Whakatane (East Coast, North Island) in conjunction with MBET.

As is standard practice in ANZ, the relatively mild wet winter months provide optimal conditions for planting projects, typically spanning from May through to September. This is principally timed to coincide with adequate rainfall being supplied to young plants during their early establishment and before the weather gets too hot and dry. For dune restoration projects, native dune plant species are specifically susceptible to extreme summer conditions.

The reason is that the Spinifex and Pingao need to get their roots down deep enough to get good moisture levels over their first summer. So, if you get them in too late, they haven't had time to have a few of those warm, sunny days to get their stems used to the intense heat – Joy (CNPN).

Consequently, the majority of native dune stabilising restoration plantings, comprising Spinifex (*Spinifex sericeus*), Pingao (*Ficinia spiralis*) alongside Wiwi (*Ficinia nodosa*) and Pohuehue (*Muehlenbeckia complexa*) [27] are planned during June-July on the Coromandel's east coast. For the nurseries supplying plants across multiple dune restoration projects as well as the Coastcare co-ordinators that are overseeing planting operations, this relatively short window of opportunity for dune plantings requires thorough planning. 'By the time you get to August-September, your plants are actually quite well established' - Tara (Coastcare-TCDC). And since planting invariably relies on sufficient numbers of volunteers to get the supplied numbers of plants into the ground, planting events are often arranged to coincide with weekends in order to extend the opportunity for second home owners to participate. For a few select communities, 'annual' planting events are specifically held over the former Queen's Birthday, as a long weekend at the beginning of June. For Rings Beach, as at Whangapoua, a main dune planting event held over the former Queen's Birthday weekend has become a permanent fixture in the social calendar when a strong turn-out of permanent and part-time residents can be rallied. At Rings Beach, this is traditionally followed by a morning tea put on by residents. With Coastcare hosting at least one dune planting event at each beach every winter, follow-up plantings are variously distributed between beaches from one year to the next in order to use up plant stocks.

With numerous active dune restoration projects distributed around Coromandel's eastern seaboard, it is perhaps unsurprising that the planting season has come to define winter for its

[27] Typical combination of native dune restoration plants

heavily invested co-ordinating personnel: 'I guess I associate a winter with planting season as well. So, if it's not wet, it's not planting season, so therefore its summer. I mean, for me now, (I distinguish between) planting season and not-planting season' – Tara (Coastcare-TCDC). Most of Kūaotunu's grassroot ECGs, including the ORG are likewise orientated towards the winter planting season involving coastal wetland and bush habitats.

May-June-July is the planting season. And I think once August comes, then we kick back a bit. We've done a lot of work for the last, you know, two, three seasons…and then we sort of start having a bit of a lull there…..So, the work doesn't stop but it reduces. About Easter, I think, is the end of that (summertime). The dotterels leave…When we get onto the next season, then we can start thinking about our planting, don't we? – Josie (ORG).

With the summertime 'lull' coinciding with summer tourism, there is a clear 'workaround' involved in focusing conservation activities into the remaining seasons.

So, when summertime moves into the autumn, wintertime is probably the busiest time for us, as far as we've got our funding in for weed controls. We do a lot of weed control when the summer visitors go. Obviously trapping continues - around the autumn and springtime, the predators are (more) active - so trapping increases to a certain degree. Instead of doing predator control once a month over the summer period, at this particular time, we're doing it every two weeks, because birds are nesting, which is our main mahi really. And then moving into autumn, it is a very busy time for us as a community....planting, planting, planting. And that takes a shitload of work. Thousands and thousands of volunteer hours go into everything we do - Phil (ORG).

'Working Bees', which are routinely held (weekly/fortnightly/monthly) over the winter months as part of maintaining dune plantings, draw to a close by early December - around the time when the first wave of visitors are expected. As the early mornings begin to heat up in December, it becomes increasingly uncomfortable for participants to work in the sun during sociable hours. As well as the practical difficulties of hand pulling weeds from increasingly active beaches, many participants are themselves otherwise preoccupied with hosting visitors and family. But since most broadleaf plants, including dominant exotic weed species, do most of their growing prior to the peak summer months, the temporary suspension of coastal gardening operations by volunteers over this period is not considered overly detrimental. For KDCG, the last fortnightly weeding-bee held in late November/early December is followed by a social barbeque to mark the practical conclusion of the dune restoration year. Around the same time, the popular local pizza eatery 'Luke's Kitchen' extends its operational hours from a rudimentary four evenings over the winter weekend to 9am-10pm for seven days of the week to coincide with the arrival of summer visitors.

Concurrently, the seasonal influx of tourists generates new pressures on local beaches and their associated dune habitats, inciting conservation custodians into a protective surveillance mode that applies to co-ordinated Coastcare operations as well as grassroot environmental groups.

And then the summer season starts and that's when you just need to make sure that whatever you've planted and you've managed to maintain so well, actually is protected from this massive influx of people – Tara (Coastcare-TCDC).

And clearly, the best vantage for monitoring summer tourist activities on local beaches is by the resident community: 'Were like meerkats - we're up there looking to see who that is' – Josie (ORG). This surveillance extends to deterring visitors and (unpermitted) dogs from vulnerable nesting shorebirds.

Usually, this time is busy keeping people and their dogs away from the dotterels or the oystercatchers and keeping an eye on all of that….– Josie (ORG).

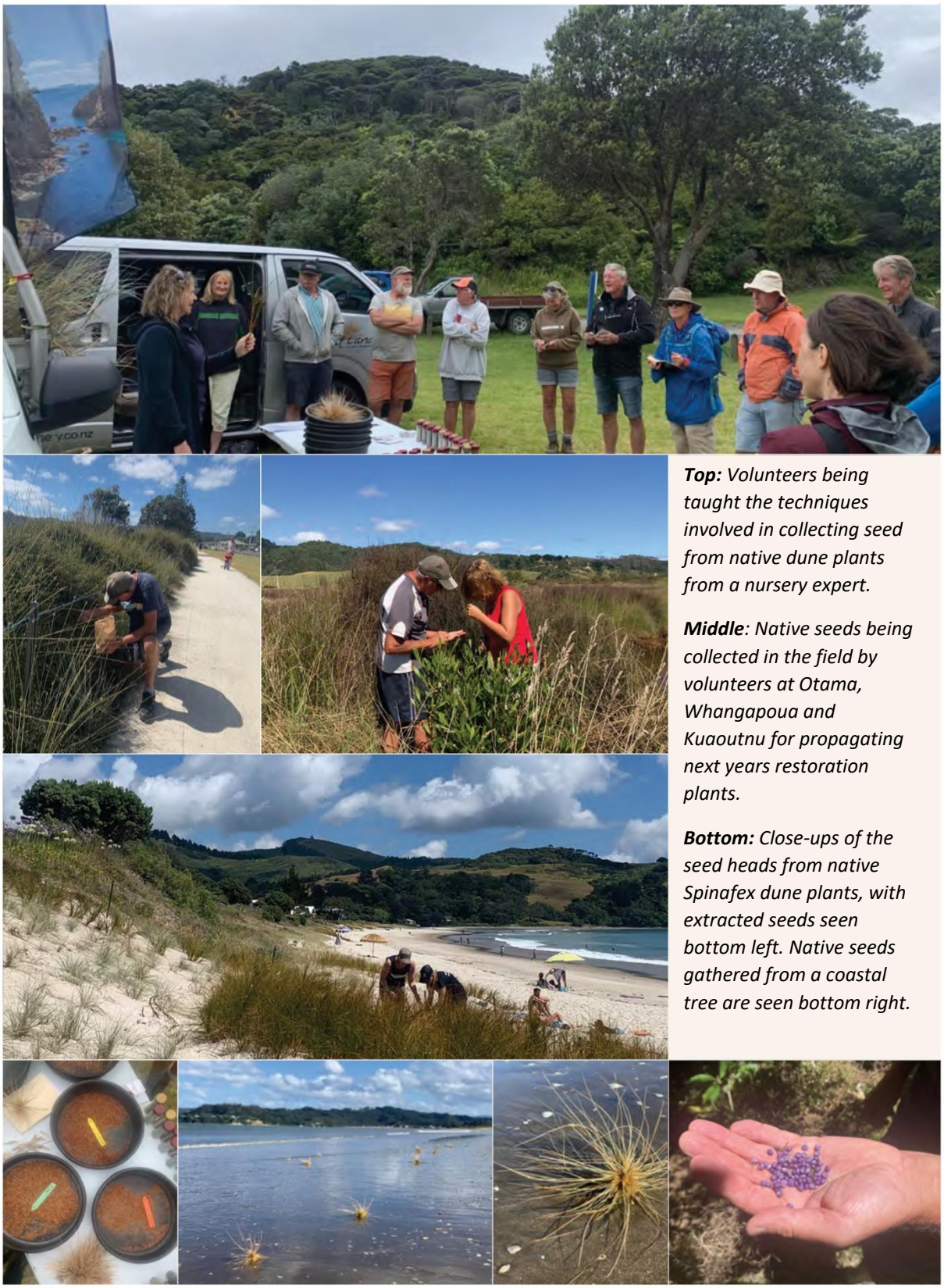
For those groups with native birds to protect, including within the wetland habitats of Rings Beach and Otama, routine pest control trapping operations need to continue over the course of the summer as they have throughout the winter months. These are typically assigned to individuals to service and maintain over the course of the year alongside group conservation activities. Taking between 2-4 hours to complete on a weekly/fortnightly basis, traplines involve large commitments of solitary time by volunteers. And unlike planting and weeding seasons, predator trapping continues year-round. While on one hand routine trappers have potentially unique insights into seasonal changes through their year-round monitoring of particular 'transects' through wetland or beach habitats, the wetland trappers I accompanied through the Rings Beach Wetland habitually downplayed many of the seasonal cues, including of flowering plants, that they otherwise pointed out to me. The suggestion here is that it is the ongoing (and therefore seasonally undefined) routines of trapping practices themselves that are potentially masking the experience of seasonality within the wetland for trappers. Members of the RBWG formally meet only four times over the course of the year, so that for many volunteers it is a solitary task compared with group planting/weeding events. At the same time, the spring/summer flush of pest catches was noted by all trappers, along with the fluctuating water levels on the tracks over winter. The general availability of plant seeds over the summer in combination with abundant food leftovers from visitors effectively sustains predator rodent populations over this period.

Summer is also the time for native seeds to be collected by nurseries to be propagated for the successive planting season. And while the seeds of native dune plants are typically collected by volunteers over the December-January period from their respective beaches, those of native bush plants are reportedly more difficult to isolate from one year to the next.

So you know, when we first started doing this, we spent a long time just walking, looking for where the trees were. And now we can tell you where the right trees are – where there's 50 Kohekohe. But we have to plan in the seasons to do enough walks…Sometimes, what we expect to happen on the trees, doesn't happen when you expect it to happen. You know, it's definitely influenced by the weather. Well, its influenced by something that's not consistent – Kit (MBET).

Consequently, the timing of seed collection from native bush requires constant monitoring of source areas, which is ideally carried out alongside routine traplines.

PROCURING



Top: *Volunteers being taught the techniques involved in collecting seed from native dune plants from a nursery expert.*

Middle*: Native seeds being collected in the field by volunteers at Otama, Whangapoua and Kuaoutnu for propagating next years restoration plants.*

Bottom: *Close-ups of the seed heads from native Spinafex dune plants, with extracted seeds seen bottom left. Native seeds gathered from a coastal tree are seen bottom right.*

Figure 13 – Procuring native seeds with participating groups on the Kūaotunu Peninsula

Showing the various stages of native dune plant propagation - from the initial sowing of seeds into trays, to 'pricking out' the young seedlings into individual pots before being transported outdoors – initially under partial shade, until ready to be planted. The volunteer nursery sessions are held weekly and often involve a different mix of participants each time.

Figure 14 – Native plant propagation with participating groups on the Kūaotunu Peninsula

PLANTING

Above: *Clockwise from top left, Coastcare organized dune restoration planting events at: Ōpito Bay, Otama Beach & Kūaotunu West*

Left*: A weekend wetland 'plantathon' with the Otama Reserve Group, followed by further plantings at Opito Bay.*

Figure 15 – Planting with participating groups on the Kūaotunu Peninsula

PROTECTING

Above: *Clockwise from top left: Resetting predator traps at Otama Beach; Routine weed control operations at Kuaoutnu West beach; Preventative measures to protect recovering dunes from foot traffic.*

Right: *Routine weed removal operations in blustery conditions at Kūaotunu East beach; A reminder that dogs are not allowed on beaches in order to protect threatened native shorebirds – also at risk from predating rodents.*

Figure 16 – Protecting habitats with participating groups on the Kūaotunu Peninsula

PLANNING

Above: *Clockwise from top left: KDCG gather for a shared lunch to mark a significant planting day; the inaugural meeting of the KDCG in 2022; Annual planting events at Rings Beach followed by a 'sausage sizzle' barbeque.*

Left: *An annual planting event at Ōpito Bay; A field meeting with WRC to plan for the coming years plantings in the Otama Wetland Reserve.*

Figure 17 – Making plans and celebrating with participating groups on the Kūaotunu Peninsula

And that's what I found. I do a little bit more trapping. When you do trapping, you get a chance to see all the trees together and pieces of bush. And I found that I get to find seeds, but at different times – because you have to go there every month or every second week – Alice (MBET).

Once the peak months of Summer monitoring have passed, the focus starts to shift for many groups towards planning restoration activities for the upcoming year: 'And then, once you survive through summer…you can start planning your next area' – Tara (Coastcare-TCDC). The ORG traditionally hold their AGM towards the end of January, both to reflect on their achievements from the previous year as well as in order to plan for the year ahead. As Phil explains below, this is strategically timed as an 'open' meeting in summertime to capture the wider membership of the group beyond its core committee.

But with summertime, you put your infrastructure in place. For us, we've done our fundraising, we've done our planting, we continue with our pest control. And that's sharing what we've achieved with people. A lot of people don't want to know, but there's generally, I think, people who do care and want to know what we've done. So summertime, we'll save a time for our AGM in our sharing time – Phil (ORG).

….and at our AGM we talk about our goals and the things that we need to achieve and the things that we have achieved. And so, I think that that is sort of the beginning of the year as far as I can see. Because we decide what we are going to focus on for the year – Josie (ORG).

Several groups identified the relative timing of their AGM, towards the end of Summer, as marking the beginning of the year - in terms of their conservation activities as much as in their social lives. 'I think we all focus, even in our normal lives, on the Christmas/New Year summer period as either the end of the year or the beginning of the New Year' – Laura (ORG). In this way, the Gregorian dictates of the calendar year, renewing on the 1st January, were not considered completely inappropriate by the majority of participants in seeing summer as bookending the conservation year on Kūaotunu. The Gregorian calendar then aligns quite closely to the solar calendar, even as many other parts of society (not least *Māori*) consider the Gregorian calendar out of step with the rhythms of the natural environment; e.g. with the 'New Year' starting in the middle of the flow of summer activity and growth. Summer in Kūaotunu (as for much of the Coromandel) is defined as a recurring social 'event' that is often in tension with the physical environment's underlying rhythms and cycles.

This inherent deviation between natures cycles and social calendars is noted by Ngāti Huarere, who are actively working towards restoring their customary intergenerational knowledge frameworks, based on *Mātauranga Māori* within the broader timelines of the contemporary Gregorian Calendar.

'I'm pretty much trying to run by the normal calendar, but the real calendar is the seasons of the year….So you always use that Gregorian Calendar as your go-to, but really, it's the climate you have to work to because you can plant stuff and it will die one year and then you plant the next year and it will flourish' – Lewis (NHWT).

A key distinction here is the specificity of *Mātauranga Māori* knowledge, 'The focus [of which] is around the local and intergenerational experiences for indigenous peoples who have 'lived' the environment and added to its stories over time' (Carter, 2019). And, in direct contrast with the static timelines of the Gregorian calendar, no one year is expected to exactly replicate that of its predecessor, with many *tohu* identifying bigger patterns of change. 'For sure, there's multiple similarities [but] with discrepancies…so, no season really mirrors one another' – Lewis (NHWT).

In *Mātauranga Māori*, this detailed awareness of changing circumstances and local conditions is based on a continuum of updated observations being passed within and through generations. Seasonal indicators, in combination with long-range meteorological forecasts and tide tables, are still strongly related to contingent cultivation and harvesting practices by descendants of Ngāti Huarere ki Whangapoua through reference to contemporary gardening and fishing calendars.

When you go through the calendar and see the high tides. I keep an eye out for us, because you can get Pauas[28] *from here to there. If it's a sunny day out on the water and the sun will bake them off and they'll fall on their back in the sand. So that doesn't happen often, but that's what happens occasionally. So, like I said, every season seems to change* – Lewis (NHWT).

5.1.3 ***Coastal Case-Studies***

The Kūaotunu Peninsula is a theoretically privileged location from which to observe and experience seasonality manifest in natural rhythms. The physical configuration of ocean, coastline, wetland and bush-clad hillsides that comprise the Kūaotunu Peninsula provides exposure to numerous elements through which to potentially observe and experience diverse seasonal phenomena. And while each of Kūaotunu's northern beaches are invariably associated with a local stream catchment, the configurations of their interior landscapes varies considerably in both scale and character, as do the morphologies of the beaches themselves.

The communities arising from individual beach settlements are equally unique in their balance of permanent to semi-permanent dwellings and in the returning frequencies of second-home owners and visitors. While incorporating some long-term residents, few participants have grown up on the Kūaotunu Peninsula, with most arriving as older adults with diverse background knowledges and experiences. There is otherwise a rich history of Kūaotunus formative occupation by *Māori* settlers, the legacy of which is etched into its landscapes and the ongoing associations of Ngāti Huarere, Ngāti Hei and Ngāti Tamaterā today. The evolving social-ecological dynamics resulting from the development of Kūaotunu's beach settlements have inspired alternative conservation practices and priorities within its resident beach communities alongside diverse manifestations and understandings of seasons as a result.

In the vignettes that follow, Kūaotunu's discrete beach environments are characterised by the temporal relations of resident ECGs, including in their routine seasonal practices and how they experience social-environmental change and periodic encounters/events. The *Māori* names

[28] ANZ marine crustacean, Abalone *Haliotis iris*

originally given to each of Kūaotunu's beach settlements are notated to provide specific reference to the cultural values with which these places were attributed by their original occupants.

Whangapoua : The bay of the poua (shellfish); Matarangi : the eye of the sky

Primary ECG : Ngāti Huarere ki Whangapoua (NHWT)

Although separated some 20km by road around its interior perimeter, the beach settlements of Whangapoua and Matarangi are intrinsically connected to the Whangapoua Harbour that they flank. At its mouth, the headland promontory of Te Rehutae Point is separated from the western tip of the Matarangi sandspit by a kilometre across. The harbour is in turn fed by a multitude of watercourses, their catchments extending deep into the Coromandel ranges. Consistent with their *Mātauranga Māori* world view, Ngāti Huarere regard Whangapoua and Matarangi beach environments as elements of the bigger harbour system within their (redacted) customary *rohe*. In this way, Ngāti Huarere are able to draw on physically diverse repertoires of seasonal rhythms and cycles replete with reference to customary knowledges extending back in time. Customary seasonal *tohu* associated with both cultivation and harvesting practices likewise extend throughout the wider harbour environment.

Lewis recounts how his mother's generation traditionally cultivated pumpkins on the terraced slopes of Opera (as part of Te Rehutae) Point, whose extended north-east aspect benefited from a full exposure to both winter and summer arcs of sun at the mouth of the Whangapoua harbour. The Mercury Islands, located some 15-20km offshore, were similarly utilised for cultivating *kumara*. Likewise, sun and wind, in combination with the tides, still dictate the selective conditions for harvesting certain *kaimoana* within and around the Whangapoua Harbour:

There's a particular wind where we get scallops wash up at Matarangi. It's a strong easterly that runs for three days and then you just have heaps of scallops washed up. So that's one of the things we watch for. We know that when there's a particular wind - then over to Matarangi! - Willa (NHWT).

For Lewis, the commute made with his parents on horseback, driving livestock over the interior forest ranges between Coromandel town (located on the opposite coastline) and Whangapoua has effectively extended his customary knowledge, while simultaneously witnessing Whangapoua's development (in the 1960's) into a beach settlement.

I've been coming here with our parents since 1957, when I was born. And we've had a lot to do with this land from day one, from before it was subdivided. We used to just gallop through there on our horses when we were kids, so there was not a house in sight. And it was special to us then and it's still special to us now – Lewis (NHWT).

This enduring spiritual connection with Whangapoua, in spite of development change, is shared by Lewis' brother, Dale:

'I'm on the property that my mother and father owned and then my mother's mother. And it went right back to Huarere who arrived on the Te Arawa waka some 800 years ago. So, I have very deep

feelings for the land and also the care that was passed down to us. And I feel it a privilege and a responsibility to keep the land as good as we can and pass it on, actually, in a better condition than when we received it. The Whangapoua is special to us because of the tīpuna who came here and it just feels like a place of home' – Dale (NHWT).

With the development of Whangapoua into a beach settlement, Ngāti Huarere retained land on the foothills located to the south, which has been formally subdivided for residential development by the currently returning generation. While encountering opposition to this development from residents of the main settlement, property owners at the eastern end of Whangapoua's beachfront are having to finance their own defence against the isolated effects of coastal erosion. Coastcare activities at Whangapoua Beach are otherwise largely chaperoned by the conservation volunteers of the local Mana Manu Trust, as a collective of conservation-focused landowners based on the eastern shores of the Whangapoua Habour.

Matarangi's subsequent wholesale development into a beach settlement 'resort' in the 1980's included the development of a golf course at the western extent of the sandspit, which forms the mouth of the harbour. Active erosion processes have, through a series of recent storm events, exposed layers of middens[29] sitting beneath the grass turf of the golf course, which I was able to observe at the invitation of Ngāti Huarere, as they work with National Heritage NZ to record (see *Figure **20** – Section 5.2*). Meanwhile, the golf course administration is privately funding its own dune restoration project to secure their greenways against further loss to natural beach processes. Official Coastcare activities at Matarangi are further hampered by opposition from some beachfront residents wishing to retain private accessways to the beach through the dunes that otherwise provide protection to properties from active sand movement along the spit. This contention amongst residents has seen a fluxing participation in organised Coastcare activities at Matarangi in recent years.

Once fiercely contested as a sheltered food bowl, there are a legacy of *Māori* defence sites distributed around the wider Whangapoua harbour. European colonists subsequently raided the wider catchment for Kauri timber and gold deposits before pioneering farmers and 'dune people' took up interim residence (Lay, 2009). Thus, a history of conflict over the use and occupation of its natural resources appears to be ongoing at Whangapoua.

Rings Beach : *after Frank Ring – local farmer and son of Charles Ring who first discovered gold on the Coromandel.*

Primary ECGs : Rings Beach Wetland Group (RBW) / Rings Beach Residents (RBR)

The Rings Beach resident community spawned one of the original dune restoration groups on the Coromandel, with an early initiation of dune plantings in providing long-term fortification of their cherished beach, variously described to me as 'unique' and 'magical'. But while continuing to

[29] Midden – an archaeological domestic deposit associated with past human occupation

commit to formal annual dune planting events, there is no organised maintenance of the sand dunes, which is otherwise carried out on an as-needed basis by keen individuals, with routine weed control contributed by local (Council facilitated) contractors.

In the past, residents have also worked on their own initiative to remove pine trees within the bush-clad headland bluffs that contain Rings Beach, with this work since taken on by an independent group (RBWG) comprised largely of volunteers from the neighbouring settlements of Kūaotunu and Matarangi. Originally formed to restore the Matarangi Bluff Scenic Reserve (DoC), the public walkway developed through the reserve by the RBWG is acknowledged to have 'put Rings Beach on the map' (Carly - RBR) in providing an attractive native bush walk through to Matarangi. The subsequent discovery of a wetland habitat at the base of the Waiari Stream basin has become the key focus of the group, particularly in restoring habitat for endangered native wetland birds. To protect these birds, a team of dedicated volunteers from the RBWG maintain networks of animal pest traplines throughout the extensive catchment reserve around the year on a weekly/fortnightly basis. But while supportive of the RBWG, Rings Beach residents have remained largely uninvolved with the wetlands' restoration.

At the same time, the wetland remains effectively concealed by its physical enclosure at the base of the steep bush-clad basin topography that also isolates Rings Beach from its neighbouring beach settlements. With the coast road that once went around to Matarangi permanently closed by a rockfall from the Matarangi Bluff, the wetland walkway now provides the only land access between the neighbouring settlements as well as being a popular pursuit for visitors. The loss of vehicular through-traffic is regarded as a positive change by the Rings Beach community, who value their physical isolation.

In being largely comprised of traditional family holiday 'baches[30]', the compact scale of Rings Beach settlement has fostered a close-knit community, only a third of which are permanent residents. 'We've all been coming here for such a long time, that we are one big family really' – Anita. Consequently, there is a clear focus on socialising, with summer in particular being a key period for bringing 'locals' together over a series of social events. This traditionally includes a kids sports day on New Year's day and a residents 'Beach Brunch' in early January that are considered formative to their community of predominantly part-time residents (with 32 resident families in total).

The summer is our peak, most memorable time. And all of our children that have grown up here and the next generations of children that grow up here. […]The kids meet up with other children that they only ever see when they're here. Make lifelong friends out of those children and it is a really binding time for everybody – Geraldine.

[30] Bach – (originally) a simple holiday dwelling in ANZ

Kūaotunu (East & West) : *'to inspire fear in young animals'*

Primary ECG : Kūaotunu Dune Care Group (KDCG)

At the intersection of SH25 with Black Jack Road, servicing Otama and Opito Bays at the mouth of the Kūaotunu River, is Kūaotunu Village. Originally identified as rich hunting grounds by indigenous *Māori*, Kūaotunu Village today is well resourced with a local store, café and renowned pizza restaurant, 'Luke's Kitchen' while also being home to the local voluntary fire service, community hall, library and Steiner Kindergarten. During the peak of the summer season, Kūaotunu Village services large numbers of visitors to the peninsula. Otherwise known as Kūaotunu East, there is a separate residential enclave extending along the beachfront of Bluff Road, from its junction with SH25, alternatively known as Kūaotunu West, which additionally hosts a commercial campground incorporating privately owned holiday cabins and units. The east and west settlement enclaves of Kūaotunu are readily accessed from SH25 which straddles their corresponding beaches to either side of Quarry Point, which hosts a popular public boat ramp. The general exposure of Kūaotunu to this arterial throughfare is considered by many locals to undermine the fabric of the Kūaotunu community, compounded by the disjoin between east and west settlements and prevalent second-home ownership.

In apparent contrast with neighbouring beach communities, there is a palpable hostility towards non-permanent residents amongst some Kūaotunu Dune Care Group (KDCG) members. Alongside a lack of practical commitment by second-home owners to environmental conservation activities in and around Kūaotunu, there is also a perceived divergence in values from its permanent residents: 'You get a lot of people come down here to the bach and they don't know what's going on around here. Unless they know someone local' – Alec. 'And those that are part of these groups are ageing, its quite an ageing population here' – Pippa.

During the 1980's a core permanently-based resident community was collectively involved in restoration projects around the Kūaotunu Peninsula, which included work on DoC and Council reserves and beaches, in which everybody 'mucked in'. But following the sealing of SH25 between Coromandel and Whitianga townships around 2000, its development into a second-home and holiday destination has not seen a parallel commitment to conservation initiatives. As a long-term resident and co-instigator of early community conservation efforts on the Kūaotunu Peninsula, Alec continues to be part of local conservation efforts, while noting the changing social dynamics:

When we first came here, forty years ago, there weren't many people living here. I think only about two to three hundred from here to Wharekao (Mercury Bay). But everybody knew everybody. And if you had a working bee (like this morning) there would be 50 helpers come along. Because we felt the same' – Alec..

Alec directly attributes the increase in second home ownership in Kūaotunu with a diminishing custodianship for the wider environment. 'So the mix has changed a lot. And I think that's influenced the change in looking after the place as well, you know, their involvement in things'. And although dune restoration activities at Kūaotunu have recently resumed under a new local

champion, there are ongoing issues with recruiting and retaining sufficient volunteers to undertake the scope of works that have been identified by the newly incorporated KDCG – as a direct derivative of Coastcare.

The accessibility of the Kūaotunu coastline to the public via SH25, in conjunction with the boat launching facility at Quarry Point mean that Kūaotunu is under heightened pressure from visitor activities, which includes surfers during the winter months.

Otama : *My son*

Primary ECG : Otama Reserves Group (ORG)

Fed by the Otama River, the broad catchment of Otama hosts an expansive wetland sitting behind its substantially intact dune system. This configuration results in a seasonal 'blocking off' of the Otama River mouth over summer as a result of its reduced flow relative to depositional wave action along the coast. While the resulting lagoon is temporarily enjoyed for swimming by young children, the backing up of stagnant water over prolonged periods during dry summer months can often result in public pressure to artificially 'release' the wetland, which is otherwise resolved naturally through either a seasonal storm event or sustained rainfall. At the same time, the periodical flooding of the wetland provides an optimal habitat for many native wetland bird species.

For us, as an environmental group, we have to realise that it's a natural event and it does affect everything that we do as far as trapping, because the inundation levels rise and we can't actually access our tracks. So, when that happens probably depends on the season….last year was probably closed off this time (early December) for almost the entire four/five months. But this year is a completely different season…and it's all around rainfall. So, the more rainfall we get during this period of time…the less it will close up and then the water levels rise and that changes the whole ecosystem, as far as what uses it - the birdlife that's in there. Because obviously, the more it's closed off, it becomes a natural resource for the birds – Phil.

The Otama wetland is otherwise surrounded by farmland contained within a backdrop of vegetated hillsides under native bush as well as commercial plantation forestry. Although in a mix of private and public land ownership, the native bush backs onto the Waitaia Forest, which is the stronghold of Project Kiwi, a sanctuary for endangered North Island Brown Kiwi, (*Apteryx mantelli)* on the Kūaotunu Peninsula. While providing a substantial physical buffer to the wetland habitat and wider catchment beyond, the dune system at Otama Beach is also attributed with ecological significance. The physical integrity of the dunes have enabled the active dune system to function relatively unimpeded as part of coastal processes at Otama – including in accounting for the seasonal impediment of the Otama River.

Otama is distinguished from its neighbouring beaches with a relatively small residential base, being largely focused at its eastern end along a short extension of the main beach road. The discrete location of housing at elevation above the far end of Otama beach contributes to a wild and remote character that ironically draws many day visitors during the summer. During

favourable conditions in the winter, Otama also serves as a destination for touring surfers, while being enjoyed year-round by its residents.

And I think the advantage we have at Otama is we have everything in one little spot. The sand dunes, the wetland, the Pa sites and all that. So, it's quite great that everything is in one little place. And we just don't have to worry about what happens – Beau.

Comprised of both permanent and part-time residents, the core community of the ORG are socially a tight knit group, with a common sense of custodianship for their environment: 'I became involved in the group here because I really like to be part of the community and I really like the people. And I wanted to get involved with the people and the environment together' – Sam.

From its small residential base, the ORG are passionately engaged in the management of the wetland as one of four reserves at Otama, while tactically drawing on neighbouring communities for large planting and maintenance events. Unlike planting events I attended at other beach communities, the ORG would go whole days for a full weekend until all the supplied plants were in the ground. At the same time, I was also aware of fractures within the resident Otama community, which meant that certain residents – both permanent and part-time - did not partake in the organised activities of the ORG. Support of Coastcare activities at Otama have also been divisive in recent years, with restoration of the western end of the beach carried out by an alternative set of residents to the ORG. Josie explained, 'Everybody loves this place [Otama] and cares about it. And some people care about it in a different way than others. But you know, we all care about it'.

For Phil, present-day unrest at Otama is reflective of historical conflicts dating back to its original occupation as an original *Māori* settlement on Kūaotunu. 'There's a lot of historical *Māori* significance of Otama and I think that's half the reason we have a lot of internal conflict here is because of the unresolved issues of the past' – Phil. The four historical *Pa* sites located around Otama, which falls under the *rohe* of Ngāti Hei as part of the wider Mercury Bay are very much in the consciousness of the ORG as a result.

Opito Bay : the linking of headlands at the furthest end

Primary ECG : Opito Bay Ratepayers Association (OBRA)

In its location at the eastern end of the Kūaotunu Peninsula, Opito Bay is the furthest destination from SH25. Spanning between two prominent headland Pa's, Opito Bay is distinguished with 4kms of sandy beach and a deviant north-easterly aspect. With its affluent residential base incorporating a significant proportion of contemporary holiday homes, the population swells significantly over the summer season from a base of less than 10 permanent resident families. As well as offering safe family swimming, the Bay also provides a launching ramp for strong recreational fishing interests. And in spite of being made up of predominantly part-time residents, Opito Bay's Residents Association (OBRA) is actively invested in local conservation initiatives. Reflective of the external skills and resources that the group is able to draw upon, the OBRA was influential in lobbying for the eventual ban on commercial scallop dredging imposed by the

Ministry for the wider Mercury Bay waters, alongside Ngāti Hei from 2021. Once renowned for the droves of scallops that would seasonally wash into Opito's sheltered waters upon north-easterly winds, the voluntary *rāhui* (prohibition) was temporarily emplaced at Opito in an attempt to restore its diminished stocks. An annual game fishing competition otherwise continues to bring in the New Year at Opito Bay, while highlighting its appeal for recreational fishing.

Without a physical presence in the Bay today, there is nonetheless a rich history of *Māori* occupation at Opito, which persists within the wider *rohe* of Ngāti Hei. As well as a bountiful fishing resource, the fine basalt stone that was mined from its Te Tehanga hill was widely deployed for toolmaking, marking Opito as an early industrial 'hub' for the Coromandel. This *Māori* legacy is recognised by some of today's residents in the 'spirituality' they attribute to the eastern end of the Kūaotunu Peninsula, alongside its natural attributes, in convincing part-time residents to routinely make the 3 hour journey from Auckland to the furthest beaches. 'It is a passion for the bay; It is a beautiful part of the world - just captivating really. Quite a spiritual place. And when I come here, its emotional, but you just feel safe' – Clive (OBRA). Clive, who is well versed on the history of Opito, also noted that the original *Māori* 'occupation' of Opito Bay would have been seasonally based around summer fishing and winter hunting and cultivation practices.

While TCDC co-ordinated annual planting days at Opito Bay are generally well attended, there are no routine resident working bees covering ongoing maintenance operations for the dunes, which are otherwise maintained by local Council contractors. Under the co-ordination and funding of the OBRA, a handful of permanent residents actively trap around the wider Bay, supplemented by the intermittent efforts of part-time home-owners. With a strong strategic focus, the ratepayers committee are also actively advancing a biosphere initiative for the wider Kūaotunu Peninsula, in collaboration with Kūaotunu ratepayers (KRRA). At the same time, the development of a recent subdivision at the northern end of the Bay, in conjunction with ongoing commercial plantation forestry operations, represent contending interests to this vision.

In the place-based accounts outlined above, we see unique configurations of seasonal rhythms intersecting with the short pulses of daily tides alongside longer-term patterns of forestry cultivation and associated sedimentation, for example. The residential tenancies of Kūaotunu's inhabitants likewise span several years and opposing hemispheres to multiple generations in the case of Ngāti Huarere. Uniquely manifest in their distinctive operations, participants of Kūaotunu's ECGs, exhibit distinctive traits extending beyond a shared environmental stewardship ethos. As outlined below, these distinctions can also account for variable understandings of seasonality within and between beach environments, as well as variously contributing to the timescapes of its organisational cultures.

5.1.4 ***Seasoned Lifestyles***

Cycles of conservation volunteer participation appear to periodically fluctuate on the Kūaotunu Peninsula. At the start of my fieldwork, the first working bee I attended for the Kūaotunu Coastcare group in November 2020 comprised of just four people. With a new local champion emerging over the summer, volunteer recruitment increased fourfold, by 2020, alongside a

resumption of fortnightly weeding bees - and by tenfold for subsequent planting events. By early 2022, the Kūaotunu Coastcare group had formed an Incorporated Society through which to strategically fundraise and plan for future dune restoration works, while remaining under the general guidance of a TCDC-facilitated Coastcare. In this way, Kūaotunu Dune Care (KDCG) has swiftly become the most formalised Coastcare group on the Kūaotunu Peninsula. Their efforts have been duly recognised by the CRTNZ by awarding the activities of the KDCG at their annual conference in 2024 .

In this case, the revival of dune care activities at Kūaotunu were driven by the motivations of a local 'champion' who had recently moved from Auckland to take up permanent residence at a former family beach house at Kūaotunu West. As part of a process of semi-retirement, her move resulted in a closer engagement with the local environment, concurrently fostering an increased awareness of local issues. As an independent grassroot organisation, the ORG was instigated in much the same way by a self-employed resident and his family, supported by a small semi-retired/ semi-permanent resident population.

With the Thames-Coromandel District identified as home to the highest proportion of older persons (aged 65+) in the 2018 NZ Census, it is not surprising that Kūaotunu's permanent residents are predominantly made up of retirees. Local conservation groups are consequently dominated by retired volunteers with an increased flexibility to participate in both weekday and weekend operations. 'We just shifted here a couple of years ago and trying out this retirement thing. So, we've got a bit more time to come and play and do the dune-care'– Kerry (KDCG). Voluntary groups are also utilised by some as an introduction to the local community: 'We want to be involved in the community and it's a good way to get to know people' – Aaron (KDCG).

While several participants have made a permanent move from the closest conurbations of Auckland, Hamilton or Tauranga into former holiday homes, baches or sections; some have moved to Kūaotunu from further afield, including from Taupō. Others still have ended up in Kūaotunu from overseas, with some participants originating from Europe, as well as from the US, Africa and Australia. Most typically, these immigrants have spent working lives elsewhere in ANZ before eventually retiring to Kūaotunu.

In each of these scenarios, there are clearly altered reference points for individual understandings and perceptions of seasons on the Kūaotunu Peninsula. When its winter temperatures are comparable to a 'poor' UK summer, this is construed as a lack of seasonality on the Coromandel by a British ex-pat, who had also spent time in South Africa (Jack - RBWG). During her time living in continental South Africa, a winter daytime temperature of fifteen degrees was experienced quite differently by Tara (Coastcare-TCDC) to the same temperature under the maritime influences of the Coromandel Peninsula: 'If its 15^{o}C - you wear a jacket; whereas here, its 15^{o}C – it's very, very mild…so two very different areas'.

And although there are clearly common factors in drawing retirees to the favourable climes and landscapes of the Kūaotunu Peninsula, there are also other circumstantial factors at play. How individuals interpret seasons they observe on the Kūaotunu Peninsula is inextricably influenced

by their prior knowledge and experience – which is ultimately tied to personal interests and underlying values. Pippa and her partner Aaron are beekeepers, formerly from Taupo:

And I think it's interesting observing the different trees here - a lot of different species to what we would find naturally in Taupō…And in looking at how that is related seasonally, that they can be different markers for a different type of season to what we have previously experienced in Taupō. And not just the trees, but the birds too – Pippa (KDCG).

Those retirees who have previously only visited Kūaotunu during the summer holiday season can become newly aware of additional 'off-season' phenomenon. This was the case for Laura and her husband, Beau, who were obliged to remain at Otama for a whole year through the 2020 Covid pandemic in ANZ, having routinely spent previous winters overseas.

Well, up until this last year, I was away during September and October. I'd never seen the shags nesting. This year, I actually got to see them feeding their babies. And the other thing I noticed, was the seasonal changes in the plants. Because I spend a lot of time walking through the sand dunes, during winter and early spring, I walked through there and then all of a sudden all of those little green shoots came out and now all those little fluffy things. Zillions of them, like they weren't there three weeks ago. So I saw them come alive.– Laura (ORG).

For long-term residents, such as Dan, living on the Otama farmland originally purchased by his father in the 1970's, seasons are clearly integral to the family farming operations. 'Even though they're not as extreme…they really do control what we do here'. Now farming more-or-less full-time after former careers, Dan's seasonal awareness has increased substantially as a result. 'So, the seasons are pretty mild, but still working with the land. When I was working in TCDC, of course, the seasons didn't really affect me as an office job. But here it really does' – Dan. As one of the few residents to have spent their childhood on the Kūaotunu, Dan is able to draw on past recollections in his interpretation of seasonal conditions. Most participants are otherwise lacking in historical reference points to their local seasonal knowledges and therefore only able to make inferences based on shorter timeframes.

In the nearby settlement of Whangapoua, descendants of Ngāti Huarere are collectively engaged in the process of returning to their ancestral 'lands' alongside a relearning of customary knowledges and wisdoms inherent within its broader environs. And unlike the transient retirement-holiday model of occupancy on the Kūaotunu Peninsula more generally, this repatriation involves intergenerational *whānau* (family) and their relationship with and resulting knowledge of the environment accrued over 700 years, so that it may continue to be handed down to future generations.

So, in regard to how we feel about the whenua, we have hundreds of years of our tipuna that are living or have been buried into the whenua [land]. So, there's our heritage, it is with their blood in the land. So that explains the spiritual connection that we have to our land because all or part of us is there. How we got here was through them – Willa (NHWT).

Although the indigenous 'residents' of Whangapoua, these descendants of Ngāti Huarere otherwise describe their occupation as a temporary tenancy within the legacies of their ancestry and Maoridom.

In Maoridom, it's not just ownership, its kaitiaki – we care about the environment…and its people as well. If we can educate people by living how we want to live and set an example, then hopefully the next generation - which I'm trying to instil in my children - that it's not a possession, it's a tenancy really. And a privilege' – Dale (NHWT).

But at the same time, Ngāti Huarere also struggle to uphold their customary stewardship practices alongside the contemporary land uses of Whangapoua. Commercial forestry operations within the wider harbour catchment and a Sewage Treatment Plant (at Matarangi) both directly impact the harbour alongside ongoing residential development. A disconnect with the *Maramataka*, in favour of a prevailing Gregorian calendar, has arguably contributed to the further loss of customary local seasonal knowledges by Ngāti Huarere.

Figure 18– Summarising the nested kaleidoscope of variable factors involved in diverse understandings and interpretations of seasons amongst research participants on the Kūaotunu Peninsula.

5.1.5 ***Summary Analysis***

That the colonial 'ideals' of four seasons are largely discounted by Kūaotunu locals is unsurprising, particularly given the relatively mild sub-tropical maritime climate prevailing over the Coromandel. On the Kūaotunu Peninsula, 'summer' and 'winter' are generally construed by participants to be the 'primary' seasons, incorporating the variabilities of 'spring' and 'autumn' as transitional months. At the same time, winters are mostly considered to be relatively mild and thus enabling outdoor activities to continue throughout much of the year. This was my own experience of visiting Kūaotunu over three successive years for my research. Although dressed to the conditions, I was rarely cold participating in planting/weeding bees. And likewise, working coffees at Kūaotunu village's Kua Kawhe were always taken sitting outside.

As for much of the Coromandel, the meteorological distinction between summer and winter is amplified by its function as a peak summer holiday destination, bringing large numbers of 'outsiders' to temporarily reside within Kūaotunu's beach communities. For those locals ordinarily attuned to seasonal rhythms through a commitment to routine conservation practices, their experiences are altered by the sheer numbers of visitors, rendering many organised activities impractical during the peak summer period. Locals are equally preoccupied with hosting their own extended families and guests during this time. Thus, while visitors are drawn to the natural aesthetic appeal (and associated recreational values) of the Kūaotunu coastline, their presence is simultaneously imposing on the environment and the local conservation initiatives working to restore it. Consequently, many local environmental groups distinguish between their formal practical working 'conservation' year (generally extending from February/March through to November) versus discretely maintaining a protective surveillance during the peak tourist season they must accommodate over December/January/February. The local environment is importantly perceived by these participants as a dynamic living system - warranting reciprocal protection and nurturing - including from human induced forces of change.

Concurrently, it is the combined natural aesthetic and mild climatic appeal of the Kūaotunu Peninsula that crafts an attractive retirement lifestyle for many permanent residents, alongside a high investment by second-home owners. Collectively, the geographical origins of many Kūaotunu 'residents' is as diverse as the temporal frequencies of their occupancy – both in how long they have been resident/owned a second home at Kūaotunu (duration) and how frequently (periodically) they might then visit over the course of a year. Seasons are differentially experienced at Kūaotunu as a result - ranging from individuals and families visiting during the annual summer holiday season only, through to permanent residents collectively engaging in a full calendar year of conservation. In addition to the variable temporalities of residential tenancies, the background interests and values of permanent and part-time residents further influences the nature and extent to which they practically engage with Kūaotunu's beach environments and the seasonal awareness they develop as a result. And since participation in local community conservation initiatives appears to be a shared expectation of many permanently based participants, there is inevitably some animosity towards those residents choosing not to contribute.

Factions of varying degrees are evident within almost all of Kūaotunu's beach communities, alongside a common frustration, within ECGs at least, at the difficulties of recruiting and retaining volunteers to carry out practical works. Several particularly passionate volunteers were observed to work across groups at both the practical and administrative level as a result. Through extended social networks, these locals would appear to demonstrate an expanded sense of environmental stewardship for the wider Kūaotunu Peninsula, while addressing the social shortcomings of individual beach communities. Jude is one such local, who has been a permanent resident at Kūaotunu for 30 years.

And I think the problem is its usually just the same people all the time. Right through the years, it's the same – from playgroup through to working bees. And we find it's the same with Kauri 2000 now at planting days. We have the same people coming each year we have a volunteer day. And we're struggling at the moment to find new trustees. The wetland group (Rings Beach) is the same.' – Jude (KDCG).

As a largely ageing population, there is a reduced expectation for volunteers to be able to continue participating in ECGs into the longer-term, which adds a further layer of volatility into the voluntary basis of ECGs, particularly where leadership roles are concerned.

On one level then, the experience and resulting understanding of seasons appears subjectively based on the nature and frequency of how individuals practically engage with Kūaotunu's beach environments relative to their personal biographies and acquired skills. This is directly relatable to Polanyi's conception of tacit 'Personal Knowledges' (1962), in conjunction with Ingold's skilled relational 'agent in environment' – both phenomenologically derived from subjective experience (Ingold, 2000). Experiencing seasons collectively through organised conservation practices is additionally dependant on the social-cultural dynamics of groups operating within individual beach communities, as much as the bio-physical dynamics of the environment that spawns them.

At Rings Beach, members of the wetland group (RBWG), with their strong ecological restoration mandate, have a different practical understanding of seasons compared with its resident community, with their alternative focus on nurturing social-cultural values in the context of the 'hosting' beach environment. Likewise, through practical management of their wetland, members of the ORG have specific insights into the seasonal dynamics of the Otama catchment as an integrated hydro-ecological system in which beach processes play a role, as opposed to those gained exclusively through Coastcare operations, involving different members of the segmented community. In this way, both the physical and social dimensions of discrete beach settlements appear to highlight fundamental differences in how seasons might be alternatively construed and collectively understood by the resident communities of the Kūaotunu Peninsula. Those individuals involved with local ECGs working across case-study environments may contribute alternative insights into seasonal rhythms as part of a distributed community of practice (Wenger & Snyder, 2000).

As annual climatic cycles, local knowledge of seasonal variability is acquired and developed through experience involving ongoing practices and recurring events accumulated over time,

while being specific to the microclimatic variables of case-study sites. The variable residential tenancies of Kūaotunu's beach settlements are additionally associated with wide-ranging references to seasonal 'norms'. And since the majority of residents have moved to Kūaotunu in their latter life-stages from outside of the Coromandel, the timeframes of accumulated patterns of seasonal knowledges are short - with 40 years being the longest permanent residency reported amongst participants.

This is contrasted with the long-term association of indigenous *iwi/hapū* with the Kūaotunu Peninsula, including that of Ngāti Huarere ki Whangapoua, involving seasonal knowledges acquired over the course of some 700 years. Rather than being confined to individual beach settlements, the customary seasonal knowledges derived from *Mātauranga Māori* by Ngāti Huarere were originally compiled from the wider catchment of the Whangapoua Harbour extending to the offshore Mercury Islands as part of an integrated ecosystem conception. In confirmation of the holistic systems approach on which *Mātauranga Māori* is founded, customary seasonal signs or *tohu*, such as the relative timing of Pohutukawa flowering, were also interpreted in the context of other factors/conditions rather than being read in isolation and therefore used to determine variable outcomes (Chisholm Hatfield et al., 2018). While implicating an awareness of interconnecting environmental influences accounting for variations between seasons as well as between years, the specificity of place from which this knowledge is derived is also highlighted.

Since spending time away from Whangapoua, in the wake of WW2, the inevitable loss of customary seasonal knowledges by Ngāti Huarere has been compounded by its subsequent development as a beach settlement (followed by Matarangi). In conjunction with commercial forestry operations within the wider catchment, residential development has resulted in substantial changes to the harbour environment. Some traditional *tohu* of seasonality are no longer apparent in this new environment. In the process of returning to their ancestral lands, the descendants of Ngāti Huarere are attempting to recover local seasonal knowledges associated with customary traditions that are the foundation of their place in the world, while simultaneously passing it on to their children (*tamariki*). Drawing on recollections from their own youth, the older generation are attempting to calibrate environmental changes from customary *tohu*, including those that have become obsolete as a result of social-environmental change.

This process of reconciliation has also involved acquiescence to the Gregorian Calendar by Ngāti Huarere, as a social fixture accommodating the statutory holiday season rather than trying to uphold the customary *Maramataka* as a lunar reckoning of time reconciled with traditional cultivation and harvesting practices. While still making casual reference to the moon phases alongside the solar cycle in contemporary gardening practices, the resulting hybridization of calendars by Ngāti Huarere is not out of place at Kūaotunu, where residents variously draw on seasonal knowledges from alternative cultures and geographies. At a national level, *Maramataka* are becoming increasingly recognised for the accumulated inter-generational seasonal knowledges they effectively validate, as a dynamic monitoring tool that is highly specific to place (Hikuroa, 2017). One such application is for the ongoing monitoring and interpretation of seasonal change in the context of changing climates (King, 2008).

Acting as contemporary custodians of Kūaotunu, local conservation groups are effectively in the process of redressing perceived imbalances in human activities with contextual 'natures' involving shared seasonal practices, while drawing from a diversity of geographical and cultural backgrounds. But the lifestyles of participants and the varying frequencies with which they practically engage with their resident beach environments, equally gives rise to some subjectivity in the collective interpretation of seasons and whether and how they might be changing.

By way of summary, *Figure **18*** provides a distillation of the bio-physical and social-cultural factors observed to be at play in the shared experience of seasons and their subsequent re-interpretation from one group, one year and one place to the next on the Kūaotunu Peninsula.

5.2 Experiencing Change

Question b) **In what ways is seasonal variability practically experienced and accommodated by locally organised groups in the context of broader patterns of social-environmental change?**

With locally specific seasonal knowledges partially derived from broader social-cultural dynamics and specifically the cultured logics associated with conservation stewardship practices, it follows that broader patterns of social-ecological change may manifest through the seasonality of these practices. Since coastal conservation initiatives on the Kūaotunu Peninsula are specifically engaged in a multiplicity of seasonal rhythms, I explore with participant ECGs, below, their relative experiences of seasonal change and how variability within and between seasons may be practically accommodated within their organised activities. How local seasonal variability is variously interpreted by different groups in their collective sensemaking of broader patterns of social-environmental volatility is then considered with participants as a premise to exploring their anticipation of and preparedness for future change in the following section.

5.2.1 The Nature of Seasonal Change

Conversations around seasons on the Kūaotunu Peninsula often led to discussions around what is changing. On one hand, this appears to be inconsistent with the mild seasonality generally attributed to Kūaotunu by participants. However, the changes are as much to do with shifts in seasonal patterns as their absolute characteristics and therefore privileged to longer-term residents.

Yes, I think the big thing is the seasons are changing and they're changing quite dramatically, NOW. Whereas, through my younger days, those changes weren't really noticeable. But change seems to have sped up. It's like that incremental curve, in that there's more volatility in our seasons now and more extremes noted in the weather. Right now is a classic example; I don't think we've had a June this mild in all the time we have been coming here. The winter's aren't nearly as cold, while the summers have moved back a long way. Sometimes we feel that summer doesn't start until Christmas here. So, we're seeing changes in our seasons - the seasons are shifting back – Kit (MBET)

For some longer-term residents, in particular, the current conditions are also symptomatic of an incrementally warming climate. Consistent with IPCC projections for ANZ, a decline in winter frosts at Kūaotunu is variously couched as common evidence of locally warming conditions amongst some longer-term participants.

So basically the frosts haven't existed here for quite some time in comparison to, say 20 years ago, 30 years ago. And 40 years ago, when we were kids, it wasn't unfamiliar to see a frost. So seasons have changed. The winds seem to be more prevalent one year from one direction than they are from another – Lewis (NHWT).

*I've been keeping climate or weather records ever since we've been here (*42 years*). And the thing I've noticed in the last few years, is that we don't seem to be getting as many frosts as we used to. We only had two that I've recorded this year. And usually, say ten years ago, there'd be at least six or seven. So, I think its warmed up. Whether its temporary or not remains to be seen* – Warren (RBR).

Although initially, there appears to be a discrepancy between whether frosts are still occurring on the Kūaotunu Peninsula, Lewis, Warren and Kit all live at elevation above their respective beach settlements and concede that frosts can still occur at the lower level on the flats. 'We might find that we get frosts down at the other new nursery, but we don't get any frosts here' – Kit (MBET). Dan, in his farming of the flats at Otama, has likewise observed a diminishing frequency and intensity of frosts in recent years:

So, Otama is really good. We don't even get a frost here. I won't say ever but we haven't had one for a few years. And you might, on a really cold winter, get one and you'll see that it's frosty in the morning, but it's gone by 10:00am - sort of a light dusting. And in the valleys - you certainly don't get it up high – Dan (Otama).

So that while changes in the incidence of frosts on the Kūaotunu Peninsula are commonly registered by long-term residents, the nature of change varies in the unique experiences of residents within their particular beach settlement. Potentially, these broadly perceived transitions in local microclimate alongside an associated volatility in weather are making broader seasonal categories harder to define.

Accordingly, we have heard deviating definitions of seasons from participants, including in their relative timing and periodicity, as well as in their key traits. So that, while summer and winter are fundamentally discerned as warmer and cooler periods (as they were originally by indigenous *Māori*) neither are absolutely defined – even within the geographical confines of the Kūaotunu Peninsula.

For most resident participants, summer is typically referenced through social aspects of seasonal tourism and statutory holidays, incorporating the fixed calendar dates of Christmas and New Year. Consequently, winter transitions to summer on the basis of increased numbers of people and associated busy-ness, which is also practically reinforced in the seasonal opening hours of local shops and cafes at Kūaotunu.

When Lukes [Kitchen] goes to seven days a week from three days a week in conjunction with daylight savings. I think very much that daylight saving has a big effect on me in thinking that summer is coming and spring is here – don't you feel? When it changes, the time changes. It just confirms to me that it's on its way – that we are well into spring – Joan (KDCG).

For Joan at least, these anticipated timetabled social events provide confirmation of seasonal timings at Kūaotunu, with summer validated by the timing of flowering of native coastal Pohutukawa trees relative to daylight savings. In this way, Joan is combining national 'standards' of summer through daylight savings to alert her to upcoming seasonal change in conjunction with locally appropriated definitions of summer through the extended tourism season (in the opening hours of Luke's Kitchen) alongside Pohutukawa flowering. In providing an effective 'triangulation' of local timings drawn from separate cues within her everyday life, it is the relativity of these timings to one another that provides an approximate confirmation of summer for Joan.

The transition through Daylight Savings (to 'winter time' on the first Sunday of April) likewise provide a reminder of the transition back to winter at the end of summer for participants – even if the ambient conditions do not necessarily correspond. 'I don't say, 'hey its autumn now' because the summer just rolls on and then suddenly daylight savings changes and its winter – but winter's mild' – Kit (MBET). In this way, the manipulation of circadian rhythms, brought about through daylight savings, serves as a common benchmark against which seasonal conditions, as actually experienced, may be calibrated alongside increasingly unrealistic expectations of seasonal conformity.

Through a routine engagement with environmental conservation practices, most participants seem acutely aware that seasons are not gauged through alternating conditions of weather and climate alone. Instead, many participants appear to apprehend seasonal variability at Kūaotunu as part of an inherently dynamic complex of social and natural rhythms, in which there is no underlying assumption that any one season will necessarily mimic that of the previous year.

5.2.2 Calibrating Change : A Seasonality of Seasons

Drawing on previous accounts of how seasons are variously understood by participants, it follows that their interpretations likewise form the basis of how variability and accruing change in seasonal rhythms and patterns are perceived. Accordingly, we find evidence of seasonal change sourced by participants from a suite of observations over ranging frequencies and timeframes that are uniquely derived from the defined spatialities of their shared conservation practices and resident lifestyles. In addition to local weather patterns and their links to bigger climate cycles, participants variously draw from rich repertoires of interactions of social-cultural cues with phenological and hydrological cycles and rhythms operating at different frequencies, with some of these cycles occurring at intervals extending beyond the calendar year. In the context of the coastal environment, this includes in the anticipation of relative interactions of water and sediment in erosion cycles and sand budgets that are otherwise the focus of long-term projections of changing climates, through the Council's SMP project. However, the seasonal orientations of environmental conservation activities and the relative frequency of changes detected therein,

appear to enable participants to collectively accommodate some variability within their current operations, before change becomes problematic.

For commercial nursery operations supplying native plants from locally sourced seed, a variability in the reproductive cycles of some plants is inherent. So that, while the flowering and subsequent seeding of native forest plants is expected to occur during a particular phase of the year (season) the exact timing and abundance of specific flowers and fruit might vary considerably between years. In addition to the variable timing of summer coastal Pohutukawa blooms previously identified by Ngāti Huarere, there is an awareness that the flowering of certain native forest trees might also be subject to longer cycles.

So the Titoki seeds that Kit was talking about before - apparently they do [seed] *every seventh year. So you might have three trees in a row and one of them is going to seed this year and then the next one might do it the following year* – Alice (MBET).

For Kit and Alice, both learning to propagate native seeds to supply local restoration projects, the annual process of collecting native seed within the local bush is complicated by this variable timing of seed collection between years.

It's only been in the last few years that we've been gathering seeds. And sometimes, what we expect to happen on the trees, doesn't happen when we expect it to happen. Because we've been recording what we've been doing - what happened last year. We've gone out and looked and the (Titoki) berries haven't opened. And whether it's the tree or whether it's the season – I'm not sure. So there's some confusion, perhaps even in nature, as to when the seasons are. And it's been much more pronounced for us since we've been gathering seeds – Kit (MBET).

Alice (in her 20's) is relatively new to ANZ, having travelled here from Europe after finishing school and is consequently observing and learning about the native bush without references to historical conditions and phenomenon. Her immersive experience of seeing many things for the first time does, however, allow her to make critical interpretations.

But its only when you're surrounded by the environment or looking at it all the time – or just paying attention. You just have to pay attention and then you can see. And when we collect seeds and do nursery work, I always try to see other things. It's the same when I do the trap-line. Suddenly, I've got heaps of rats. Why? Because you don't have any food in the bush. That means I don't have to go seed collecting - because there's nothing left – Alice (Mercury Bay).

While on the one hand Alice is acutely tuned into observing and interpreting new and changeable details about the bush from one year to the next, she is (as yet) unable to make inferences of any longer-term changes. As a longer-term resident of Whitianga, Kit is otherwise attempting to reconcile their shared experiences of seed collection within the context of broader changes he has observed in local weather conditions and an apparent shifting of seasons.

Similar insights provided the foundation to many customary *Māori tohu*, through which 'plants helped to denote seasons, the time for annual tasks by their flowering, fruits etc.' (Best, 1922;

Johnson, 1946). For Ngāti Huarere, who have customarily harvested *kiamoana* (seafood) from the Whangapoua Harbour, seasonal timings remain highly contingent on local observations, and the relations (direct or coincident) between multiple rhythms in an environment, such as: 'when the flax flower, the kina are fat' – Lewis (NHWT). Additionally, the detailed monitoring of plant, bird and aquatic-marine life alongside weather patterns relative to the lunar calendar (*Maramataka*) and astrological constellations, traditionally provided multiple references from which changes could be registered and patterns derived. While noting the 3-4 yearly cycles of blossoms amongst certain native trees, Elsdon was informed by *tangata whenua* in the Mataatua district, 'When trees commence to blossom on their lower branches first, then a *tau ruru*, a warm and bountiful season will follow, but if they blossom at the top first then a *tau matao*, a cold and unproductive season follows.' (Best, 1922 in Johnson, 1946, pg.34).

Critically, these detailed practical observations, drawn directly from nature and monitored over time, are associated with an awareness of bigger patterns of system change beyond annually cycling seasons. Most obviously, the alternating cycles of La Niña and El Niño (ENSO[31]) account for fluctuating seasonal conditions experienced between years. For the native nursery operations involved with ECGs at Kūaotunu, an awareness of these bigger systems is important in planning for their seasonal operations and specifically watering relative to ambient temperatures:

Every day, whether it's the cloud cover or we had a cold snap overnight, or whether we've had a high daytime temperature. It all has to be managed and then watering is done accordingly….So, my big worry for this summer, for instance, is: are we going to have any cyclones? We're in La Niña, we're going to get a warm wet period– Joy (CNPN).

Watering also allows Joy to keep high summer temperatures down in the nursery, while artificially extending the germination period out to December 'whereas naturally in the wild they [seedlings] would have germinated in spring and that would have been it'. Within the last five years however, the extended germination window has been pulled back to November, 'Because we're getting heatwaves now in November, that we've never had before. Unseasonably warm temperatures just completely at the wrong time that can throw the whole crop' – Joy (CNPN). But while nursery operations are able to regulate growing conditions (to an extent) they also have to synchronise the timing of plant supply with restoration projects.

In this way, Joy's nursery operations remain strongly dictated by seasons, not least of which is in ensuring the co-ordination of plant supply with the practical planting season. 'So, we have timelines at each time of the year. We have a seed collection period that generally runs from December through to April. From April to August we're dispatching – so the plants are going out and being planted and then from August through to September, we're making [propagating] those plants again'. And it is through Joy's detailed monitoring of seasonal conditions - gained over 30 years in business - that she has been able to detect recent shifts in climate. In combination with heatwaves, Joy has also noted a gradual shift in the timing of spring-summer patterns: 'So, I have

[31] ENSO – El Niño Southern Oscillation

the ‘one month’ factor. So, whatever everybody else is saying, on the radio or TV, it’s almost a month different to what it used to be. Spring was the first day of September, but now its sort of August’. And this has critical implications for the relative timing and co-ordination of her nursery operations, which include in the procurement and supply of plants for coastal restoration plantings on the Kūaotunu Peninsula.

So, we’re still dispatching in August, but actually we’ve got to be sowing in August for the following year. So, its cramming those two together and that’s clashing more and more….But I guess the big picture for me is that we’re having longer extended periods of the same type of weather, with intermittent large weather events and this has been happening for a good ten years….And each year, we thought ‘its just a bad year’ but actually now we’ve had seven bad years in a row and this is a TREND now’ – Joy (CNPN).

5.2.3 Coastal Cacophonies : Shifting Sands, Significant Storms and Wavering Waters

On the Kūaotunu Peninsula, these broader climate patterns are variously reported by participants in terms of hydrology, or water in the environment. Without necessarily referring to them directly, many permanently-based residents are clearly aware of ENSO and other global climate cycles through their manifestation in weather patterns and events. The ORG collectively noted that big storm events typically occur in September (spring) at Otama and especially in the last couple of years, while noting that they sometimes also occur in their late summer (February-March) time: ‘Well, we get some in the winter, but we often get one in the summer, a sub-tropical one, but we haven’t in the last couple of years’ – Phil (ORG).

As we have already learned from the ORG, rain-bearing storm events have practical implications for the complex hydrological regimes of the Otama wetland that they manage, with the closing and opening of the mouth of the Otama River also dictated by significant storm events. ‘And the whole opening and closing off of that lagoon is a massive impact on the whole ecosystem’ – Phil (ORG). In understanding this as a dynamic system, the group is equally aware that the relative timing and duration of the lagoon closing may vary from season to season: ‘So that last year was probably closed off by this time’- Phil (ORG). Typically, the lagoon blocks off in summer when the flow of the Otama river is sufficiently reduced by lower rainfall in combination with north-easterly winds causing wave action to bank and form a bar at its mouth. Unless the lagoon is artificially opened, the wetland remains cut-off until the next weather ‘event’. Neighbouring farmer, Dan, is likewise affected by the seasonal opening and closing of the lagoon in his management of the adjacent wetland flats for stock grazing. ‘So we prefer it not to be opened up when there's a drought. And then in winter, we really need it opened up for the floods’. Concurrently, Dan is also conscious of the effect of the ENSO cycles on the wetland in terms of drought and flood scenarios:

So when I think of La Niña, (well I think its La Niña) we get a lot more rain. And it's sort of very wet all at once and we get a lot of easterlies. It's sort of windy and it's constant showers coming over. And the other one is when it goes really dry. And that's when we run the risk of drought – Dan (Otama).

And since most houses on the Kūaotunu Peninsula are also on rainwater tank supply, residents are likewise vulnerable to fluctuations in rainfall from year to year and need to learn to plan accordingly. 'I put in another water tank at my property because of the low rainfall. We already had two, but I put in a third one; And since I put that tank in, it's never stopped raining!' – Kerry (KDCG). During this same period, Aaron and Pippa moved to Kūaotunu from Taupō (Central North Island): 'So winters are a lot colder down there. But here, the whole winter seems to be wet. There's been a huge amount of rain and storms' – Aaron (KDCG). Kent, who has been visiting Kūaotunu for thirty years, before moving here permanently, confirmed that 'this is the wettest winter we have had for a long time'. For Alec, who has lived as a permanent resident at Kūaotunu for forty years, he would typically expect there to be greater fluctuations in winter rainfall than has occurred within recent years under the extended La Niña phase: 'You can have a wet winter this year, it can be dry next year and you get the water tanks in; This is not typical'. Storm events are likewise seen to 'come and go', with less regularity, noting that one summer Kūaotunu experienced 'about three cyclones one after the other' – Jude (KDCG). More recently, the summer of 2023 involved successive tropical cyclones severely impacting the Coromandel.

Often to dramatic effect, the periodic movement of sand by storm-induced wave action was observed across most of Kūaotunu's beaches by participating residents. While the relative timing of movement was uncertain within and between years, there was a general comprehension amongst participants that this was 'normal' within natural beach cycles – even when brought about by cyclonic weather events.

We have had very severe storms coming in from the north. Especially with cyclones that generate big waves, just further north. And I can remember along that end of the beach – probably from [Ruby's] place onwards – the sand dunes were cut back, so there was probably a 15 foot drop from top to bottom. So, a huge amount of sand got washed out that year. And it all came back again – Warren (RBR).

Likewise, Otama residents recount similarly alarming experiences of sand erosion and accretion temporarily recontouring their active beach system:

In July 2008 we had a winter weather event. I wasn't living here then and came down the weekend afterwards and walked down through the valley to the beach. It wasn't there. There was not a grain of sand from the end of the beach up to where the stairs are. It was only rocks. Because of the wave action, a lot of trees were broken and falling down. And I was beside myself. I was calling DoC to come down here and do something with our trees. But the guy said to me ' That sand will just be sitting out there and I'll bet by Christmas that it's all back again'. And sure enough it was – Jill (ORG).

These cycles of beach erosion and accretion are also the foundation of the Coastcare initiative in bolstering the recovery potential of active dunes through native sand-binding plants that work against undermining wave action. But the movement of sand at Otama is also understood to move with the weather more generally, and therefore observable across multiple temporalities, as recounted by Sam, as a part-time resident:

Sand comes and goes, the movement is phenomenal from one day to the next. Sometimes the entrance to the river comes across this way, sometimes it goes over there. It changes from week to week and the dune shape. Sometimes there's a lot more backing up and then you see the little grasses growing out. And then the next thing we've had some waves and then we'll get a drop of a metre and a half and it's all flattened out and then just slowly within a couple of weeks, its back again. It's amazing to watch, almost every time I come, the beach is different – Sam (ORG).

According to data published on the WRC (Waikato Regional Council) website[32], Kūaotunu Peninsula's northern beaches are generally within a steady phase of recovery in the intervening 20 years following successive storm events in 2006 and 2008 (both associated with La Niña phases). However, Rings Beach and Opito Bay are noted as relatively stable – with less than 5m movement over 40 years of monitoring, while fluctuations of up to 30m have been ongoing at Kūaotunu West and Matarangi over the same period. With this magnitude of variation, the relative timing and timeframes of coastal monitoring becomes critical.

At Kūaotunu, the visible degradation of dunes in recent years, including through the encroachment of invasive weed species, has been the key motivation for the resurrection of the Kūaotunu Dune Care Group. Meanwhile, Rings Beach residents were aware of the long-term monitoring activities of WRC and generally accept their findings to be in line with their own observations. 'In other words, whether its climate change or whether the difference is overall, it hasn't changed very much – not like some beaches. And I don't know why. Because we face north and north-east and yet somehow or other this beach, more so I think even that Kūaotunu, recovers. It recovers really, really well' – Geraldine (RBR).

Through her regular observations as a permanent resident that likes to swim, Geraldine has otherwise detected changes in the local tides. 'And I think that is conspicuously different…apart from the king tides and things. Overall, it seems that high tides are getting closer to the base of the sand dune on a regular basis - they'll be high tides right up to the dune'. Another permanent resident from the group had concurrently registered a difference in the level of low tides, 'I was just saying to [Sean] too, when the tide is out, we noticed, at times, that it is out much further' – Ruby (RBR). Geraldine additionally believes that the sea temperature has been gradually warming over the years. Most recently, this has been evidenced in an algal bloom periodically appearing in the waters at Rings Beach. 'And we get that pink fluffy, horrible seaweed in the water now because the water temperature is warmer. In all the years [30 years] I've been here the last two or three are the first time we've seen that.' – Geraldine (RBR).

The 'seaweed' at issue is in fact the red algae *Spyridia filamentosa,* which has also been observed at Whangapoua Beach by Ngāti Huarere, who have 'catalogued' the arrival and disappearance of many other species within the wider Whangapoua catchment during their long-term tenancy. 'We've seen a lot of differences in the seasons over this period of time, 64 plus years. Things are changing a lot' – Lewis (NHWT).

[32] https://grassroot.waikatoregion.govt.nz/environment/coast/coast-monitoring/shoreline-change-report-card/

Our Dad used to go duck shooting. And you'd see swans there in May. You see them all year round now. And if you shot a swan down and cut it open, you'd find hundreds of little flounder in it. And so the flounder population gets decimated. So that was part of our kaimoana that now doesn't exist - to the same extent. And we didn't have any Canadian Geese, or Paradise Ducks. They're everywhere now. We didn't have possums. Possums weren't even on the Peninsula [Coromandel] *when we were kids. And now they're just everywhere. So, there's so much more wildlife. But at the same time, we've lost some too* – Lewis (NHWT).

As part of their *Mātauranga Māori,* world view, the loss (or addition) of one species is inextricably related back to the wider ecosystem in terms of downstream effects by Ngāti Huarere. But there is also an understanding that the rate of change is ultimately detectable one year to the next through seasons.

Basically, to me, you have to take each year as it comes, because you combat with this problem - you've got to sort it. But the next year it throws another problem at you. You might get an influx of crickets and they just wipe out your vineyard. Next year they're gone, but you've got a whole lot of birds come in and wipe them out. And the next year, you've got skinks and then bronze beetles and guava moths. It's just a continual battle fighting everything that comes along – Lewis (NHWT).

Through this constant variability, participants are already living with expectations of uncertainty, not least within their annual conservation practices, as much as in their daily lives as residents of Kūaotunu Peninsula. While consistently demonstrating that a degree of variation can be accommodated within 'expected ranges' of particular phenomena – including seasonality – by particular ECGs, difficulties can arise when these ranges are exceeded. Most obviously, this includes through sudden amplifications of phenomena, typically resulting from extreme weather events (see Staupe-Delgado et al., 2024). The recent experience of successive ex-tropical summer cyclones in 2023 presented one such challenge for residents of Coromandel's east coast. As recounted through the Focus Group Workshop held with participant representatives from Kūaotunu's ECGs, there was a common feeling of being 'overwhelmed' by the scale and magnitude of these combined events and the severity of their effects (as documented within *Appendix **D***).

Although cyclones are not totally 'unexpected' on the Kūaotunu Peninsula, particularly given the orientation of its beaches towards the tropics, its remote rural communities remain relatively under-resourced to prepare for extreme weather events. When these occur in the summer, the physical impacts of storm events on Kūaotunu's beach communities, and the associated costs are amplified by depreciating numbers of visitors and the associated loss in local revenue from tourism. This was the effect of the 2023 cyclones, with the extended closure of SH25a restricting access to the Coromandel's east coast until the following summer. Gradually, though, the peninsula was able to return to within its 'normal' ranges of operation, which included an 'uneventful' 2023/2024 summer holiday season.

Alternatively, the capacity of ECGs to accommodate incremental change, such as through intensifying residential development, may be gradually exceeded over time without practical recourse.

5.2.4 Interpretating Change through Social Causes

Once the conversation turned to sustained negative environmental impacts associated with changes in seasonality, many participants started making inferences to direct social causes. Here, the gradual demise of scallop stocks within the wider Mercury Bay area through commercial overfishing serves a poignant example. Prior to formal restrictions being implemented at the ministerial level, the championing of a voluntary *rāhui* by the Opito Bay Ratepayers Association through Ngāti Hei, was widely acknowledged across the Kūaotunu (*Figure **19***). Although comprised predominantly of second home-owners, many of Opito's long-standing (part-time) residents had registered a gradual decline in the recreational availability of scallops for which it was coveted over the past 20-30 years. Recreational scallop fishing on the Coromandel was previously timed from September to March to coincide with 'summer', while commercial dredging was restricted to the preceding three months from July to September. Prior to restrictions being formally imposed, Kūaotunu residents recall seeing up to 30 commercial scallop boats out in any one day during this period.

With its sheltered north-easterly aspect, and shallow sandy substrates, Opito Bay is a natural repository for scallops washed up in storm events – as evidenced by the shells that still continue to litter its beach. Long-term residents from Kūaotunu likewise recalled 'Years ago, a big easterly would come through. We'd take our wheelbarrows and we'd be knee-deep in scallops' – Jude (KDCG). In a December 2020 interview by Radio New Zealand with Joe Davies (*Kaumatua* from Ngāti Hei) he explained from a *Māori* perspective: "It was a natural way [to collect] without having to go diving, pull a dredge or buy them commercially. The last big washup that we had was about seven or eight years ago and we have noticed that phenomena just don't happen anymore."

Concern for the dramatic reduction in scallop availability within the wider Mercury Bay is commonly shared across participants from most beach communities on the Kūaotunu Peninsula, with most welcoming a formal suspension on commercial dredging: 'Very happy to see the scallop boats being banned from dredging out here. Because, even just prior to lockdown [August 2021], there were boats out there every day. And it's nice not to see them there now' – Aaron (KDCG). So over-fishing practices are often attributed as a major cause of changes in coastal ecosystems that manifest as demonstrable shifts in seasonality in plant and animal species.

Ngāti Huarere also lament the loss of *kaimoana* generally within the Whangapoua harbour, related to changes in seasonality associated with land use. Respondents attributed a shift in seasonality and ecosystem health to plantation forestry operations within the upstream catchment alongside residential developments including at Matarangi. Lewis recounted that his mother's generation were able to swim their horses across the short breadth of the harbour mouth extending between Matarangi and Whangapoua, which has been substantially extended within his lifetime. It is the erosion associated with this reported widening that has recently

exposed a series of middens at the western end of the Matarangi Spit, previously sitting beneath the manicured greens of the Matarangi Golf Course (*Figure **20**).* With the Golf Course being a key drawcard to the predominantly retired settlers at Matarangi, there are currently extensive efforts underway to secure the naturally shifting sand spit from further migration. And in spite of Ngāti Huarere questioning the current capacity of its wastewater treatment plant, the residential development of Matarangi continues.

So, because of the Matarangi Wastewater Treatment Plant we don't take our oysters from the other side of the [Whangapoua] harbour anymore. There's this huge problem with the sewage run-off. But the ones up this side of the harbour, they're also getting crowded out by mangroves and just the building up of the silt – Willa (NHWT).

Alongside residential activities, the gradual siltation of the inner harbour is strongly attributed by Ngāti Huarere to commercial forestry operations within the wider catchment, while also noting the impacts of plantation harvesting on the local weather:

When the forestry comes off, the skyline will change by 60-70 feet. So, they can predict the weather, but when that forestry is moved, its all over the show. And then, when they cut the forest over this side, it changes that as well and then we get landslides which affects our kaimoana and our seashore there and its possibly why, in our time, the mudflats have turned into sludge. Sludge and mangrove forests that were never there when our mother was a kid – Lewis (NHWT).

Siltation caused by commercial forestry operations in combination with artificially straightened farm drains has likewise been an ongoing issue for the Otama wetland, as the receiving environment to the wider catchment. Downstream, the ORG are also conscious of managing the effects of the seasonal opening and closing of the Otama River mouth on the wetland habitat. 'So, any degradation going down or further back up into the catchment ends up there, in one shape or form - whether its [artificially] opening the lagoon or sediment coming down from forestry through the catchment...' – Phil (ORG).

An intensification of residential development generally, but particularly as holiday homes, is frequently associated with beach degradation by participants involved in dune restoration activities, and an alteration in the seasonal pattern of sand movement. For the coastal scientists I spoke with (from both TCDC & WRC), the encroachment of beach houses into the active dune zone fundamentally compromises the ability of dynamic dune systems to respond to and recover from periodic erosion events. Less obviously, the narrowing of natural dune profiles as a result of residential development 'squeeze' is also undermining the collection of viable seed from native dune plants due to the change in wind patterns required for their pollination. 'Instead of blowing up and down the beach at that crucial time in November, when pollination is taking place, the winds are now more on and off-shore. And because there is such a thin margin of beach now, it just doesn't allow for the wind direction to change' – Joy (CNPN). Although the potential quantities of viable seed have always been lower from the Coromandel's east coast beaches than from Waikato's more substantial west coast dunes, Joy reports that the yields of viable native seed collected from dune plants on both coasts have been approximately halved in recent years.

Concurrently, the seasonally warming temperatures that Joy has previously noted coincide with a widespread increase in parasitic 'smuts[33]' found in Spinifex, plants, which undermine their reproductive potential. With Spinifex the more difficult dune plant to propagate anyway, these combined issues are mounting serious threats to Joy's commercial nursery operations.

Equally working against organised conservation efforts on the Kūaotunu Peninsula is a commonly held frustration with the recruitment (and retention) of volunteers, which is seen to fluctuate over the course of a year as well as over time. There is a perceived change in the patterns of social interaction. And since grassroot conservation initiatives are often championed by key individuals within a relatively small resident population base, this creates an inherent vulnerability in the durability of their governance. As quickly as new groups, such as the KDCG may emerge at the hands of a new local champion, another group may just as easily expire or be substantially compromised with the departure of key members. Within the relatively short timeframes of my research, I witnessed several primary informants stand down from their leadership positions.

5.2.5 Communities of Coastal Conflict

At Kūaotunu, a perceived lack of commitment to local conservation initiatives by absentee 'bach owners' is equally associated with a diminished sense of 'community' by some participants. As a long-term resident and instigator of early conservation activities at Kūaotunu, Alec recalls: 'everyone was mucking in basically…we were getting people from all the areas. But it doesn't seem to happen now'. With the majority of original residents, being young families seeking an alternative lifestyle, the social dynamic of Kūaotunu 40 years ago, was potentially quite different to the recreational retirement demographics with which it is associated today. The loss of the annual fishing competition from Kūaotunu previously held in June-July as a fundraiser for the local fire brigade and winter movie screenings held at the Kūaotunu Hall are likewise considered 'seasonal' casualties of this trend.

Alongside intensifying second-home ownership, the extending timeframes of visitation to the Kūaotunu Peninsula is also seen to bear increasing pressures on the local environment. Again, this is most apparent at Kūaotunu (east and west settlements), which provides key facilities and services to visitors. Ongoing concerns for the KDCG are around managing public access through the fragile dune systems. 'I mean, the demands on this beach in the summertime, with the kids all running up and down the dunes….And then [in winter] the surfers come here and they get out of their car and they just go straight down over the dunes'- Joan (KDCG). Kent has also noted increasing number of boats coming to launch from Kūaotunu, 'They come from miles to this boat ramp and its free as well. Elsewhere, you've got to pay. Car parking is getting restricted in summertime - there's boats and trailers everywhere. And now I don't go out in the summertime'. As a fisherman himself, Kent is also concerned about the associated impact on local fish stocks,

[33] Smuts are a group of fungal pathogens most notably affecting members of the botanical grasses (Poaceae)

although he doesn't hold holidaymakers entirely accountable. 'And so, the environment's getting a lot of pressure from elsewhere. Not only just the holidaymakers' – Kent (KDCG).

With several part-time residents amongst its eclectic core membership, the ORG has a somewhat altered relationship with holidaymakers and visitors generally, in accepting their right to recreate and share in enjoying Otama as much as they do themselves. 'Just because we look after it, doesn't mean we own it. You do get a sense of ownership out of it and that's why we feel protective. But we also want to share it with New Zealand because it's a beautiful place and its everybody's to use' – Laura (ORG). Relatedly, the group is strongly focused on fostering community relations through their environmental activities. 'So my passion is obviously the environment, for looking after it – but also, the community. Without the community you have nothing' – Phil (ORG).

While being conscious of the increased environmental pressures associated with peak visitor numbers, the ORG appear to reconcile this with their practical conservation efforts during the winter months, alongside passive conservation-focused monitoring over the summer holiday period. In this way, managing the temporary effects of summer visitors may be likened to acclimatising to an anticipated periodic weather event, whereby remediation measures are carried out in the following winter, alongside fortification works ahead of the subsequent summer.

'*So that's us putting our work in during the year and then the end result for when people do arrive here. And people will want to take things: they want to take kaimoana, they want to take a memory, they want to take whatever they can. So, for us, it's a very protective time. Its time to share the place..but the more you become connected to the place, the more value it has: Kaitiaki*' – Phil (ORG).

Politicised debate and divergent values and priorities are put forward as another cause of environmental change apprehended through a perceived shift in seasonality. The ORG has also come up against local resistance from second-home owners and permanent residents with alternative perspectives on valuing and conserving Otama. A history of sabotage to old growth Pohutukawa trees growing directly seaward of existing houses on Otama Beach Road originally highlighted this conflict, which was also instrumental in setting up the ORG some 10 years ago. As noted previously, Phil believes the local conflict bears the legacy of the historical significance of Otama to local *Māori* and the unresolved feuds that ensued - in a cultural cycle of sorts.

The recent consenting of a 12-Lot residential subdivision within farmland directly adjacent to the Otama wetland by TCDC is a latest challenge to the ORGs conservation efforts. And while Otama awaits residential expansion, the residential subdivision already underway at the eastern end of Opito Bay is expected to augment its second-home ownership even further, in spite of being formally opposed by existing residents. In effectively undermining the volunteer efforts of local ECGs, the continued consenting of coastal subdivision by Council has inevitably compromised their relations. Meanwhile, Council is simultaneously driving local Coastcare activities, which are mostly addressing the effects of historic subdivision on natural beach processes.

Residential development at Rings Beach is otherwise rare, with most owners electing to renovate or add to existing baches in order to maintain the modest architectures of the traditional holiday community. Several original baches have already been passed onto the next generation, with few houses ever making it onto the public market as a result. This residential inertia maintains an impression of stability that is consistent with coastal processes at Rings Beach. It is conversely interesting to note that the neighbouring settlement of Matarangi, recorded by WRC as the most unstable of Kūaotunu Peninsula beaches is also the most intensively developed. This negative relationship between encroaching beachfront development on dynamic coastal processes is frequently highlighted in extreme storm events, including by the 2023 cyclones, in which the Matarangi spit suffered further erosion losses from its western extent that were atypical for a summer cyclonic storm event.

Because of its 'unprecedented' nature and effects, which included losses of dune habitat (and plantings) from some beaches, one of the outcomes of the 2023 summer storm event was that sceptics challenged the efficacy of dune restoration works, including at Matarangi. While acknowledging these losses, those conservationists directly involved in local dune restoration projects were otherwise encouraged by locations where restored dunes had successfully held out (or were redistributed) against the raging storm. This fundamental difference in the perceptions of coastal conservationists and some beach residents establishes a different premise to human-environment relations, based on participation and the resulting knowledges with which this is associated. After initially suffering a decline in volunteers from some Coastcare activities on the Coromandel more generally, WRC reported small increases in recruits on the back of the 2023 summer storms, alongside a couple of new initiatives. The fluxing of volunteer recruits and the associated capacities of ECGs, by events and circumstances, further contributes to the uncertain conditions of their operations from one year to the next.

5.2.6 ***Summary Analysis***

Seasonal change is experienced by participants at varying temporal and spatial scales on the Kūaotunu Peninsula, with the conception of change apparently intrinsic to interpretations of the inherent variability associated with seasons. Fundamentally, change is recognised in the transition from one seasonal phase to the next within any one year. Consistently, this involves an anticipated transition from 'summer' to 'winter' periods, based on both prevailing weather patterns and amplifications of seasonal tourism. But there is also a shared understanding amongst participants that neither summer nor winter - in their timing, duration and traits - will map seamlessly onto the preceding or following season, suggesting an awareness of ongoing patterns of change. Accordingly, summer and winter are framed as reference points from which to co-ordinate and compare one year to the next by participants, rather than as rigid frameworks. The reported weather volatility of the transitional seasons, particularly over the 'springtime' phase of the year, is likewise associated with a general reluctance by participants to ascribe them with labels and associated timings. Most recently, the early cyclones of 2023 dramatically challenged all expectations of 'summer', and specifically for the tourism-dependent local economies of the Coromandel Peninsula.

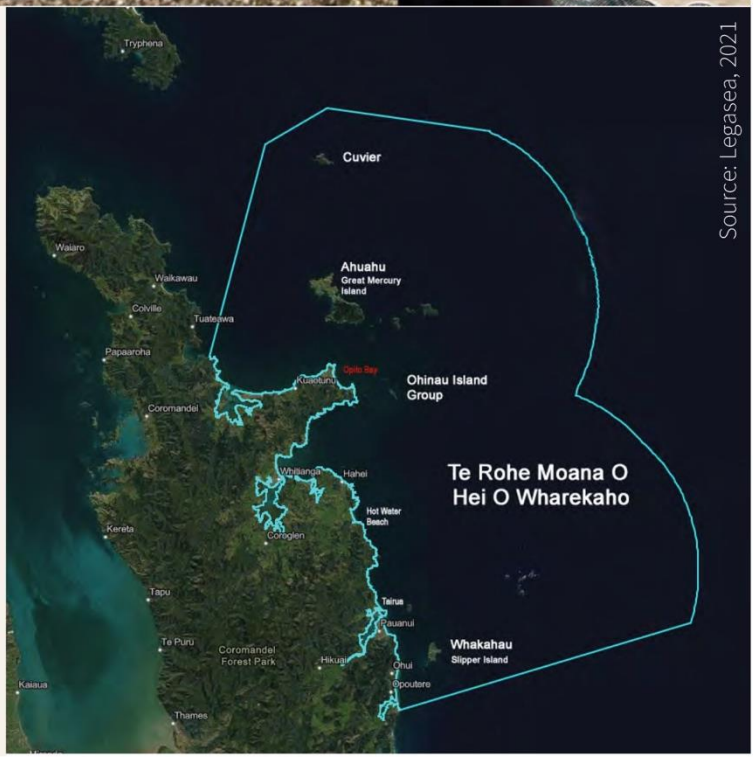
At the same time, participants from different conservation groups looked to reconcile seasonal change beyond prevailing weather phenomenon, to include a suite of diverse phenological elements that may be observed and calibrated from one season and one beach to the next through a shared participation in routine practices. Compelled by personal interests, and a shared concern for the local environment, many conservation volunteers have come to apprehend new repertoires for reading seasons, as comprising multiple seasonal rhythms. Using knowledge acquired from routine field observations accumulated in place over time, many longer-term participants can identify and interpret both inter-seasonal and inter-annual changes from cues ranging from the reproductive cycles of specific species of plants, birds and fish, to the frequencies of mammalian pests alongside monitoring their local microclimate. Those participants with their own weather stations are additionally able to substantiate seasonal transitions within years as well as make inferences to longer-term changes in local conditions in combination with other seasonal cues. Thus the reconciliation of multiple cues obtained through a diversity of pursuits by residents may be likened to the customary knowledges derived from local *tohu* through the frameworks of *Mātauranga Māori* in combination with the *Maramataka*. Through this system, *Māori* were made aware of broader patterns of change extending beyond the annual-seasonal cycle. Now armed with access to global forecasts and weather records, Lewis (NWHT), instinctively looks to Europe for cues to broader climate patterns as a universal form of knowledge.

And what I've noticed, over the last – probably about eight years, is our seasons seem to mirror a year later what happens in Europe. If they have massive high temperatures in Europe, we get that the next year….And when there's a lot of flooding, we cop that the next year' – Lewis (NHWT).

Other residents likewise appear intuitively cognisant of the influence of bigger climatic systems, including the effect of ENSO cycles on seasonal weather patterns between years at Kūaotunu. A comprehension of the broader oscillations of sand erosion and accretion at work on Kūaotunus' beaches has also enabled individuals to ascertain the relative stabilities of particular beaches to be generally consistent with monitoring by the Regional Council (WRC). At the same time, those participants volunteering for local Coastcare activities specifically appreciate the dynamic fragility of beach systems and the key role that dunes and their native sand-binding plants play in maintaining their stability. By extension, they also understand that the beaches that have attracted residents and visitors to the Coromandel's east coast in the first place, continue to be undermined by the very communities that are variously trying to restore them. But while the 2023 summer cyclones affirmed the efficacy of dune restoration for core volunteers, the inevitable losses of dune habitat from the most vulnerable beach locations was heralded as failure by local sceptics, and highlighted alternative understandings of nature's systems and the role of human-environment relations within this.

OPITO BAY, DECEMBER 2020

Above: *Locals gather at Ōpito Bay in support of the local scallop rāhui imposed by Ngāti Hei in response to critically declining stocks. Once renowned for its burgeoning scallops, the beach is still littered with their remnant shells.*



Right*: Mapped extent of the total ban on scallop fishing formally imposed by the ministry in the wake of the interim scallop rāhui and relentless lobbying by locals.*

Figure 19 – Interim Scallop Rāhui applied to Opito Bay

CHANGING TIMES

WHANGAPOUA & MATARANGI BEACHES, 2022

Above & Right : *Collapse of the Matarangi Golf Club greens located on the shifting 'beachfront' sandspit at the entrance to the Whangapoua Harbour. Ongoing wave action has concurrently exposed layers of historic shell middens buried beneath the golfing greens from early Māori occupations.*

Below *: Beachfront housing at Whangapoua located on the crest of the active dune front*

Photo by Richardsons Real Estate

Figure 20 – Retreating Coastlines at the mouth of the Whangapoua Harbour

CHANGING TIMES

OTAMA BEACH, SEPTEMBER 2019 : TCDC

Above: *Photograph taken by a local Otama resident of the Otama wetland area in the aftermath of the 2019 storm event which left Otama (and Ōpito Bay beyond) cut-off from the rest of the peninsula due to*

Left: *Modelled mapping (produced by the WRC) of projected extent of flooding within Otama's wetland resulting from rising sea levels – during the same high-tide scenarios experienced during the 2019 storm event – noting the remarkable consistency of these projections with the lived reality.*

Figure 21 – Flooding & Inundation at Otama Beach

Meanwhile, the commercial nursery operations supplying native plants for local dune restoration projects are equally vulnerable to subtle changes in the seasonal regimes on which their plant propagation practices are based. The detailed monitoring derived from daily observations through practices spanning several decades has detected a gradual shift to warming seasons that potentially undermines their supply chains. As commercial ventures, these plant nurseries must adapt their operations to the shifting rhythms of nature through process of entrainment, while obliging restoration projects to comply.

For the majority of Kūaotunu retirees, their residential tenancies are too brief to be able to confirm any long-term changes in seasonal conditions or climate. Indigenous *iwi*, along with some long-term residents, have witnessed and experienced the most significant social and environmental changes at Kūaotunu. However, a holiday visitor can also offer unique insights into seasonal aspects of change that might otherwise go relatively undetected. The Covid-19 lockdown in Autumn 2020, for which many second-home owners retreated to Kūaotunu from their working city lives, potentially revealed extended insights into Kūaotunu's environment and the seasonal rhythms contained therein. Some long-term residents otherwise report a gradual warming of ocean temperatures that could also be confirmed by long-standing summer visitors to Kūaotunu as well as regular winter surfers. More recent residents also registered this warming through the algal blooms that appeared on some beaches in conjunction with recent extreme summer weather events. Generally, however, the ranging exposures to and experiences of longer-term seasonal changes by Kūaotunu's inhabitants means that individual interpretations of any long-term changes might remain largely uncorroborated, other than through the informal sharing of knowledges within and between organised groups, and shared practices.

Conservation-orientated locals are specifically preoccupied with addressing the tangible effects of human activities on the local Kūaotunu environment – which can be accessed through seasonal relations to place - with the commercial overfishing/dredging of scallops within Mercury Bay a prime example. The collaborative response of OBRA working with Ngāti Hei was based on decades of observations by long-term second-home owners in conjunction with customary harvesting practices both reaching the same 'tipping point'. But while the voluntary *rāhui* was widely endorsed by the wider Kūaotunu community, there are many internal conflicts in local human-environment relations that go unresolved. Many participants are acutely aware that ongoing residential development is intensifying pressure on local resources within the coastal environment, and particularly through burgeoning second-home ownership in the context of seasonal tourism. A collective of Opito Bay's residents sought to prevent the (now-consented) Opito Sands subdivision, while Ngāti Huarere are actively seeking to have the Matarangi Sewage Treatment Plant upgraded to avoid discharges into the Whangapoua Harbour.

The intensification of residential development along beachfronts is a particular concern of local Coastcare volunteers, most of whom have specifically avoided owning property located on dune systems. When residential development is allowed to encroach into the active dune system, as at Matarangi, its rhythmic cycles of defence and renewal are disrupted, along with the regenerative potential of native dune-binding plants. Indirectly, these gradual changes are manifest in the

diminishing resilience of beaches to accommodate extreme seasonal weather events, as well as to seasonal population swells. As both a retirement haven and a beach holiday destination in a constant state of flux, Matarangi harbours ongoing conflicts within its residing community. But with the possible exception of Rings Beach, most of Kūaotunu's beach communities are embroiled in conflicted agendas in responding to fluctuating environmental pressures, including from ongoing social change, while simultaneously contributing to the cause.

Ultimately, the seasonal changes anticipated within and between years by participants on the Kūaotunu Peninsula resonates with a residing population in a constant state of flux and as reflected in the multitude of lifestyles and tenancies accommodated within its evolving beach settlements. While monitoring social changes over several decades at Kūaotunu, established environmentalists, in addition to local *iwi*, have become aware of localised change as much through their consequences as through their speculated causes. In the meantime, many second-home owners continue to see dynamic coastal processes working in opposition to their recreational lifestyle choices. So that while locally organised ECGs, including externally co-ordinated Coastcare operations, have emerged to redress local manifestations of environmental degradation attributed to the occupation of coastal environments, these groups are forced to confront the broader patterns of social-environmental change playing out through contested understandings of human-environment relations.

5.3 Apprehending Futures

Question c) **To what extent do local agendas reflect/give effect to communal understandings of changing seasons and climatic variability?**

Following an imperative for Councils to plan for future scenarios of changing climates in ANZ, there is a strong focus on building resilience within the coastal communities that are expected to bear the brunt of effects. For the Thames-Coromandel District, the SMP project was originally hailed by TCDC as leading the way (nationally) in the development of dynamic adaptive pathways (DAPP) informed by participant communities alongside scientific modelling for future scenarios of local change. With local ECGs only partially representing their increasingly divergent resident beach communities, they are nonetheless uniquely attributed with particular insights and timelines to local processes and patterns of social-environmental change, along with a range of iteratively developed adaptive responses. While this experience has been primarily explored through an attunement to seasonal calibrations, we find that the intersecting temporalities of beach settlements provide compound insights into patterns of change. Where there are multiple ECGs involved in case-study coastal settlements, their collective wisdom has the potential to make a meaningful contribution to local adaptive planning. But the transfer of local wisdom across organisations and agendas relies on how local ECGs themselves relate their activities and practices to broader contexts and objectives and conversely, how these discrete knowledges might be accommodated within broadly strategic planning agendas.

In this section, I explore how the planned activities of participant ECGs are variously informed by their practical experience of seasonal change and to what extent this knowledge is extrapolated

into their future planning in the context of the development of the SMP by TCDC. With local ECGs clearly privileged with enhanced opportunities to observe and monitor a spectrum of intra- and inter-annual seasonal changes specific to individual beach catchments, for some participants this knowledge is reconciled with a cumulative awareness of longer-term social-environmental change. While only few participants referred specifically to changing climates, some made indirect inferences to globally scaled climate systems (notably ENSO) having bearing on local weather patterns and seasonality, alongside an awareness of gradually warming oceans. Long-term social-environmental changes, and the need to plan accordingly, are otherwise signposted by TCDC's SMP project in the context of apparently increasing significant storm events. Yet, notwithstanding an awareness of broader changes, most local ECGs I worked with on the Kūaotunu Peninsula are necessarily preoccupied with practically managing and responding to current conditions and local circumstances versus strategizing for trajectories of future change. The diverging temporal foci of local ECGs acting in the here-and-now versus the long-term planned interventions of TCDC clearly sets up alternative agendas for local communities experiencing change, while raising a potential for conflicts, alongside reconciliatory/complementary approaches.

In addition to published reports, attendance at public meetings and semi-structured interviews, key insights into future planning approaches and agendas were gained through the Focus Group Workshop (FGW) that I hosted as the conclusion of my fieldwork, involving invited representatives from participating ECGs, alongside the statutory agencies I had also worked with. Timed in the wake of successive cyclone events during the summer of 2023, and following TCDCs publication of the SMP reporting (in late 2022), I was able to focus participants on their direct and indirect experiences of living and working with seasonal volatility as a potential catalyst to planning for future scenarios of change. This workshop also provided a key opportunity for Kūaotunu-based 'conservationists' to reflect on and discuss current and future challenges to their operations alongside those of invested representatives from local authorities, including TCDC and WRC. Although invited, representatives from DoC tactically declined to attend the workshop, as documented within *Appendix **D***.

*5.3.1 **Planning Scenarios for/with Change : Alternative Agendas***

Imperatives for long-term strategic planning for Kūaotunu's beach settlements most often surfaced in my research relative to projected (and experienced) changes to the cycles of storm events and coastal erosion, and how sea-level rise may exacerbate these impacts on coastal communities. While I was careful to avoid broaching narratives on changing climates directly during interviews and fieldwork, it would typically come up in conversations around planning for future scenarios relative to the independent agendas of ECGs in the context of the SMP project.

Early on in my research (December 2020) I was invited by the ORG to attend a meeting involving WRC and DoC in which environmental consultants provided a progress update on their development of a Wetland Management Plan for Otama that the ORG had instigated and received funding for in partnership with DoC and WRC. In recognition of the ecological significance of the wetland, the ORG sought expert advice on its long-term management in the context of current

and future threats, including that of inundation associated with rising sea levels. The presentation visuals included an aerial map showing the modelled extent of floodwater inundation associated with an upper-level storm tide (3.2m) resulting from a 1m sea level rise at Otama (*Figure **21**).* The four ORG members present at the meeting immediately related this visual to their experience of major flooding resulting from a torrential rain event in September 2019, which left Otama temporarily isolated by the flooding of the Otama Beach Road. Photographic records of this storm event (as depicted in *Figure **21***) revealed a remarkable correspondence between the statistically modelled scenarios of flooding at Otama with the lived experience of its residents. And yet it was interesting to observe from the meeting that the ORG were most concerned by what flooding would mean for effectively manging the wetland as a dynamic ecological system, in which periodic inundation was seen as an inevitable occurrence, rather than the direct effect of flooding on their homes and intrinsic lifestyles.

In my later conversations with the ORG, I discovered that members were generally pragmatic about future scenarios of rising sea levels and coastal erosion at Otama, as Laura explains below:

I'm not worried about it. I mean, I understand that (climate change) is coming and that its going to have an impact on our environment. But I think we've got to deal with what we've got now. And we're very lucky, because that natural sand dune system is a very wide one for ANZ, so we've got a huge buffer against coastal erosion right there – Laura (ORG).

The substantially intact dune system at Otama, in conjunction with the adjacent wetland located within its 'backdune' portion, is an ecologically rare preservation in the face of contemporary coastal development pressures elsewhere. In recognising that the Otama wetland provides a considerable reserve for floodwaters, the Wetland Management Plan that the ORG has commissioned gives them further confidence to be able to contend the threat of rising seas:

We do need to make some plans into the future. And where we're planting now will be flooded out and will eventually die out. But by planting there, it should slowly regenerate as the water comes (up) and we'll probably have to do some planting in that margin. And so, we'll continuously have to adapt to the water level rise, if and when it happens – Laura (ORG).

In fact, the ORG have already adapted their practices to seasonal inundations of the wetland, with the temporary uplifting of traplines from around its margin each year. At the same time, most of Otama residents are uniquely situated at elevation off Otama Beach Road, which sits at least 10 metres above the beach. So that while the low-lying Blackjack Road that sits behind the main dune system is prone to periodic flooding in the vicinity of its crossing the Otama River, residential properties on Otama Beach Road are physically removed from the direct risk of floodwater inundation as well as coastal erosion.

What I saw in Otama started me looking at the long-term inundation and erosion prospects and planning for Kūaotunu's other beach settlements. In direct contrast with Otama, low-lying beachfront properties, most notably flanking the largest settlements of Whangapoua and Matarangi, at the opposite end of Kūaotunu, are specifically vulnerable to seasonal erosion. The

scenarios and associated risks of coastal erosion and inundation between Kūaotunu's communities consequently vary by the physical characteristics and orientations of its beaches to the prevailing easterly/north-easterly wave direction, as well as by the length and containment of beach environments. According to TCDC's Coastal Scientist, the north-facing orientation of most of Kūaotunu's beaches makes them less vulnerable to easterly winter storm surges and cumulative erosion, while having an increased exposure to summer cyclones. Typically, however, the timing of summer cyclones during the beach accretion phase will not result in significant erosion.

'*Generally, the wintertime is the most destructive for the coast. You get your successive storm events in the wintertime and particularly with La Niña. So, its back-to-back storm events that take away all the sand and it doesn't come back. Whereas summertime you might get a tropical cyclone and depending on the severity of that cyclone, usually, there's enough sand on the beaches to buffer the energy so that the toe of the dune doesn't erode. And it's probably more relevant to those north-facing coasts. They tend to have more exposure to those tropical cyclones, whereas the last two years of winters haven't really affected the northern beaches'* - Jesse TCDC

In straddling the mouth of the Whangapoua Harbour, Matarangi and Whangapoua beach settlements are both subject to localised areas of net erosion resulting from the dynamic exchanges of sand and water between the harbour and its interior catchment with the Pacific Ocean. The 'fixing' of the sandspit at Matarangi by residential development has severely compromised the natural migration of this sand feature across the harbour mouth, while periodic erosion at the eastern end of Whangapoua is edging further towards beachfront properties (see *Figure **20***). The north-east inclination of Whangapoua beach towards the easterly wave direction additionally contributes to this erosion potential: '[Whangapoua] gets the most wave energy, because it's at that same north-east angle, but it's also a bit protected' (by the headland) – Jesse (TCDC).

Successive severe storm events reported in the winter of 2008 and summer 2009 acted as key catalysts in reviving dune restoration projects around the Coromandel's east coast, with support from WRC. This timeline also coincides with the genesis of several independent local environmental conservation groups, notably including the Rings Beach Wetland and Otama Reserves Groups at Kūaotunu, alongside a parallel trajectory of increasing second-home ownership. But with increasing frequencies and intensities of summer and winter storm events resulting in periodic beach erosion, challenges to the efficacy of dune restoration projects by some beachfront property owners has been inevitable. Some Coastcare groups have suffered in membership losses as a result while TCDC (on board as a key facilitator since 2018) has come under increasing pressure to respond with hard engineering 'fixes'.

The summer of 2018 delivered a further 'weather bomb' in January that affected northern and central areas of ANZ. On the Coromandel, the coincidence of the deep low-pressure system involving severe winds with king tides resulted in extensive damage to low-lying coastal areas, including the main populations of Thames and Whitianga. After years of inaction, the widespread

damage that this extreme storm event caused across the district effectively instigated the SMP project by TCDC in the following year. TCDC subsequently appointed their first in-house Coastal Scientist in 2020.

5.3.2 Shoreline Management Planning

Led by international engineering consultants, Royal Haskoning DHV, TCDC's SMP project was designed to establish a comprehensive risk framework for 'the sustainable management of risks to people, property, the environment and '*tāonga'* associated with coastal hazards in the short to medium term. Coastal hazards are specifically identified as coastal erosion, coastal flooding and coastal landslides (by TCDC/MfE). Based on the Ministry for the Environment's (MfE) guidelines for Dynamic Adaptive Pathways Planning (DAPPP) community engagement is critical in tailoring adaptive pathways that are specific to individual coastal settlements. Accordingly, 'Over three-years, the project moved from identifying hazards, through assessing vulnerability and risk, to determining adaptation options based on thresholds specific to each community'. The resulting coastal adaptation pathways (CAPs) were published online as the 'Thames Coromandel Coastal Adaption Pathways iReport' in late 2022, with a clearly defined community focus:

In a future where we will face greater challenges associated with climate change and sea level rise, these pathways will guide how the district's coastal communities adapt and improve their resilience.

The Kūaotunu Peninsula falls within the Whangapoua-Mercury Bay area, as one of four coastal compartments that comprise the SMP project for the wider Thames-Coromandel District. This area incorporates the settlement of Whitianga and its harbour, alongside that of Whangapoua. Kuaotunu's northern beaches, extending from Rings Beach through to Opito Bay were originally identified, through provisional modelling, as medium priority areas for coastal hazards in a 'first pass' risk assessment. The shoreline of the Whangapoua Harbour, including Whangapoua along with Matarangi, were identified as high priority areas (along with Whitianga), while the remainder of the coastal compartment, including the southern shoreline of the Kūaotunu Peninsula, were attributed with low priority. Following the more detailed analysis reflected in the final published version of adaptive pathways for discrete sections of coastline, Kūaotunu's northern beaches, east of the Matarangi Bluff, have retained a moderate-low risk for coastal hazards. The harbourside settlements of Matarangi & Whangapoua remain associated with areas of high exposure to erosion and inundation risks within the next 20 years and beyond (*Appendix **I***).

The coastal adaptation pathways proposed by Council in the final reporting of the SMP project for 138 discrete shoreline units have identified dune restoration/ rehabilitation as a provisional step in fortifying Kūaotunu's beach settlements against the threats of erosion associated with rising sea levels. Offering an interim nature-based response to retreating shorelines across the Coromandel's east coast beaches, dune restoration is proposed as a continuation/extension of existing efforts. The pathways then identify signals, triggers and thresholds for courses of action/management into the medium term. For all of Kūaotunu's northern beaches, dune restoration/rehabilitation is to continue before 50% of the foredune is lost. In locations where this

is anticipated to occur earlier, (at Matarangi and Whangapoua) dune fortification is recommended in conjunction with other soft engineering approaches such as beach push-ups and sand fences[34]. Changes to planning practices to deter future development within erosion prone areas are also recommended in conjunction with advanced planning for retreat, while hard engineering options are proposed in a few limited locations (notably within the most populated settlements of Whitianga and Thames).

But in spite of the opportunities provided throughout the course of the SMP project, very few members of the ECGs I studied attended the local public consultation events hosted by TCDC for the Whangapoua-Mercury Bay Area, including those hosted at Kūaotunu. At one event, held at the Kūaotunu Hall (in August 2022) I noted two research participants from approximately 20 public attendees. Another two of the public representatives on the SMP project steering panel that oversaw the development of SMP's for the wider Whangapoua-Mercury Bay Area were also participants in my research. With both individuals involved in multiple environmental conservation projects across the Kūaotunu Peninsula, their role in the SMP project may be considered strategic for Kūaotunu. At the same time, the location of the main population centre of Whitianga within the Mercury Bay harbour area was a key focus of public concern throughout the course of the SMP project. The SMP project was otherwise guided by six founding community-focused objectives contributed by community panel members from across the district, as follows:

1. *To better understand our coastal environment, its process interactions and social, economic and cultural context, and the physical and climate changes that will affect it.*
2. *To define and reduce the coastal flooding and erosion risks to people and our social, cultural and natural environment over the next century.*
3. *To reduce the threat of coastal flooding and erosion to people, property and valued assets to an acceptable or tolerable level.*
4. *To encourage the provision of sustainable flood and coastal defence measures.*
5. *To discourage inappropriate development in areas at risk from coastal flooding or erosion.*
6. *To produce resilient coastal communities that are prepared for change and aware of the appropriate risk reduction measures they can take.*

In concluding, the SMP reporting acknowledges the work that still needs to be done to 'produce' resilient coastal communities that are 'prepared for change' through appropriate 'risk reduction measures'. Including in the implied procurement of resilient coastal communities, the terminology of the SMP reporting does not appear to support a clear community focus. In spite of its renaming during the course of the project from Shoreline Management Plan to Shoreline Management Pathways, I was informally asked by a participant early on in my research, what was the meaning of 'Shoreline Management'?

[34] https://thames-coromandelcaps.ireport.royalhaskoningdhv.com

Without my broaching the subject directly, the SMP project came up infrequently in participant interviews that were run in parallel with its community consultation phase. For some individuals, the Tsunami risk to the Kūaotunu Peninsula was seen as a more immediate threat to contend both in terms of its anticipated probability and effects. Consequently, informed locals are well versed on where exactly to 'retreat' to under a Tsunami warning. Ngāti Huarere, whose elevated land is the retreat destination for Whangapoua, even joked about how beach residents would have to rapidly reappraise their relations in the event of a Tsunami. But when formally tabled as a topic during the FGW session and following the publication of the SMP reporting, there was general support amongst participants for the SMP project, calling for TCDC to fast track its implementation in the wake of the 2023 summer storms. This suggests that there may be a perceived division of responsibilities by local ECGs, whereby their focus is maintained on embracing the everyday practical management of their immediate environs, while Council initiatives are more strategically orientated towards managing future concerns for the wider district over an extended timeframe (with associated costs). Here, the requirement of Council to maintain a 5-10 year strategic planning focus is reconciled with their ongoing obligations in the facilitation and management of public assets – both of which are subject to corresponding financial cycles.

With variable input from resident publics and based on modelled scenarios of coastal hazards (and associated risks) jointly defined by TCDC/WRC, the SMP project is focused on managing physical public assets and infrastructures as the material basis of response triggers. Related to the SMP project, there are initiatives underway within TCDC to register beaches and wetland habitats as 'natural assets' that would benefit directly from Council funding allocations in the future. However, such a selected 'commodification' of beaches and wetlands potentially contradicts understanding these habitats as dynamic hydro-ecological systems and the human-environmental relations that are integral to them. Of particular concern, is that as assets the 'management' of beaches and wetlands would become subject to financial cycles (and approvals) – that are typically disjointed from ecological systems. How this change in status of ecological habitats might affect their current management by independent groups is also at issue. At the same time, there was a common frustration amongst representatives attending the FGW session at the lack of public engagement and associated 'education' surrounding environmental restoration projects more generally around the Kūaotunu Peninsula. This relational issue of communication was likewise reflected in the apparent lack of direct involvement of ECGs in the consultation process of the SMP project. Strained relationships with local authorities were expressed by several groups throughout the project and again during the FGW Workshop, particularly where they did not feel fully supported in their voluntary endeavours. The recent consenting of new residential subdivisions at both Otama and Opito, while Matarangi continues to infill its residential base, additionally conveys conflicting messages regarding the orientation of Council's planning agendas and its local community focus.

*5.3.3 **Grassroot Initiatives***

When the Ratepayers Associations for Kūaotunu and Opito Bay jointly convened an Environmental *Hui* in May 2021, in order to couch their vision for the Kūaotunu Peninsula becoming a self-

sustaining 'Biosphere', local conservation initiatives were well represented, alongside local MP, Scott Simpson and the Ministry of Primary Industries (MPI). *Kaumatua* Joe Davies of Ngāti Hei was strategically on-board as a key stakeholder to the project, alongside DoC. Notably, neither TCDC nor its Coastcare activities were officially represented. Yet, despite sharing in many common environmental aspirations for the Kūaotunu, the meeting did not unite participants, with several ECGs clearly resistant to the idea of falling under an umbrella authority, or being externally controlled.

In reflecting on this meeting, and the position expressed by the ORG, Bruno later explained:

What was important is that everybody has already acquired a lot of knowledge of what we're doing. Project Kiwi know what they're doing; We know what we're doing. So, you cannot put everybody in one bay. Because everybody has specific knowledge to what they are doing and that has to be respected – Bruno (ORG).

Here, Bruno's comments highlight the specificity of knowledge gained through the practical management of local beach environments versus a more strategic (broad-scale) top-down planning approach. While scenarios of coastal erosion and rising seas were raised in my own discussions with participating ECGs for my research, this was rarely portrayed as an immediate concern, nor motivation. Instead, there was a shared concern amongst residents on managing the present issues facing their immediate environments, alongside a common assumption that these efforts would be generally aligned with achieving broader long-term environmental gains.

Joan (not present at the Environmental *Hui*) is strongly focused on the immediate issues facing Kūaotunu's public beaches in her work with the KDCG. Over the course of my fieldwork, several participants vented their frustrations at working with/alongside formal organisations, including TCDC and DoC, while others empathised with the high workloads and limited resources of these government authorities, requiring them to prioritise their focus elsewhere. 'TCDC have got such a massive area to cover. I think that makes it even more difficult [for them] to control the environment around here' – Joan (KDCG).

Without necessarily being involved in the SMP project, many Kūaotunu locals are additionally aware, through direct comparisons with their own beaches, of the relative hazards of other coastlines within the wider Mercury Bay area, such as at Whitianga and Pauanui: 'When you see what's happening on Buffalo Beach, at Whitianga and Pauanui…We seem to be absolutely impervious to it compared to those situations' – Damon (RBR). Active coastal erosion is readily observed at both Buffalo Beach and Pauanui (further south). In this context, there is an associated comprehension that the remotely populated Kūaotunu Peninsula is simply not a priority for managing coastal hazards by TCDC.

It appears then, that many Kūaotunu beach communities are resigned to being marginalised by governing authorities. In nearly all cases, the independent grassroot environmental organisations I worked with have come about through a need to address shortfalls in the practical management of local nature reserves by their administrating authorities. This premise frequently establishes

strained relations between the presiding authority and volunteer groups. As well as being sceptical of top-down planning strategies, participants are additionally aware of the bureaucratic limitations to implementing ambitious plans. 'I just think they have got their hands full. They've got so much stuff happening and so much politics…Better to do your own thing. That's why we've got all the different groups' – Jude (KDCG).

In spite of harbouring an apparent resistance to strategically planned interventions, most of the groups I worked with have developed their own environmental agendas. And as much as the range and diversity of local conservation initiatives represent the variable environments of Kūaotunu's beach settlements, they also reflect the diverging values and interests of host communities as well as the underlying social-cultural dynamics and associated temporalities of place.

For example, the Opito Bay Ratepayers Association (OBRA) is administered by well-networked professional/executive second-home owners, with a strong focus on preserving their 'holiday/retreat' environment under six key domains:

- *Marine Protection & Regeneration*
- *Pest Free Ōpito*
- *Dark Night Sky*
- *Clean Waters*
- *Coastal Community Cultures*
- *Project partnering with Central Government, Local Authorities & Local Iwi*

To this end, the OBRA lists 'Coromandel Scallop Restoration' and 'Pest Free Opito' as two of its current projects, in which successes include the ministerial ban on commercial scallop dredging within the wider Mercury Bay area, alongside a substantial grant (in the order of NZD$300K) from the MPI[35] for the removal of wildling pines from the wider bush cover of the Kūaotunu Peninsula – extending right through to Matarangi Bluff. In this way, the OBRA have been effective at lobbying for ambitious environmental outcomes for the wider Kūaotunu Peninsula through their strategic connections, including with central Government, at the same time as nurturing local relations with Ngāti Hei and TCDC. The OBRA also rely heavily on its few permanent residents to service local traplines, while rallying the wider holiday home population for annual dune restoration planting events (through Coastcare). In upholding its status as a popular destination beach, Opito Bay has also been ranked as one of the country's most pristine (cleanest) beaches under the Sustainable Coastlines[36] initiative for several years running due to the co-ordinated clean-up operations of the OBRA. Consequently, the OBRA are duly concerned about the increased environmental pressures that will result from development of the Opito Sands subdivision, currently in progress at the northern end of the bay. 'And that's why people come here - for a better life. That's why we put up a fight to stop the Opito Sands development – Clive (OBRA).

[35] Ministry of Primary Industries

[36] www.sustainablecoastlines.co.nz

Kūaotunu Residents and Ratepayers Association (KRRA), which draws from a diverse membership contributed by Rings Beach, Kūaotunu West and Kūaotunu Village (East) is likewise working strategically towards local initiatives prescribed within the Kūaotunu Community Plan. Identifying as a 'working coastal community village' with over two thirds of permanent residents, the Kūaotunu Plan - accessed via the Kūaotunu dedicated website[37] - has a strong community focus. In this capacity, the KRRA strives to 'safeguard the community and environment from exploitation' while 'maintaining the unique character of Kūaotunu'. Local interests are represented in KRRA's dealings with TCDC, WRC and DoC through their long-term planning processes, with the Kūaotunu Plan updated every 10 years. Priority issues include managing mounting pressures on local resources associated with visitor influx during an extended peak holiday period, alongside construction traffic associated with the Opito Sands subdivision and commercial forestry harvesting at eastern end of the peninsula. And while environmental objectives include dune and bush restoration alongside pest control and clean streams, these initiatives are being championed by locals independently of the KRRA. Amongst these are the KDCG, who have worked alongside TCDC to set their own agendas and priorities for restoring Kūaotunu's east-west beaches as the basis to securing targeted funding as an incorporated society. Formed in the context of the SMP project and successive severe weather events, the group specifically anticipate dune management in the context of changing climates.

The Otama Reserves Group have likewise worked strategically alongside the WRC and DoC to procure their Wetland Management Plan, which provides a practical basis to optimising the environmental functionality of the wetland (a DoC reserve) both in its present context and under future climate scenarios in an inherently progressive adaptive approach.

At least we have a plan. We know where we are going. And as change happens, we're still going to be adapting to the seasonal change anyway. We're still going to be doing the work. Even though we might be gloom and doom. In another 50 years, we're still going to be trying to cope – Laura (ORG).

Largely based around the seasonal dynamics of the wetland, relative to coastal processes, the ORG are already accommodating annual variability within their current practices, while strategically anticipating future change through the development of their Wetland Management Plan. At a basic level, the variable timing of the wetland being cut off from seasonal beach processes and its subsequent reopening is associated with unique social-environmental tipping points that determine whether this happens naturally or is artificially released every year. There are also situations on the Kūaotunu Peninsula when social-environmental responses have been enacted by local communities following substantial change detected incrementally over longer periods of time. The scallop ban over the wider Mercury Bay area was jointly initiated by the OBRA in collaboration with Ngāti Hei and following a gradual decimation of the summer scallop stocks for which Opito Bay had been renowned. In this endeavour, marine surveys were privately funded

[37] www.kuaotunu.co.nz

by the ratepayer group in order to substantiate local knowledges (of change) and as a basis to engage with marine environmental advocates, LegaSea[38].

Kūaotunu's residential communities significantly came together in firstly determining a critical threshold to locally depleted scallop stocks using both local monitoring and expert interpretations and secondly in the co-ordination of an appropriate response to this ecological crisis. The success of this self-organised collaboration between resident groups in achieving an interim ban on commercial scallop fishing within the wider Mercury Bay area is starkly contrasted with the relative lack of community engagement in TCDCs externally co-ordinated SMP project.

At Whangapoua, Ngāti Huarere have commissioned (in 2015) an independent report on the state of the Whangapoua Harbour, using a culturally-based *Mauri* Model Analysis method, to determine its declining state under current catchment management practices, specifically citing the Matarangi Wastewater Treatment Plant as a primary concern. The report coincided with the timing of the WRCs Harbour & Catchment Management Plan for the Whangapoua Harbour, which included the northern beaches of the Kūaotunu Peninsula and on which Ngāti Huarere were consulted as key stakeholders. Representatives of Te Ngāti Huarere ki Whangapoua Trust continue to work constructively with the WRC towards improving the *Mauri* of the Whangapoua Harbour and the cultural values inherent within this. But based on the principles of *Mātauranga Māori*, the alternative *Mauri* Model Analysis reports that multiple tipping points have already been broached for the Whangapoua Harbour.

Meanwhile, at the western end of the Matarangi spit, where successive erosion events have encroached into the private golf course, an affiliated group has independently instigated dune restoration plantings to specifically protect the greenways. At the same time, Coastcare representatives, including within TCDC, report strong resistance to dune restoration plantings directly in front of beachfront property owners at Matarangi, where their beach access has become compromised. On the opposite side of the harbour mouth, Whangapoua's eastern beachfront properties have also been directly confronted with encroaching wave action associated with net erosion losses. Recognising this as a relatively isolated impact, in spite of local dune restoration efforts, affected property owners have privately funded 'beach push-ups[39]' by working in with TCDC/WRC, as a temporary buffering measure to offset localised wave action.

Consequently, many of the physical environmental triggers identified above are not only specific to place, but are also culturally defined, in reflecting the range of values, interests and priorities inherent within Kūaotunu's coastal communities (see *Table **6*** below for a summary). Within local ECGs these triggers may be established over ranging timescales through co-ordinations of shared experience and routine monitoring that is specific to place alongside customary practices and sense making. This is contrasted with the tipping points that have been identified through the SMP project, which appear more specifically tied to communal public infrastructure asset

[38] www.legasea.co.nz : a non-profit organisation dedicated to restoring the marine environment in ANZ

[39] Beach or sand push-ups provide a sacrificial barrier of sand in defence of properties against extreme storm events

management and civil safety criteria in conjunction with remotely modelled data with limited public input.

EST.	ACTIVITIES	KEY INITIATIVES / PROJECTS
NGĀTI HUARERE KI WHANGAPOUA TRUST		**NHWT**
1998	Environmental & Cultural advocacy	**Ngāti Huarere ki Whangapoua Mauri Model Analysis (2013 Assessment)** An assessment of Whangapoua Harbour environmental conditions and overall health based on Mātauranga Māori principles and indicators that was independently commissioned by NHWT. The NHWT are otherwise actively engaged in monitoring activities from within the wider Whangapoua catchment through managing relations with its various land owners as well as TCDC.
MATARANGI DUNE RESTORATION GROUP		**MDRG**
2023	Dune beach restoration, planting and weed control	Following several years of inactivity, the Matarangi Dune Restoration Group has reformed in the wake of Cyclone Gabrielle.
RINGS BEACH WETLAND GROUP		**RBWG**
2008	Wetland restoration, planting, weed & pest control	**Pine eradication & Track building** After receiving a share of a grant from the MPI, the RBW group have been focused on eradicating pines from with the reserve in recent years, alongside intensive pest management to protect endangered native birds, including NI Brown Kiwi and Fernbirds that inhabit the wider wetland.
KŪAOTUNU DUNE CARE GROUP		**KDCG**
2022	Dune beach restoration, planting and weed control	**Dune Restoration Management Plan (2022/23)** Incorporated in 2022, the KDCG have developed an overall restoration plan and programme of works in collaboration with TCDC as a basis to securing funding and resources. The plan includes consideration of restoring Kūaotunu's dune beaches in the context of changing climates and holidaying populations.
ŌTAMA RESERVES GROUP		**ORG**
2016	Wetland reserve restoration, planting, pest control and wetland management	**Wetland Restoration Plan (2022)** The ORG received a grant to develop a Wetland Management Plan to cover the long-term management of the wetland, both its wildlife and hydrology, including in the context of rising seas and increased inundation associated with changing climates.
ŌPITO BAY RATEPAYERS ASSOCIATION		**OBRA**
1995	Weed & pest control, dune plantings, bush plantings, beach clean ups & monitoring	**Environmental Pillars & Biosphere Projects** In recent years, the OBRA have developed a programme of environmental management/restoration within the Ōpito Bay area, with key workstreams that are co-ordinated between permanent and part-time residents through the Ratepayers Association. The OBRA were also instrumental in bringing about a cessation of Scallop dredging within the wider Mercury Bay area as well as more recently proposing the wider Kūaotunu peninsula as an ecological Biosphere.

Table 6 – Summary of current interests and initiatives of participating grassroot coastal conservation organisations on the Kūaotunu Peninsula

5.3.4 ***Conflicted Conservatisms***

With statutory planning agendas necessarily focused on managing future scenarios for the Coromandel, local ECGs are practically focused on restoring and maintaining local environmental resources in the context of the daily, monthly and seasonal-annual rhythms of the present. As well as being attributed with locally relevant environmental knowledge in the process, these groups are made aware of bigger picture social-environmental forces of change, while generally comprehending the role and associated value of functional ecological systems and cycles. Since in many cases, their restoration endeavours are addressing short-falls in the statutory management of local natural resources, there are inevitable tensions between these organisational levels, often fuelled by historic mistrust. At the same time, the SMP project has highlighted the mutual dependencies of both parties in co-ordinating responses to future coastal hazards through dune restoration. While TCDC have established this potential through their facilitation of Coastcare initiatives in co-ordination with local ECGs, the general resistance of grassroot organisations to be externally managed is compounded by TCDCs failure to specifically engage with local ECGs as part of community planning processes for the SMP project. Tensions additionally arise from the independent interests of second home owners and visitors operating outside of, and frequently in opposition to, local (residential) ECGs, as well as TCDC, by ultimately running counter to the broader objectives of collaborative adaptation planning and governance.

For some residents, the SMP initiative is seen as a mechanism to advocate for 'concrete' engineered defences over the natural fortification of existing dune habitats in the interim. While concurrently championing the Coastcare initiative on the Coromandel, TCDC is charged with reconciling the provisional recommendations of the SMP reporting in bolstering dune fortification efforts, with disparate local agendas. But the general abstention of representatives from local ECGs on Kūaotunu (including those directly involved in coastal restoration), from the community planning component of the SMP project process is now problematic for its implementation.

Also at issue for many of the Coromandel's east coast beach communities, including the Kūaotunu Peninsula, is the scale of dune restoration/rehabilitation works that have been specified in the short-term by the SMP reporting to provide critical fortifications against the modelled threats of future erosion. With local Coastcare groups already struggling with the recruitment and retention of regular volunteers for the man-hours of planting and maintenance works required, this has effectively become a shared issue for TCDC in planning for the implementation of the SMP. Funding constraints are already a recurring issue for volunteer conservation initiatives, both in the procurement of plants and in the equipment needed for their ongoing maintenance. In partially subsidising local coastal restoration efforts through the Coastcare initiative, TCDC equally acknowledge their reliance on local champions to effectively lead independent community initiatives.

Five years ago, they were just managed on a really ad-hoc basis. Now there's more funding for it. But we know that we probably need lots more funding. But you also need a few people in that community to be passionate to then run it. So, its quite tricky in that sense – Jesse (TCDC).

Joan, who is credited with transforming a waning Kūaotunu Coastcare into an incorporated society in 2022, is already feeling overwhelmed with the scope of her role, which currently involves administrative applications for funding alongside the co-ordination of volunteer restoration activities that previously fell to Council facilitators. 'There is so much to do. But then I just keep thinking, baby steps…' - Joan (KDCG). As the 'parent' organisation to the KDCG, TCDC remains strategically involved through its Coastcare co-ordination activities. In the case of KDCG, the incorporated society developed from a dedicated group of Coastcare volunteers covering both of Kūaotunu's east and west beaches. For most other Coastcare activities on the Kūaotunu Peninsula, Coastcare volunteers are recruited from pre-existing local ECGs. In this way, the Coastcare initiative is seen to provide a bridging organisation between TCDC and grassroot conservation initiatives on the Coromandel.

In November 2022, at the conclusion of the planting season and following the publication of the SMP reporting, TCDC hosted a mini-conference for local Coastcare groups that was also attended by representatives from the Regional Council (WRC) and Department of Conservation (DoC). With a pretext of celebrating the successes of Coromandel's Coastcare volunteer groups, the session also provided TCDC with an opportunity to highlight the looming challenge of bolstering dune restoration efforts around the Coromandel's east coast beaches. With the procurement and supply of native dune plants also requiring expansion, (in order to cover the extent of dune restoration plantings specified by the SMP documentation, specialist nurseries are also now grappling with how to meet the increasing demand through their current operations. Seasonal factors and variable weather patterns directly influence plant propagation rates as well as the recurrent risks involved in restoration projects suffering plant losses through seasonal storm events.

The successive cyclonic episodes of summer 2023 have effectively brought both the SMP project and current dune restoration projects into the spotlight on the Coromandel Peninsula, alongside their local opponents. With previous storm surges being relatively localised in their effects on the wider Whangapoua-Mercury Bay Area, the relative scale and intensities of ex-cyclone Hale and cyclone Gabrielle consecutively hitting the Coromandel region, just one month apart, were widespread in their combined impacts affecting residents and local business as much as conservation efforts. In addition to the flooding of low-lying areas generally through accumulated rainfall, local roading networks were compromised by countless landslips that temporarily isolated rural communities. The dramatic failing and extended closure of the arterial SH25a in strategically traversing the Coromandel Ranges between Kopu and Hikuai substantially extended the journey times to the east coast from Thames, with residents and visitors required to detour around the coastal highway and only once it was cleared of localised slips.

The social toll reported by attendees of the FGW I hosted in the aftermath of the summer 2023 cyclones, involved initial stress for individuals as a result of isolation and associated damage to business and properties - followed by rising tensions within coastal communities. With several Kūaotunu beaches also suffering cumulative losses from both their sand (and vegetation) budgets as a result of the combined summer storm events, the efficacy of dune restoration efforts were,

again, called into question by many beach residents (see *Appendix **D***). As the scope of coastal restoration plantings was substantially increased for the 2024 season, specifically to replace storm losses, local challenges to dune restoration projects also affected the supply of volunteers needed to plant. Despite the counter narratives of their respective dune restoration volunteers, the 2023 storm events stoked ongoing divisions within the resident communities of both Matarangi and Kūaotunu.

Notwithstanding the magnitude of successive cyclonic episodes affecting the Coromandel in 2023, many of those familiar with Kūaotunu would anticipate summer cyclones under a La Niña cycle. Typically, sand erosion associated with summer cyclones is readily restored to affected beaches as part of their cyclical (seasonal) sand budgets. And while some east coast beaches held up reasonably well against ex-cyclone Hale and cyclone Gabrielle as a direct result of recent coastal restoration efforts, they received less publicity than those that suffered net erosion losses. An alternative appreciation of beaches as dynamic (albeit tenuous) buffering systems as opposed to natural assets threatened by the external forces of nature, underpins much of the tensions within Kūaotunu's beach communities, whereby engineered 'solutions' to offset increasingly variable cycles of beach erosion are frequently sought.

Rather than provide key opportunities for experiential learning, the summer 2023 storm events have poignantly served to embed these alternative mindsets within the reactive 'knee-jerk' response of some beachfront home owners to externalised forces of change. Compelled by self-interests that run counter to the dynamic adaptive planning focus of the SMP initiative and democratic participatory planning more generally, such views also contradict the broader stewardship objectives of local ECGs. Those ECG representatives attending the FGW alternatively ideate 'cultures of connectedness' being fostered through the social networks of environmental stewardship initiatives operating on the Kūaotunu Peninsula in the face of environmental change.

*5.3.5 **Summary Analysis***

With TCDC's SMP initiative progressing in the context of successive years of increasing extreme weather events on the Coromandel, unseasonal change is providing a key reference to adaptation planning for the district, alongside short-term emergency response management interventions. At the same time, the biannual monitoring of parts of the district's shoreline, which feeds into modelling the coastal hazard scenarios on which the SMPs are based, fails to record the baseline seasonal periodicities of many events. Storm events are poorly depicted in summations of seasonal rhythms over a given year, or indeed in the case of fluxing sand budgets within ENSO oscillations spanning several years. The AP's prescribed for sections of the district's shoreline come to be based on managing generic risks to public infrastructural assets and civilian safety, which are in line with TCDC's statutory responsibilities and priorities. In this way, the risk and responsibilities of Council are seen to increase substantially with summer tourism. And while some AP's generated for Kūaotunu's beach settlements identify planning restrictions on coastal development as an adaptive mechanism, residential subdivisions of varying scales and stages are being progressed at Matarangi, Opito Bay and Otama. Thus, the potential of some adaptive

pathways under the SMP initiative are already being undermined by the consenting activities of TCDC within the present.

This is contrasted with the informal immersive monitoring of individual beach environments by residents and specifically those routinely engaged in shared volunteer practices through local ECGs. Continuous change is calibrated by local ECGs from one day, month, season and year to the next within specific beach environments. In routinely making incremental adjustments to their ongoing practices, ECGs are effectively responding to gradual forces of change while concurrently being able to contextualise larger 'trigger' events. This includes in the monitoring of sand accretion and erosion cycles over extended periods of time on beaches, rather than as single events out of context.

The ways of knowing and acting derived through the plethora of environmental conservation initiatives operating on the Kūaotunu Peninsula are as much a reflection of the diversity of cultural interests, values, concerns and priorities that are resident within the social-cultural dynamics of its beach communities as of its physical beach environments. This is effectively demonstrated in the range of locally identified social-environmental 'tipping points' that have incited radical responses by self-organised resident groups in recent years - notably including the scallop *rāhui* at Opito Bay as well as the independent dune plantings by the golf club on the western point of the Matarangi spit. In the former case, the co-ordinated success of the locally organised scallop *rāhui*, in rallying substantial numbers of residential groups to bring about divisive change in the management of local scallop stocks, (through pertinacious lobbying of the Ministry) is contrasted with the relative apathy of Kūaotunu locals to engage with the strategically planned interventions of the SMP project by TCDC.

Consequently, we can presume that many of the values and temporal ways of knowing associated with local environmental initiatives have not been duly considered within the strategically externalised AP's developed through SMPs for individual beach 'communities'. At the same time, most local ECGs exist through perceived shortcomings in the practical day-to-day or seasonal management of Kūaotunu's nature reserves, including its beach and wetland habitats, by their statutory governing agencies. Here, the relative remoteness of the Kūaotunu Peninsula is understood to be a factor in this apparent 'neglect' in spite of its recognised environmental significance. In adopting custodianship of their residential environments, local ECGs have become specifically attuned to broader social-environmental forces of change, and how they become visible in shifting patterns of seasonal rhythms, while practically prioritising immediate issues and concerns within the available means of their customised planning agendas. In comprehending the local environment as a dynamic integrated system of human-environment relations, many local ECGs are already actively working with ongoing change, including seasonal change, as a basis to apprehending future scenarios. Limited by funding and volunteer availability, many groups are now looking to TCDC to expedite the SMP project, while seeking ancillary support in their everyday conservation activities as an allied component of this endeavour. TCDC is in turn looking to existing conservation volunteers, alongside the wider community, in order to capacitate the provisional steps of the SMP project.

But in spite of being broadly aligned in their long-term planning aspirations for the Kūaotunu coastline, and particularly in responding to changing climates, prevailing tensions between local government and under-resourced independent environmental initiatives threaten to undermine these mutual collaborations. Meanwhile, the consenting of new subdivisions at Opito Bay and Otama by TCDC does nothing to restore community relations over the Council's environmental priorities for Kūaotunu. There are additional factions within some coastal communities that have engaged with the SMP initiative as a means to lobby TCDC for longer-term engineering fixes to the immediate threats of beach erosion. In the FGW, a lack of education around natural beach processes and coastal ecological systems more generally was commonly cited by representing ECGs as a key barrier to the SMP process - while persistently undermining the legitimacy of their own endeavours.

Yet in communities such as Opito Bay, where strong local leadership of a predominantly part-time resident population is associated with a clear prioritisation and resource allocation towards local environmental protection and management, requests for engineered groyne structures are still raised by some residents in favour of nature based solutions. So far, these have been summarily dismissed by the OBRA committee: 'You can't play with nature like that and the last thing we want here is to have an unnatural barrier' – Clive (OBRA). Yet the recent consenting of the Opito Sands Subdivision by TCDC is effectively undermining these natural beach processes. While unsuccessful in preventing the further subdivision of Opito Bay, in spite of a substantial submission against the Opito Sands development, the OBRA has otherwise continued to advocate for environmental 'injustices' within the locality. Their tactical maintenance of working relationships with local and central government agencies as well as with neighbouring landowners is considered instrumental in the efficacy the OBRA, with apparent lessons for other autonomous local environmental groups. Specifically, the reach of the OBRA suggests the frequent lived (daily/monthly/seasonal) timeframes of coastal governance as the domain of grassroot ECGs, while the larger spatial and temporal scales of resource planning fall to both local and national governments.

But many independent environmental groups, including the neighbouring ORG, are fiercely defensive of their hard earned local knowledges and the associated values they attribute to local environments. This sees them strongly resistant to being overtly planned or managed under externalised agendas and associated temporalities. This resistance has been effectively demonstrated in the proposed Kūaotunu Biosphere project championed by leadership collaborations between the OBRA with KRRA, while some individual volunteers have otherwise been observed to stealthily participate across Kūaotunu's environment groups. Founded on a premise of working *with* nature's systems, many ECGs are equally reluctant to over-intervene with 'nature' by giving precedence to trusting in the balance of the bio-physical rhythms of places, 'If we interfere with it, well, you're interfering with the whole natural cycle of it' – Phil (ORG).

CHAPTER

06

CRITICAL INTERPRETATION & EVALUATION

6.1 Introduction

Following a provisional summary based analysis of my research findings within the preceding Chapter 5, I now turn to critically address my secondary questions through recourse to the conceptual framings of my research, from Chapter 2. Throughout this process I have been conscious of my prior experience working as a landscape planner/ecologist in the field of residential subdivision and development, including in coastal settings similar to the Kūaotunu Peninsula and an awareness of the local politics contained therein. These are additionally fuelled by external relationships between local resident communities and statutory agencies, including TCDC, as much as the politics of internal relations within local communities.

As a resident of Thames, I regularly engage with Coromandel 'locals' in both my professional and personal lives. In developing a critical analysis and interpretation of my research data, I am equally aware that my personal profile as a white professional European immigrant has bearing on my framing and subsequent interpretation of data as well as how my research participants have been able to relate to me, as I to them. Through a sustained period of practical participation in independent coastal case-study groups over the course of my fieldwork, I have been fortunate to have developed trusted working relationships with key participants, thereby granting me access (as well as contributing) to shared local knowledges and collective sensemaking. While concurrently drawing on existing professional relationships within TCDC, I have strived to maintain a balance in working across groups, in order to incorporate multiple perspectives into the analysis of my research findings. At the same time, the particular focus of my research has specifically involved giving prominence to local perspectives within the broader arenas of adaptation planning and governance. My own conscious efforts to maintain 'working' relations with prior contacts through the course of this research have been previously addressed in Chapter 4 under the ethical considerations covered within Section 4.8.

6.2 Overview

In referencing a rhythm analytical approach by which to interrogate the relationship between seasonality and Kūaotunu ECGs, *Figure **22*** (located at the start of Section 6.3) provides an overview of the spectrum of social-environmental rhythms encountered across the Kūaotunu Peninsula during the course of my research. As well as highlighting the assemblages of seasonal rhythms at play on the Kūaotunu Peninsula, *Figure **22*** depicts the nested relationships between seasonality and the daily and longer-term patterns and events that are variously encountered by resident participants of ECGs over the course of a year, and from one year to the next. In this framing, seasonality is couched within amplified cycles extending over multiple years, while containing shorter monthly or diurnal rhythms. The resulting composite patterns of human-environment relations that are uniquely attributed to the seasonalities of individual beach settlements are first discussed in relation to theories of place, under 'Reconciling Relational Rhythms with Place'. Emerging as seasonal architectures built on the rhythms of practical participation within local environments, the reciprocity of human-environmental relations

constituting local ECGs are developed further as distributed forms of local environmental stewardship, potentially conditioned by institutional logics.

How seasonal variability and change is perceived and effectively calibrated by participant ECGs, with reference to the complex assemblages of intersecting polyrhythms within beach settlements, is discussed under 'Acclimatising with Change'. Here, I draw from institutional-organisational theories of processual change, alongside parallel theories of place, with which to highlight the ongoing practical adaptations of individual groups, including indigenous *iwi*, as emerging forms of situated adaptations – demonstrated by seasonal change. This approach is subsequently contrasted and compared with the externalisation of future-focused strategically planned adaptations of local government, under 'Governing with Temporality'. As well as highlighting fundamental differences in the temporal orientations of grassroot and statutory organisations constituting place, this section looks at how their divergent temporal orientations might undermine the resilience of place-based communities in the context of accelerating social-environmental change.

6.3 Reconciling Relational Rhythms with Place

Question: a) How are seasonal rhythms constitutive of social-cultural relationships with place?

As much as Kūaotunu is renowned as a holiday destination on the Coromandel's east coast, it is generally understood to be a seasonal place. Thus, In spite of the relatively mild sub-tropical maritime climate that prevails over the Coromandel's eastern seaboard, the mobile rhythms of contemporary society produce variable flows of people through Kūaotunu's beach settlements that are specifically amplified over the summer holiday period. In this way, the Kūaotunu Peninsula embodies the temporalities of social calendars and schedules as much as meteorological-astronomical variables involved in prescribing its seasonality over the course of a year. But in relating seasonal rhythms to socially organised spaces, we are specifically concerned with understanding how these prevailing patterns of seasonal activity play out within the microclimates of Kūaotunu's discrete beach settlements and how their differences are reflected within the cultures of local organisations practically responding to patterns of change within and from one year to the next.

In the section that follows, I draw on local understandings of seasons from participants of Kūaotunu's resident ECGs to evaluate the role of seasonality within contextualised relational understandings of beach settlements as places in process during the current times of rapid social-environmental change. At the juxtaposition of land with water and ecological conservation practices with visitation, we find unique co-ordinations of human-environment relations within Kūaotunu's coastal settlements by attending to their rhythms.

Specifically, I discuss key intersections of social-cultural-biophysical rhythms as the seasonal architectures defining the broad temporal patterning of the Kūaotunu Peninsula, before focusing on the rhythms of social engagement comprising its individual beach settlements alongside the

human-environmental relations that give rise to alternative forms of organised stewardship and resistance.

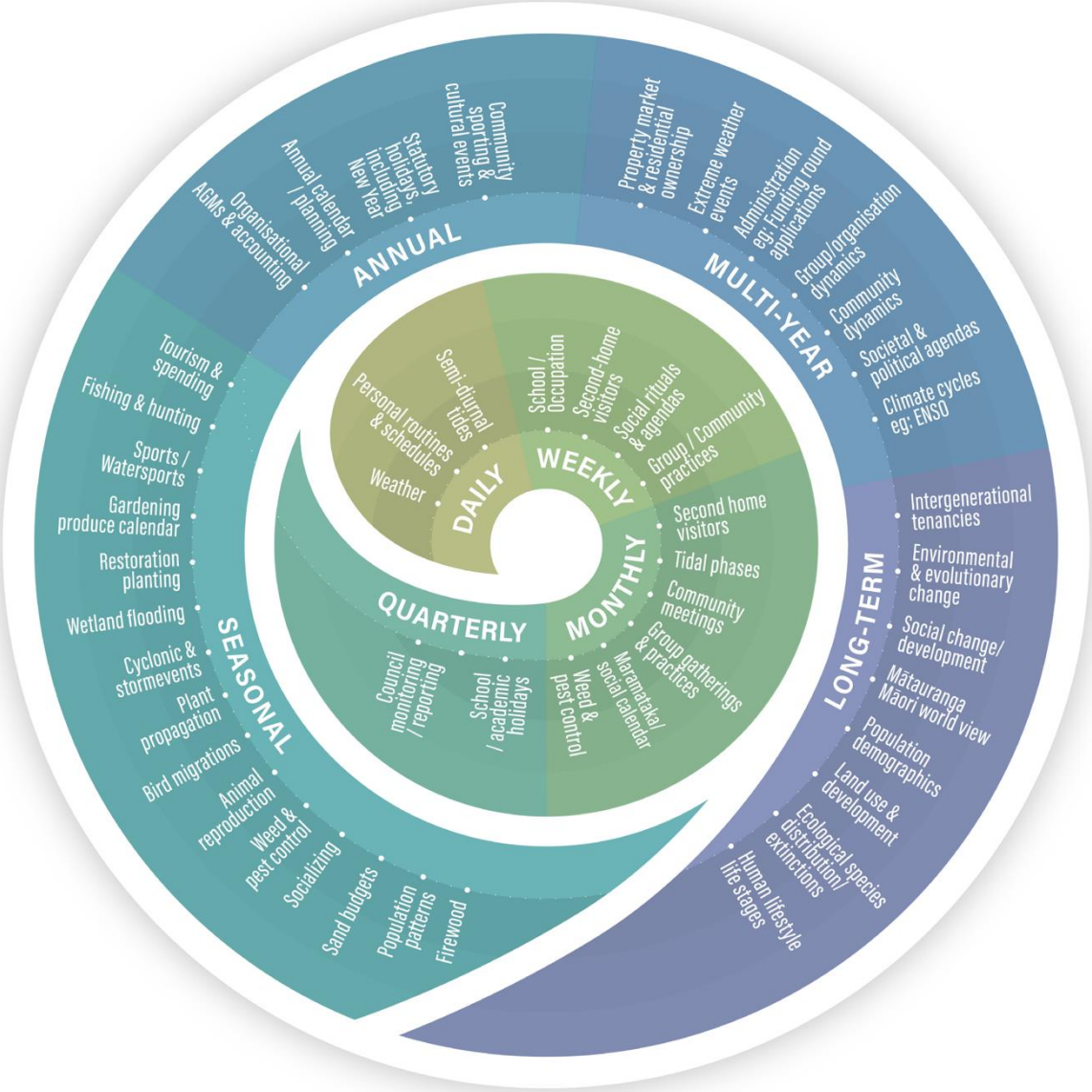


Figure 22 – A schematic 'rhythmanalysis' of the Kūaotunu Peninsula depicting the full range of intersecting social-environmental rhythms encountered over the course of the research

6.3.1 Rhythms as Seasonal Architectures

Contextually, the fluid temporalities of Kūaotunu's coastal communities remain nested in and framed by the wider timings of ANZ society and global tourism. In offering relief to the 'monotonous grind' of scheduled urban lifestyles, the ostensibly relaxed nature-based timescapes (Adam, 2005) of the Coromandel (actively marketed as 'Coromandel time') are as appealing to urban visitors as the 'natural character' of its iconic coastal landscapes. In reality, the obligation for many domestic tourists to visit the Coromandel over the statutory peak summer holiday period (spanning Christmas and New Year) generates an acute periodic time-squeeze on natural

resources as well as social infrastructures. Consequently, the aspirational relaxed tempo of 'Coromandel time' is periodically interposed by a 'busyness' derived from the opposing temporalities of urban lifestyles. For working families with school-age children, peak summer is extended through to early February, when the new school year begins. The 'shoulder' seasons extending either side of peak summer between Labour Weekend and Easter (October to April) are alternatively reserved for visitors on more flexible timeframes, including those specifically wishing to avoid the peak season, as well as international travellers in search of extended summer adventures. Hence, while the duration of 'summer' is approximately defined by the arrival and departure of visitors to Kūaotunu between the months of October and April (over half of the year) the variable flows of visitors through Kūaotunu during this time is associated with a succession of 'hybrid' temporalities. Insofar as Coromandel timescapes intersect with externally derived timescapes (school holidays, international tourism), we see how the pulses of visitors that define this place are timed elsewhere. The resulting temporalities of place are at least as much imposed from outside as generated within, by unique geographies for instance. Here, the increasingly fluid mobilities of a contemporary globalised society contribute to the experience and understanding of seasons at Kūaotunu as a result.

As a case-study, the Kūaotunu Peninsula demonstrates how everyday life is patterned by the intersecting social and biophysical rhythms of place. With proportionally few permanent residents occupying the peninsula, its burgeoning cycles of visitation set a contemporary dynamic to Kūaotunu's eclectic beach communities. Concurrently, a multiplicity of environmental rhythms derived from interactions of land with sea are associated with enhanced and extended opportunities for inhabitants to experience and connect with the seasonally distributed 'natures' of Kūaotunu: 'I notice change here dramatically over the seasons and look forward to it' (Clive, OBRA). As a place, the Kūaotunu Peninsula is alternatively experienced by people at different times of the year. For inhabitants, it is the cycling of the rhythmic relations between people and environment that set the practical pace to many lifestyles on the Kūaotunu Peninsula, while eliciting a spatio-temporal definition of its beach settlements as discrete coastal nexuses that are subject to ongoing fluxes of change (Krause, 2022; Kothari & Arnall, 2020).

With local ECGs comprised of both permanent and part-time residents, most participants have ended up in Kūaotunu from prior lives and preoccupations with other places, including from overseas, and many continue to maintain relatively high levels of mobility. In contributing a globalised dimension to its human-environment relations, the experiences derived from the extended mobilities of retirees, second-home owners or international 'interlopers' are also associated with ranging references to seasons that are variously compounded by the cycles of domestic tourism. A common seasonal frame of reference is often lacking for individuals as a result (Bremer & Schneider, 2024). But for many participants, Kūaotunu is the 'place' to which they permanently settle, regularly return, or retire to call home: 'this is our *turangawaewae*' (Judi, RBR).' Privileged with weekday availability and a desire to 'give back' through their retirement lifestyles, many retirees turn to organised environmental conservation activities and the social connections this affords as a surrogate to working lifestyles. Working-age participants typically

maintain a level of occupational flexibility commensurate with the alternative lifestyles of Coromandel residents, while the contributions of second-home owners is often limited by their commitments elsewhere (Bennett et al, 2018).

In practice, the temporal co-ordination (and inherent awareness) of human activities with dynamically intersecting environmental rhythms is critically contingent on flexible timings that are privileged to rural residential lifestyles, and more so to retirees. Through pliant repertoires of daily practices, residents of Kūaotunu may become specifically attuned to a multitude of rhythms and cycles with which to plan and co-ordinate a range of activities over the course of a day, month or year/s. In stark contrast to the rigidly enforced linear constructions of the commodified working week and its associated time squeeze, those retiring to the Kūaotunu Peninsula are thereby given the opportunity to recalibrate or retrain their personal schedules within a spectrum of biophysical time settings (Adam, 2005). Since humans are biologically conditioned to solar rhythms, an entrainment to circadian and seasonal cycles is embraced by many Kūaotunu locals as a positive 'regression'. While rural communities are often construed as 'insular' in their focus, coastal settlements are inherently engaged with the pervading global circulations of ocean-climate systems as well as specifically benefiting from an unencumbered exposure to cosmic planetary dimensions (Johansen et al., 2021). Concurrently, the immersive experience of inhabited natures generally afforded by Kūaotunu's relatively remote beach settlements and the fluid timekeeping of cyclical 'coastal times' are highlighted by many participants as both liberating and grounding – 'The power of nature is just awe inspiring' (Clive, ORRA).

Intersecting social and environmental rhythms become especially prominent in environmental conservation work and the synchronisation of life cycles and activities across multiple species. For many permanent residents, the exodus of visitors at the conclusion of the tourist season, around Easter, heralds an alternative 'restorative' phase to Kūaotunu, when many cherish having 'the place to ourselves'. With the period between April to October reserved for practical participation in local environmental conservation initiatives, this timing coincides with the terrestrial planting season extending between the cool wet months of May to September for the implementation of restorative native plantings. Other ecological restoration and routine maintenance activities, including weeding and animal pest control, are also confined to this 'wintering'[40] period in order to avoid potential conflicts with summer visitors, specifically within over-populated beaches. In reality, much of the work undertaken by local ECGs, including through Coastcare, is subversively designed to reconcile the negative effects of human activity on Kūaotunu's coastal environments. Second-home owners that may otherwise consider themselves as 'semi-permanent' residents participate in summer population swells, along with the extended families and guests of permanent residents. Only a fraction of total residents also participate in the wintering activities of local environmental initiatives on the Kūaotunu Peninsula. In this way, conservation rhythms are seen to circumvent the pulses of human visitation, in setting a seasonality to coastal

[40] 'Wintering' as defined by author Katherine May (2020) in her book of the same title to define and embrace a period of life that is experienced as being sidelined or left out in the cold.

stewardship; a cycle of ecological restoration activities during the winter months to counter the pressures of holidaying populations during the extended summer months.

Taking reference from a musical theory of rhythms (Lahdelma & Eerola, 2020) the different seasonal modes suggested by volunteer participants implies alternating states of relative *consonance* (relief) and *dissonance* (discord) between the formative social-environmental rhythms involved in the co-ordination of annual conservation practices with the 'visitation' cycles of extended summer tourism at Kūaotunu. This in turn relates to Lefebvre's more definitive classifications of *arrhythmia* - in depicting conflicts, such as created by fluxing summer visitation rhythms with nesting shorebirds, on Kūaotunu's beaches and *eurhythmia* in defining the regulating, mutually constitutive (harmonious) rhythms of nature's cycles, such as observed in tidal movements, circadian rhythms and seasons. In this context, local conservation efforts are framed as proactively contributing towards a sustained *polyrhythmia* - as intersections of multiple rhythms without dissonance (Lefebvre, 2004; Lyon, 2019). In effect, the trade-off between periodically timed conservation practices in providing constructive relief (consonance) to the consuming rhythms of summer population influxes, involves practical navigations between inherently conflicted rhythmic activities in striving towards a perceived balance in human-environment relations. In music, the perception of orchestrated consonance and dissonance (sonance) involves (stylistic) subjectivity (Di Stefano & Bertolaso, 2014) which is construed here as the alternate subjective experiences of Kūaotunu, afforded by its seasonally constituting lifestyles, associated worldviews and a resulting sense of place (see *Figure **18*** – Section 5.1.4).

The seasonality of environmental conservation and stewardship foregrounds particular underlying tensions and politics between social groups in Kūaotunu. Thus, while many Kūaotunu businesses revel in the economic opportunities associated with seasonal tourism (proverbially 'making hay while the sun shines'), other residents (many as retirees) are clearly conflicted in an awareness of the increased pressures that visitors periodically exert on local resources. In addition to the loading of local infrastructures and services (specifically roads, water supply, sewerage[41] and emergency services) that fall to TCDC, local ECGs regularly confront threats to the habitats of native flora and fauna, including through increasing numbers of animal pests (specifically rats) associated with the excesses of human occupation during the summer holiday period. In anticipation of these seasonal ecological disturbances, members of local ECGs variously adopt modes of passive surveillance during the peak summer months. Historical tensions are similarly manifest in the divergent stewardship practices and worldviews between indigenous *Māori* populations and 'other' (colonial) populations.

Notwithstanding that indigenous communities have historically fallen into arrhythmic relations with their environments at points; where indigenous *Māori* once lived by the custodial principles of *Mātauranga Māori*, human-environmental relations were largely founded on a fundamental reciprocity of (transient) inhabitation. Now that ANZ, as an 'advancing' multi-cultural society, is

[41] Specifically at Matarangi, where Ngati Huarere have observed discharges into the Whangapoua Harbour from the Wastewater Treatment Plant

less dependent on its immediate natures to survive, a relational (polyrhythmic) 'balance' between humans and their dwelling environments has not been sustained (Turner et al., 2012). Even at relatively remote locations such as the Kūaotunu Peninsula, where the base population remains low, resident human-environment relations are continuously undermined by fluxing cycles of visitation alongside a primacy of derived 'recreational natures' (Johansen et al., 2021).

As relational places in process (Massey, 2005; 1999) the ebbs and flows of seasonal tourism and occupancy account for significant changes within beach settlements over the course of a year and from one year to the next. Meanwhile, diverse experiences of seasonality by Kūaotunu's residents is shaped by their cultural ways of engaging with beach environments, in the frequencies and periodicities of their relational interactions, alongside the dynamic mobilities of visitation and residential lifestyles. Thus, while individual beach settlements can be physically defined by their discrete geographical catchments, ecological habitats and associated microclimates, they are also distinguished in practice through unique configurations of human-environmental relations in and over time.

6.3.2 ***Rhythms of Reciprocity***

In the habitual binding of humans to the idiosyncratic rhythms of place, new identities and values are engendered through the embodied agencies involved in maintaining (or redressing) the balance of its constituting human-environment relations (Jones & Massa, 2013; Locke, 2013). In the case of the Kūaotunu Peninsula, the coastal environment exerts its own form of affective agency in attracting visitors and residents to occupy its iconised recreational natures in the first place, while subsequently invoking a desire to 'give back' for many committed locals (Johansen et al., 2021). As noted previously, this environmental reciprocity often corresponds with personal transitions, for many residents, in trading their former working lifestyles for participation in organised conservation activities (in retirement or semi-retirement), while continuing to draw on their unique biographical experiences and practical skillsets from formative institutional contexts. And while *Mātauranga Māori* is referenced by some participants in defining an ideological balance in human-environment relations, Ngāti Huarere descendants are themselves in the process of reconnecting with their ancestorial homeland of Whangapoua, through a reconciliation with customary stewardship practices. Consequently, contemporary forms of environmental stewardship were observed as emerging within the eclectic collaborations of participants across the voluntary practices of ECGs I worked with at Kūaotunu.

Bennett (et al., 2018) note that environmental stewardship (ES) has long been associated with shared values and logics for a moral ethic of care, that influences communal practices and decisions, and is intimately tied up with noticing and responding to social-environmental change, often through creative governance arrangements (Dunn & Jones, 2010; Marquis & Lounsbury, 2007; Orlitzky et al., 2011). Such stewardship was observed within the organisational contexts of the Kūaotunu Peninsula, in accommodating the self-organised grassroot environmental conservation initiatives at the micro-level, alongside the broader resource management and

governing responsibilities of Local and Regional Councils at the formalised macro organisational level.

By relating a logic of environmental stewardship (ES) to the broader institutional field of conservation, we can see how ES has manifest as a range of ECGs specific to social and physical contexts at Kūaotunu – consistent with an holistic Institutional Logics conception. The relative motivations and capacities for stewardship within these different contexts additionally account for the variability in environmental initiatives between beach settlements. Where the balance of 'nature' is apparently most overt, such as at Otama, with its small residential base and high residual ecological values, there appears to be an increased investment of inhabitants in nurturing local SESs, and specifically where their statutory management is perceived to be lacking. Indeed, local conflicts at Otama have involved 'rivalling' environmental initiatives.

Taking reference from Ingold's phenomenological dwelling perspective (2000), we can speculate that the immersive experience of prevailing natures afforded to Otama's inhabitants fosters reciprocal relations alongside an increased awareness of its inherent rhythms and cycles (Krause, 2013). Equally fundamental to reciprocal human-environmental relations observed at Otama, through the ORG, is a shared understanding that human inhabitants are integral to the local SES and therefore critically influential in its equipoising dynamics. 'So, if we interfere with it, you are interfering with the whole natural cycle of it' – Phil (ORG). Alternatively manifest to varying degrees (and agendas) within different ECGs, the stewardship activities observed within RBWG, KDCG and OBRA suggests an underlying environmental ethic that is common across all groups.

Drawing from a tradition of local volunteer conservation interventions in ANZ (Logan, 2016), alongside an appreciation for *Mātauranga Māori*, an ethic of ES is similarly understood as embedded in cultural traditions and religions worldwide (Attfield, 2015; Berry, 2006). So that, rather than supporting a new idea of an emergent or hybrid macro-environmental logic forming in response to global social-environmental change (see Ansari et al., 2013; Dahlmann & Grosvold, 2017; Gümüsay et al., 2020) a shared ES ethic might be alternatively derived from a more fundamental core logic that relates to an ongoing 'practical sustainability' by humans, as social 'participants' within their immediate natural world (Hoffman, 2019; Roos, 2017).

As voluntary custodians of Kūaotunu's coastal environments, most ECGs advocate an holistic approach towards nurturing resilient, healthy SESs, emphasising the many benefits; from coastal buffering, to recreational utility or the intrinsic value of environmental health. Key to this research are the practical organisational rhythms of conservation, and the environmental pacers that structure this work, being central to the stewardship logic of ECGs. The customised interventions of different ECGs, through co-ordinated practices of weeding, planting, pest control and access track maintenance operations, can thereby be construed as contributing to intrinsic cycles of timed adaptations, including on a recurrent seasonal basis. Conservation activities are timed and enacted in an attempt to attune to locally-specific rhythms – of tides, sand budgets, storms, migratory birds, visitors – while concurrently inscribing new social rhythms on that place; effectively enhancing the polyphony of rhythms that temporally define individual beaches in and

over time. In this sense, local conservation practices contribute timings – as temporal rhythms – as well as in the organisation of time into moments, periods and sequences (Shove et al. 2012). This entrainment of conservation practices to local social-environmental rhythms effectively provides a foundation for their ongoing adaptations to changing circumstances, while being premised on an immersive routinised practical monitoring by participants.

Again, this was particularly evident at Otama, where the relatively large coastal catchment incorporates an 'intact' succession of bush to sea habitats of significant ecological value, including the restoration wetland that is the main focus of the ORG. But sitting at the confluence of land, water and coastal systems, the brackish[42] wetland habitat is naturally sustained in a tenuous state of fluxing 'amphibious' rhythms of wet and dry (Krause, 2022) that are highly susceptible to intervention. Consequently, drainage of the adjacent pastures and run-off from commercial forestry operations within the upper catchment represent ongoing threats to the wetland system. The high ecological stakes of individual habitats, alongside a shared appreciation of their critical interconnections have established relatively low thresholds to adaptive restorative measures by the ORG. Importantly, the conservation activities of the ORG remain ultimately focused on redressing the integrated balance of Otama's broader ecological systems as opposed to targeting isolated ecological management interventions.

Representing a proportion of Otamas' few residents, the ORG draws on the unique skills sets, friendships and experiences of current and retired lawyers, builders, teachers, managers, entrepreneurs and farmers - both in their practical operations as well as in their administrative functions, which include in ongoing negotiations with surrounding landowners/agents. Here, the close configuration of this dedicated group has facilitated careful co-ordinations of its operations with the fluxing rhythms of the Otama wetland involving both permanent working and part-time residents over the course of a year. The recent return of endangered migratory Bitterns - Matuku-hūrepo (*Botaurus poiciloptilus*) to the wetland at Otama contributes a new seasonal rhythm to the wetland ecosystem, while demonstrating a reciprocal relational 'outcome' in the functionality of the local SES.

In addressing former 'imbalances' the inception of the ORG was prompted by perceived shortcomings in the practical management of Otama's patchwork of public reserves by their statutory administering organisations (including DoC). The RBWG was similarly formed around the same time (in 2006) to address the perceived management 'neglect' of the wetland within its wider catchment reserve (also under DoC). Its membership is likewise comprised of an eclectic mix of retired, semi-retired and working residents drawn from the adjacent settlements of Matarangi and Kūaotunu West in the co-ordination of their routine conservation tasks within the extensive wetland catchment habitat. While both groups are linked in their common valuations of wetlands as critical ecosystems straddling beach and bush environments on the Kūaotunu Peninsula, as well as highlighting their inherent vulnerabilities – they remain independent in their operations. The concerted restoration efforts of the RBWG, including in the extensive removal of

[42] Brackish = state of mixing of fresh and salt waters.

wildling pine trees from the upper catchment, were similarly rewarded with the discovery of threatened North Island Brown Kiwi - Kiwi-nui (*Apteryx mantelli*) occupying the wetland reserve in recent years.

Key to the stewardship 'successes' of both these wetland conservation groups is the continuity of their engagement with a range of dynamic wetland-coastal processes over the course of a year being maintained by a core group of skilled dedicated resident volunteers. At Opito Bay, with only a handful of permanent residents, local environmental initiatives fall under its Ratepayer Association (OBRA) which is largely made up of 'professional' second-home owners. Here, environmental projects reflecting the interests (and ambitions) of the ratepayers alliance are streamlined into activity groups involving combinations of permanent residents for ongoing routine tasks and drawing on numbers of part-time residents in more intermittent pursuits. In spite of its low population base and relative remoteness, the stewardship reach of the OBRA extends into the wider area – most notably through the successful scallop *rāhui* initiative, Sustainable Coastlines 'Cleanups' as well as in its conceptual Biosphere 'hub' for the Kūaotunu Peninsula. In highlighting the particular professional networking strengths of the OBRA, relative to the more covert operations of the RBWG, for example, we can see how particular combinations of resident volunteers produce different organisational configurations, whose activities are variously co-ordinated with the seasonal rhythms of beach environments at Kūaotunu, under alternative stewardship settings and agendas.

While all three of these stewardship initiatives, including the ORG, have formed relatively recently in responding to perceived imbalances in local SES the Ngāti Huarere Trust (NHWT) have effectively reformed to represent an alternative mode of customary *Mātauranga Māori* stewardship at Whangapoua in the face of contemporary environmental concerns. Here, the contending interests associated with disparate land ownership within the wider Whangapoua catchment landscape continue to undermine the reciprocity of complex human-environment relations that were once a prerequisite to its (seasonal) occupations by competing tribes of indigenous *Māori*. In their marginalised stewardship role, NHWT build on practical customary knowledges spanning several generations in order to politically advocate for environmental reciprocity within a post-colonial present. This notably involves fostering working relations with statutory authorities responsible for managing the natural resources of the Whangapoua Harbour, alongside a range of private landowners. And while the descendants of NHWT have become legal landowners to a portion of their ancestral lands flanking the Whangapoua beach settlement, they have only recently been recognised by local ratepayers. Similarly, although Kūaotunu's grassroots ECGs ostensibly operate as autonomous organisations, they critically rely on effective collaborations with statutory authorities and local landowners to support their activities.

*6.3.3 **Coastal Cacophonies***

The holistic 'balancing' approach of grassroot ECGs and customary *Mātauranga Māori* can be compared with the parallel activities of externally-organised coastal restoration operations at

Kūaotunu's local beaches, which can have a more narrow and instrumental view on coastal rehabilitation. Under the centralised directive of CRTNZ, local Coastcare groups were originally established to protect and restore depleting dune-beach habitats and their associated native flora and fauna from human modification resulting from the over-development of ANZ's beaches. As dynamic exchange systems of sand-borne energy straddling land and sea environments, coastal dunes are also widely recognised as a primary nature-based line of defence against seasonal coastal erosion and associated rising sea levels. Dune restoration has thereby become a strategy for those contending the impacts of climate change on public beach reserves, including by local and regional Councils alongside DoC (Gesing, 2021).

While coastal restoration has been undertaken since the 1980's on Kūaotunu's beaches by a range of local volunteer initiatives, the recent revival in Coastcare has been jointly co-ordinated by TCDC and WRC through their coastal hazards management planning. Ostensibly, Coastcare is operating through TCDC as a practical form of coastal stewardship on the Coromandel. Yet, the irony of TCDC actively promoting and investing in dune restoration activities as part of long-term adaptation planning, while continuing to consent to ongoing coastal development within Kūaotunu's beach settlements, is undermining for some inhabitants. Since becoming a TCDC-led initiative in 2018, the relative uptake of organised Coastcare activities on the Coromandel, has been variable across Kūaotunu's beaches as a result.

Although residents from nearly all of Kūaotunu's beach settlements participate in Coastcare's annual planting events, alongside weeding events over the course of a season, this is not always an enduring commitment. The concerted efforts of Council's Coastcare co-ordinators are likewise spread over a number of Coromandel's east coast beaches, and thereby limiting the consistency of their involvement within each. Thus, while liaising with TCDC's Coastcare co-ordinators, locally established ECGs - including ORG, RBWG and OBRA - concurrently build their own agendas and timings for restoration-conservation projects, based on locally identified concerns that may include, but do not necessarily prioritise dune restoration or align with Coastcare priorities. For some of these ECGs, Coastcare imperatives are seen as imposed and standardised - being poorly fitting to their beach environment or attuned to the rhythms they perceive locally. As well as involving disparate logics for prioritising conservation pursuits, grassroots conservation groups can also ascribe to different worldviews of what needs conserving, when, and by what practical method.

With Coastcare activities largely recruiting from established ECGs, the KDCG is notable in being effectively spawned through TCDC's co-ordination of local dune restoration activities at Kūaotunu. Here, the encounters of TCDC's charismatic Coastcare Co-ordinator with a new resident 'champion' contributed to the successful establishment of this group and its subsequent legal incorporation. But in spite of their success, the KDCG face ongoing issues with the recruitment of local volunteers beyond their core membership. Somewhat ironically, this issue is most pronounced within the most populated beach settlements comprising a mix of residential tenancies on the Kūaotunu Peninsula. Largely reflecting diverging views on dune restoration within its beach-home residency, volunteer recruitment was specifically problematic at

Matarangi, which has struggled to sustain Coastcare activities in the face of opposition from its beach front residents in recent years. With its latest 'champion' associated with a newly formed Dunecare group in 2023, we can appreciate the turbulent nature of volunteer efforts at Matarangi.

The conflicted rhythms and human agencies involved in the alternating pursuits of protection-restoration versus exploitative development of Kūaotunu's destination beaches thereby reveals powerfully contested images of place, and its emergent rhythms, as a basis for conservation work. Fraught with relational tensions, efforts to restore its coastal habitats are particularly challenging on Kūaotunu's most developed recreational coastlines, where polarised values are played out in the power dynamics between representing groups. This is especially evident at Matarangi, where wholesale residential development has effectively 'supressed' the dynamic shifting of the 'natural' feature sandspit straddling the mouth of the Whangapoua Harbour. Here, contending dune restoration activities continue sporadically in defiance of foregone dune habitat (and superimposed golfing greenways) while infill residential development continues to be consented by TCDC, in an apparently futile bid to 'fix' coastal natures in time and place.

Construed as a tripartite of interests between local ECGs, TCDC and beachfront property owners, we can draw on Lefebvre's spatial triad to make sense of these broadly contending constructions of social space as conceived (planned), lived (experienced) and perceived (imagined) places. Here, the different experiences of beach environments through a recurring practical engagement with stewardship activities is contrasted with the leisure focused aspirations of second home ownership. Also through Lefebvre, we can link the rhythms of Kūaotunu's most developed rural beach settlements as particularly subject to the urbane rhythms of capitalist logics – manifest in the filtering demographics of second home ownership and retirement rhythms. The relative affluence afforded to contemporary home ownership within Kūaotunu's beach communities prescribes a relatively narrow subset of the general population, which is contrasted further with enclaves of indigenous *Māori*, such as NHWT at Whangapoua. This hierarchy is physically apparent in the pronounced gradient of 'statement' holiday homes flanking the immediate beachfront, with more modest beach residences extending back towards the foothills of Whangapoua - occupied by descendants of Ngāti Huarere ki Whangapoua. And while membership of ECGs rarely involves beachfront property owners (nor local *iwi*) participation otherwise revolves around the rhythms of retirement that are themselves a product of capitalist lifestyles.

The distinction between the relative agencies and interests of TCDC and local self-organised ECGs are also somewhat blurred in the context of coastal restoration activities at Kūaotunu involving Coastcare. By actively supporting coastal restoration activities alongside local ECGs, TCDC appears inherently conflicted in this mediating role while continuing its regulatory role in consenting coastal development. Adding to this rural place dynamic are the more-than-human agencies of the coastal environment itself, being powerfully manifest in the rhythms of coastal processes shaping human interactions in and over time as much as being shaped by them. In addition to the localised impacts of single seasonal storm events on the Kūaotunu Peninsula coastline, the relative

distribution of sand through the cycling rhythms of coastal processes differs for each of its beaches over extended periods of time – including in some cases in a net loss of beach extents.

A resulting diversity of ECGs, with ranging conservation agendas and being variously aligned with the conservation activities of local government, including TCDC, WRC and DoC are uniquely representative of their resident beach communities on the Kūaotunu Peninsula. Alongside Coastcare, most of Kūaotunu's ECGs have emerged relatively recently in response to changing views on conservation in the context of an evolving consciousness of processes of social-environmental change on the Coromandel and beyond. As such, they are seen to define critical junctures in the extended 'seasonal timelines' of each of Kūaotunu's beach settlements and the relative balance of human-environment interactions and associated rhythms of seasonal knowledges contained therein.

In Summary:

- A multiplicity of intersecting social-biophysical rhythms extending across (and within) different dimensions provide a temporal patterning to contemporary understandings of beach settlements as uniquely dynamic places in process.
- The practical basis of social engagements with different beach environments is foundational to different perceptions/understandings of seasonality, while concurrently contributing to the human-environmental rhythms of place. At Kūaotunu this is exemplified in the contending temporalities of organised environmental conservation stewardship initiatives with the local economies of seasonal tourism and second home ownership.
- Local conservation activities are premised on a reciprocity in human-environmental relations involving a routinised practical attunement to the inherent rhythms of local SES and requiring flexible modes of stewardship. This is contrasted with the prescriptive resource management responsibilities of local government, alongside the conflicts contributed by the competing interests of seasonal tourism and second home ownership with coastal conservation on the Kūaotunu Peninsula.

6.4 Acclimatising with Change

Question: b) In what ways is seasonal variability practically experienced and accommodated by organised groups in the context of broader patterns of social-environmental change?

As embodiments of human-environmental relations, subjectivity in the social construction of seasons can account for alternative understandings of the broader influences of social-environmental change within diversified coastal communities on the Kūaotunu Peninsula, alongside their effective response. Beyond the entrenched patterns of seasonality, by which Kūaotunu is more widely inhabited and understood as a key Coromandel holiday destination, lie dynamic assemblages of social-environmental rhythms that converge in each of its beach catchments over the course of a year and from one year to the next. With seasonal patterns reflecting the dynamism of human-environmental relations over time, there are shared perceptions of (and expectations for) change amongst participants of Kūaotunu's ECGs.

Experienced locally within the 'everyday' dynamics of human-environment relations in communities of place, many of these social-environmental rhythms also extend across space and time into broadly scalar systems, including that of global climates.

In the context of changing climates, temporality is seen as fundamental to both discerning and responding to local manifestations of social-environmental change within Kūaotunu's coastal environments, through the dynamic configurations of human-environment relations and the timing and nature of activities in which they are (and have previously been) engaged. Temporally manifest as both recurrent and incremental trajectories over a range of scales, the following section sets out the relative perceptions of social-environmental change and the organised responses of participant groups in the context of changing seasons and climates.

6.4.1 ***Contextualising Change***

As informal grassroots environmental conservation organisations have formed in direct response to transpiring local environmental issues on the Kūaotunu Peninsula, they have become temporally and spatially orientated to current conditions, even while being indirectly informed by past peoples, places, practices and events through cultural inscriptions. The inhabitants of Kūaotunu's contemporary beach settlements are variously confronted with local scenarios of (socially-induced) imbalances in human-environment relations/systems and associated timescapes. Typically inspired by a key leader or combination of charismatic 'champions' within established social networks, Kūaotunu's ECGs are self-organising through co-ordinations of activities to jointly defined issues. Here, a shared sense of place and associated values appear to contribute to the 'autogestion' of ECGs, while concurrently fostering a communal dynamic, as specifically observed in the evolution of the KDCG during the course of my research.

The inherent flexibility of situated informal groups to cohere and self-organise around emerging issues of concern is a key attribute in practically confronting local manifestations of social-environmental change at Kūaotunu. In most cases, the genesis of Kuaoutunu's ECGs have come about through responding to a particular environmental 'trigger' event or the escalation of an issue towards a critical threshold. Once established, the routine activities of Kūaotunu's local ECGs can be seen to facilitate increased environmental monitoring from which to tailor their ongoing activities to further change, in what may be considered an inherently adaptive cycle.

The seasonality of Kūaotunu's local ECGs are clearly reflected in the seasonal organisation of their practices. With common conservation activities such as planting, weed and pest control largely organised around the seasonal lifecycles of plants and animals, participants must then apprehend a multiplicity of cycles and rhythms. The variable intersections of these cycles provide key temporal reference points with which to gauge both interannual variability or long-term change at alternating frequencies and periodicities (Staupe-Delgado et al. 2024). Key to this is seeing seasonal patterns as *nested within* longer time arcs, while seasonal cycles themselves accommodate shorter timescales. This dynamic relation between seasons as constantly co-constituted at daily and inter-annual time scales is one way of thinking about seasonal variability; the ways seasons repeat with difference. Notable examples of cycles occurring outside of

'standard' meteorological seasonalities include the ENSO climate cycle, or the long-term reproductive cycles of certain native tree species observed by participants at Kūaotunu. And since no two seasons are experienced exactly the same from one year to the next, the practical activities of individual groups (whether carried out weekly, fortnightly or monthly) inevitably involve ongoing adaptations to variable patterns, alongside incrementally changing social-environmental conditions over the longer-term. The recurrent experience of seasons therefore provides an important framework for participants orienting to broader processes of change, alongside opportunities to adjust, adapt or transform their practices.

Involving intersecting rhythms of sea, sand, weather, tides, plants and people, coastal restoration is specifically an inherently adaptive process. A multiplicity of rhythms are in constant co-adjustment or co-ordination in relation to each other, working towards attunement. Seasonal variability begins in the quantity and viability of native seed sourced by volunteers from native dune plants over the summer months. With relatively narrow windows of opportunity within which to collect viable seed from Kūaotunu's populated summer beaches, these are further compromised by inclement weather, with winds releasing both ripe and unripe seeds into existing dunes and rain making them susceptible to rot. The encroachment of beachfront developments into active dune systems have likewise impacted the transmission of viable seed. Summer temperatures then dictate the timing of seed propagation and the critical incubation of seedlings for planting the following winter, while nursery conditions are continuously regulated by responsive watering. A warming trend in ambient temperatures, in conjunction with an increased demand for native dune restoration plants, results in increased pressures on nurseries, involving complex logistics in their timed dispatch and distribution of seedlings to scheduled planting events.

A winter storm event can either delay or displace recent plantings, while summer storms are likely to impact both the availability and viability of native dune plant seeds for the following year. Significant storm events, such as the back-to-back cyclones of Gabrielle and ex-Hale in early 2023, uprooted existing dune plants at the same time as delaying the onset of the subsequent planting season, with widespread downstream effects across regional restoration projects. This included in the depleted stocks of much needed dune plants for the current (2024) season as a direct result of compromised supplies of seed from 2023 (WRC - Coastcare). For some participants, these frustrations are an accepted part of natural coastal cycles, involving planning with uncertainty.

And as restorers, we had to take a stand at one stage, and say, well what do we do when we lose 70% of our plants? And in the end, we decided we've just got to go out there and plant them again. So that's the approach. You can't let that one event prevent you from trying to achieve what you're trying to achieve. People say 'can you guarantee that the plants will stay there?' Well no, we can't because there might be a storm next week – Kit (MBET*).*

Other factors contribute to the complex patterns of seasonality affecting and effected by conservation work, their variability and long term change. These factors include an invasion of dune habitat by competitive weeds or the unforeseen spread of smuts within native dune plants, creating additional challenges in dune restoration from year to year. Coastal wetlands are likewise

subject to seasonal variability as a result of hydroclimatic variables affecting the critical timing and volumes of water flow and associated aquatic wildlife, in conjunction with the seasonal activities of adjacent forest and farm landowners. The cyclical harvesting of commercial pine trees pose an ongoing threat of sedimentation to both the Otama wetland and wider Whangapoua harbour alongside residential development. With its immediate catchment forming part of the Matarangi Bluff Scenic reserve, the Rings Beach Wetland benefits from a relatively contained management system. The wetland is less vulnerable to upstream land uses as a result and as reflected in the reduced experience of 'seasonality' by routine trappers from the RBWG. The ebbs and flows of active volunteer members through Kūaotunu's various ECGs are an additional challenge to their operations over the course of a year, alongside variability in access to annual funding rounds and other key resources.

Ultimately, a concentrated swell in visitor numbers to Kūaotunu over any one summer is associated with an increased pressure on the local environment, with seasonally nesting wetland and shorebirds being particularly vulnerable. And while nature was given a reprieve during the autumn/spring COVID lockdowns of 2020/21, organised restoration maintenance operations were compromised - in spite of most non-permanent residents basing themselves at Kūaotunu during this time. The local Kūaotunu economy has also been adversely impacted by reduced visitor numbers throughout the pandemic and subsequently with road closures following Gabrielle-Hale. In fact, both permanent and part-time residents and visitors were compromised by Gabrielle-Hale for almost an entire year until State Highway 25a was able to reopen in December 2023.

For representatives of local government organisations, including TCDC and WRC alongside DoC, their practical awareness of seasonal rhythms and cycles are invariably limited to the intermittent monitoring of key phenomenon by potentially rotating staff in conjunction with emergency response management. This information feeds into the modelled scenarios of change that have formed the basis of the SMP project and the broader imperative for Coastcare on the Coromandel.

*6.4.2 **Seasonal Adaptations***

In contending intrinsic variabilities within their seasonal operations from year to year, Kūaotunu's ECGs display an inherent capacity to adapt. Distinguished from the strategic adaptations pursued by TCDC in their SMP project, I suggest here that a habitual process of ***seasonal acclimatisation*** may be attributed to the adaptive activities of local ECGs, while tendering key contributions to local SES resilience from the ground up.

As a biological phenomenon, acclimatisation refers to the physiological adaptations of organisms to changes in climatic variables, such as temperature (Dunlap, 1997; Frisancho, 1993). Contrasted with inter-generational evolutionary adaptations, acclimatisation occurs within relatively short timeframes over the lifetime of an organism, while maintaining its ability to revert back to former states. Social acclimatisation can also refer to the planned integration of 'outsiders' into new situations and cultures, including on a temporary basis, while maintaining the option to retreat. Many of the European pest animals that plague ANZ today were deliberately introduced under an 'Acclimatisation Society' movement by English colonists in the mid-late 1800's, although

conservationists have been struggling to reverse their impacts on native wildlife ever since (Dunlap, 1997; Ritvo, 2018).

Here, I suggest an alternative (hybrid) take on acclimatisation, relative to the incremental adjustments in the seasonal practices of local environmental initiatives observed at Kūaotunu in responding to locally emerging manifestations of social-environmental change. Within this framing, adaptation is reconceived as an ongoing participatory process, involving sustainable transitions through iterative adjustments in everyday practices, as opposed to reacting to the isolated impacts of social-environmental change either before or after they occur (Gümüsay etal. 2020). As an ongoing process, this take on acclimatisation depends on an accumulated awareness of the intersecting rhythms and dynamic relations that are uniquely constitutive of Kūaotunu's local SESs, by which ECGs may detect and respond continuously and appropriately with change. Here, seasonal cycles are specifically relevant in effectively requiring participants to entrain to transitions between seasons as well as from one year to the next, with the potential to see local manifestations of change in relation to globally scaled phenomena. Rather than framing social adaptations as responding to environmental phenomena, ongoing processes of acclimatisation involve practitioners making incremental adjustments in their routine activities in order to accommodate changing circumstances as they evolve (Krause, 2015). Following a Lefebvrian conception of difference emerging through rhythms, we can then appreciate the making and remaking of seasonal conservation practices in this way, while concurrently referencing the potential of practice theories to bring about broader patterns of social change (Shove, 2010; 2022).

With acclimatisation so-framed as a cyclical process of ongoing adaptations to changing circumstances, it is distinguished somewhat from the stepwise continuum of future-focused trajectories that are inherent within the strategic DAPP approach adopted by TCDC in its SMP project. Sharing traits with a nested panarchy system of social-ecological adaptation, processes of ongoing acclimatisation remain temporally preoccupied with practically adjusting to material changes within the present, as they occur, as opposed to strategically making plans to adapt to forecasted change in the future. Although practically implemented at the local level, we can draw on the panarchy concept of adaptation to appreciate how adjustments at the micro-scale can cumulatively extend their impact in time and space through interconnections between nested cross-scalar systems and cycles; And relatedly, in the interconnected configurations of nexuses of conservation practices to achieve broader scales and orders of social change. As a dynamic process, seasonal acclimatisation is inscribed by past events and practices, as much as accruing systemic resilience to future scenarios.

Seasonal acclimatisations are specifically manifest from within the self-organised activities of Kūaotunu's ECGs, whose grassroot conservation practices involve continuous adjustments to changes in operating conditions both within and between years. In organisation studies, such incremental adjustments are attributed to the relative flexibility of small coherent groups to effect continuous change at micro-scales (Termeer et al., 2017). Importantly, in maintaining a fundamental open-ended flexibility in their core operations, the embodied practices of locally-

scaled informal organisations are thereby able to respond apace with dynamic changes in their operational environments that may otherwise go overlooked or unheeded (Termeer et al., 2017).

From amongst participating ECGs at Kūaotunu, the variable frequencies and timings of their ongoing weed and pest control operations serve as common examples of practices that are being continuously entrained to locally changing circumstances. At Otama, this includes uplifting animal pest traps in anticipation of rising water levels within the wetland, or setting up new regimes of beach trapping timed to the seasonal pulses of animal pests and visiting tourists. Coastal plantings respond more specifically to the seasonal patterns of sand migration resulting from wave activity for individual beaches, as are wetland plantings to rising and falling water levels. Weed maintenance is continuous: 'We go around and deal with the little bits. So the work doesn't stop…that's going to be ongoing' – Jill (ORG). And although beach profiles are externally monitored by WRC coastal scientists, this is on a more limited basis than the daily observations of fluctuating sand movement reported by several participants, who observe: 'Sand comes and goes, the movement is phenomenal from one day to the next. Almost every time I come the beach is different' Sam (ORG). By their habitual surveillance of residential beach habitats, ECGs are thereby exclusively poised to detect, interpret, calibrate and respond to ongoing change – as it unfolds.

Alternatively recognised as the 'incremental adaptations' implicit in sustaining the functioning of existing SESs under changing climates, the relative lethargies of incremental adaptations (involving ongoing adjustments to existing practices) have been widely dismissed in favour of more radically scaled 'higher order' transformative interventions, including by the IPCC (Wise et al., 2014, from Termeer, et al., 2018). And since this perspective of incremental change relates to the processual view of organisational persistence (Weick, 2019), it does not appear to support a view of transformation. But a cohort of scholars, (including Burnes, Termeer, Dewulf, Biesbroek, Vermaak, Weik & Quinn) maintain a focus on the fundamental role of practical incremental adjustments, amounting to 'small wins' in micro-scaled organisational operations as potentially contributing towards long-term processes of societal level change.

While sharing an orientation with social practice ontologies, in the primacy given to social practices to bring about societal level change, the micro-scaled incremental adaptations attributed to the acclimatisations observed from within participating ECGs are not in themselves transformative. Indeed, some participants saw their conservation activities as simply 'coping' with, instead of adapting to ongoing change. Rather, it is the potential purchase of these ongoing practices, in making small scale adjustments to incremental change from within the specific contexts of locally invested conservation groups, to gain wider traction within social fields (and their governance orders) over time.

6.4.3 ***Local Revolutions***

Consistent with Lefebvrian theories on social 'autogestion', processes of continuous adjustment amongst people, organisations and their networks – their acclimatisation - can provide openings towards more revolutionary change (Termeer et al., 2017). At Kūaotunu, this is particularly well illustrated through the interim voluntary scallop *rāhu*i imposed by Ngāti Hei in collaboration with

local ratepayer groups at Opito Bay in 2020. Precipitated by a critical decline in scallop numbers attributed to commercial dredging operations, local monitoring was based on the combined knowledges of deteriorating recreational fishing quota takes over a number of seasons, alongside the customary cultural harvesting practices of Ngāti Hei. Confirmed by locally commissioned marine surveys, scallop stocks had been previously surveyed in 2012 – almost 10 years prior by the Ministry (MPI). The political connections of the Opito Bay ratepayers and their combined lobbying efforts were effective in parliament conceding a ministerial ban on commercial dredging throughout the wider Mercury Bay area in 2021. As an interim measure, the *rāhui* provided a local pathway towards this strategic policy intervention. While it remains to be seen whether scallop stocks have been exploited beyond recovery at Mercury Bay (and the long-term effects on the wider ecosystem), the customary intervention launched an effective challenge to the efficacy and orders of existing resource management systems from the ground up.

The flexibility afforded to local ECGs additionally provides for a greater scope of activities and experimentation to be undertaken (including for routine weed and animal pest control operations) while playing to their unique skillsets and social networks in applications for funding, management co-ordination and negotiations with key stakeholders. The scallop ban at Opito Bay played to the strengths of community stakeholders, with Ngāti Hei able to impose the interim *rāhui*, while committee members of local ratepayers associations concurrently lobbied parliament (utilising existing professional networks) for a permanent ban. While instigated by OBRA, support for the ban on commercial dredging for scallops was rallied from across the Kūaotunu Peninsula, based on recreational monitoring of declining scallop stocks from other beaches, including at Kūaotunu and Matarangi. Clearly a successful outcome for a spontaneous collaboration between local community groups on the Kūaotunu Peninsula, local ECGs are not typically orientated towards outcomes as part of their inherently open-ended routine practices.

While exhibiting many of the aspired attributes of adaptive governance - alongside a demonstrated ability to collaborate and negotiate across organisations and institutions - many of Kūaotunu's ECGs have alternatively displayed a resistance to externally planned and co-ordinated interventions. And indeed, scholars have speculated that in some circumstances planned interventions may well be disruptive of ongoing adaptive processes (Termeer et al., 2017; Weick & Quinn, 1999). Returning to social practice theories, we can also draw parallel insights from the resistance of informally networked communities of practice to being externally managed.

This was effectively demonstrated by the Environmental *Hui* hosted at Kūaotunu by local ratepayers associations in May 2022, in collaboration with DoC and Ngāti Hei, to pitch a proposal for the Kūaotunu Peninsula to become an ecologically managed 'Biosphere Hub'. While the (inaugural) *hui* was well attended by representatives from ECGs, there was a general resistance to the biosphere proposal, which was apparently perceived as an external 'interference' with the independent activities of existing groups. On one hand, the groups were resistant to being externally managed under an umbrella initiative, they were otherwise openly prepared to collaborate with one another by attending. The '*hui*' format created a valuable opportunity for groups to 'present' their work, while learning about the activities of others – even though there

was not a tangible 'outcome' for the biosphere project directly. Alongside common frustrations with the bureaucracies of statutory agencies, the primacy attributed to resident environmental conservation initiatives and the customary knowledges with which they are uniquely associated, was summed up by Beau in the wake of the *hui*, 'What was important was that everybody has acquired a lot of specific knowledge of what we're doing…So you cannot put everybody in one bay' – Beau (ORG). For some participants, this territorial issue equally applies to externally co-ordinated Coastcare activities.

Here, the adaptive capacities of grassroot environmental initiatives differ from externally managed interventions in several key ways. Fundamentally, the operational flexibility afforded to grassroot initiatives enables resident members to regularly participate in activities based on shared or individually appropriate timings and frequencies over the course of a year. At Kūaotunu, the flexibility privileged to a predominantly retired membership has greatly enhanced the operational flexibility of its local ECGs. Lone trappers were specifically able to schedule their traplines around the best time of day and day of the week to suit their personal schedules, while also allowing flexibility to work in with the weather, holidays and other commitments. This is contrasted with the externally co-ordinated activities of Coastcare on the Coromandel, based on schedules of (less frequent) dune restoration activities distributed across beach settlements and involving multiple parties. With many of these events strategically planned around key social calendars (such as the Kings Birthday weekend) the opportunity for some residents to practically acclimatise to incremental change is compromised by the limited frequency of their engagement and associated knowledges of seasonal rhythms. Offering a further distinction between the reciprocal stewardship motives of informal ECGs and those of strategically planned interventions, Coastcare activities are intrinsically tied to the protection of coastal settlements by TCDC as much as they are to sustaining reciprocal coastal ecological objectives. This alternative orientation of practices and their resulting knowledges are likely to generate different responses to change.

The back-to-back storm events of ex-cyclone Hale and Gabrielle in early 2023, although devastating, were not considered isolated 'events' by many resident participants and therefore not entirely unexpected. In the context of ongoing systems of change, these extreme events were alternatively understood by some participants as key markers or waypoints of dynamic transitions within global climate systems, in which summer cyclones are known to affect the Coromandel and the Kūaotunu Peninsula specifically. In this way, participants are able to connect their local experiences of environmental phenomenon with understandings of globally-scaled systems and processes of change that go beyond abstracted constructs of Climate Change. As part of an ongoing process of acclimatisation, the 'opportunity' for organisations to learn from and transition through patterns of 'extreme' events, both through adjustments in their current practices, alongside an anticipation of future scenarios, involves consciously reflecting on the experience (Berkes & Ross, 2016). To the extent that Climate Change was not flagged as a key preoccupation of most ECGs in narrative conversations, a general awareness of globally scaled system change was effectively given meaning to participants through direct local experiences of variability and their relative capacities to respond in the 'here and now'.

Uniquely attributed with the skill sets of a situationally 'thrown together' local residential membership, the informal voluntary basis of Kūaotunu's grassroot environmental initiatives tend to be as innovative as they are passionate in their conservation stewardship pursuits. Bound in ongoing negotiations with third party stakeholders and (funding) providers, these local groups are adept at balancing resource deficits with operational efficiencies, while maintaining future direction through their current activities. But in spite of the camaraderie generated through local volunteer environmental stewardship initiatives, there is a parallel vulnerability in maintaining the skillset of a core membership and not least in its strategic leadership. Several groups experienced changes in key leadership positions during the course of my research. Kūaotunu's grassroot environmental initiatives are operating under conditions of great uncertainty as a result. In the ambiguous context of dynamic social-environmental change, the inherent capacity of these resident groups to consolidate or adapt their existing stewardship practices is therefore considered a key manifestation of local SES resilience. Within Kūaotunu's smaller settlements at least, the benefits of this resilience may also be extend across their resident community.

Based on their immersive practical attunement to the idiosyncratic rhythms of beach settlements, grassroot ECGs are otherwise uniquely privileged with relative knowledges of emerging change that provide the foundation to their ongoing stewardship processes of acclimatisation and associated resilience. Here, accruing knowledges of complex seasonal rhythms are seen to provide compound references to calibrating social-environmental change in and over time. And since ongoing processes of acclimatisation might offer important insights into broader systems of change, we turn to consider how these exclusive forms of localised seasonal knowledges may be alternatively accessed and accommodated within democratic planning for community-based adaptations to changing climates.

In Summary:

- At Kūaotunu, intersecting seasonal rhythms, including of sand, sea, weather, tides, plants and people, offer local orientations to broader processes of social-environmental change, alongside the appropriately timed adjustments, adaptations or transitions in conservation practices they necessitate from within variable social-ecological contexts.
- Beyond routine adjustments to ecological cycles, the practical stewardship operations of resident ECGs are additionally subject to fluxes in funding rounds and volunteer recruitment, as well as in the relative timings and numbers of tourists and visitors to Kūaotunu. In this way, local ECGs are inherently adaptive to changes experienced within SESs through their ongoing stewardship practices - construed here as a form of *acclimatisation* involving the making and remaking of core practices.
- Here, seasonal frameworks are seen to provide key references to navigating broader social-environmental change by linking local practical experiences with awareness of global systems and processes.

- The flexibility attributed to self-organised grassroots conservation initiatives to practically adapt and acclimatise to changing conditions, as they arise within local SES, is contrasted with the strategically planned and/or reactive responses typically associated with the regulating styles of statutory environmental governance.

- Through a panarchy concept of scalar adaptive systems, the ongoing acclimatisations of grassroot ECGs to locally manifest social-environmental change is seen as potentially formative to longer-term transitions across broader scales of SESs and their associated governance levels. Particularly in the context of needing to know more about the local effects of changing climates in order to effect appropriate adaptation responses at the beach community level, an authentic engagement with the practical wisdoms of grassroot coastal conservation initiatives is seen as imperative.

6.5 Governing with Temporality

Question: c) To what extent do local governance agendas reflect communal understandings of changing seasons and climatic variability?

Through the shared understandings and meanings that distinguish one organisation from another, different perceptions of change - including that of changing seasons - determine how responses are practically governed, along with their relative timings. In the context of changing climates, the shared values and logics giving definition to localised forms of environmental stewardship at Kūaotunu and the temporalities of its associated governance are particularly relevant. Here, a distinction may be drawn between the transient governance arrangements of informal (grassroots) conservation initiatives and established (authoritative) resource management organisations in both their understandings of change and the social-political agendas that frame 'appropriate' actions. Further distinction may be drawn with indigenous governance and worldviews associated with *Te Ao Māori* which centres and elevates reciprocal human-environment relations in and over time.

In the context of the adaptation planning initiative of the SMP project by TCDC and its associated investment in local Coastcare activities, I consider below the relative interactions of governance roles, through Kūaotunu's organisational-institutional arrangements across time and space. How evolutions of the competing interests and power geometries involved in governance arrangements might then shape community resilience at the beach community level is considered in turn.

6.5.1 ***Customary Stewardship Iterations***

Although most ECGs inhabiting the Kūaotunu Peninsula have formed within the last 70 years - consistent with the residential tenancies of its beach settlements - they share elements of their stewardship ethos with an intergenerational customary *Māori Kaitiakitanga* extending some 700 years back in ANZ's history. Not least, this includes in the temporal orientation of ECGs to a multiplicity of rhythmic assemblages extending beyond the present coastal environments of

Kūaotunu's beach settlements. Here, experiences from relatively recent pasts provide the foundation to practices performed within the present, with an underlying ethic of caretaking the wider environment for future generations. The holistic framing of *Mātauranga Māori* likewise sees activities as performed within the present but informed by past learnings, while simultaneously providing for future generations.

Kia whakatōmuri te haere whakamua

I walk backwards into the future with my eyes fixed on my past[43].

In this research, these customary principles of *Mātauranga Māori* are maintained within the descendants of Ngāti Huarere through the work of the NHWT at Whangapoua. The environmental conservation movement that has subsequently risen out of colonial exploits in ANZ is likewise aligned with attributing value to the past (Logan, 2016). In the context of contemporary social-environmental change, including rapidly changing climates, the imperatives for both conservation and *Kaitiakitanga* are increased. Accordingly, most of Kūaotunu's ECGs have formed in response to issues arising from changing conditions within the present, and specifically those that critically threaten to undermine the balancing dynamics of its existing SES. While living in the context of ongoing change within their current environments, the conservation ethos and imaginaries of Kūaotunu's ECGs are otherwise premised on returning to present or prior future states as 'anticipated future presents' (Barbehön, 2022, p. 304). This is contrasted with modelled extrapolations of future conditions that form the basis of externalised adaptation planning for climate change at the district level. Concurrently, the ongoing adaptations involved in the performance of conservation practices by ECGs, including on a seasonal basis and from year to year, are progressively contributing resilience to local SES through processes of acclimatisation. Indirectly then, the current stewardship activities of local ECGs are potentially associated with building future resilience into local SES within a broader context of changing climates. Yet the imperative of local environmental stewardship initiatives is driven by immediate experiences of change by participants, alongside speculations as to their likely social causes and catalysts. Here, the social divisions within many of Kūaotunu's beach settlements, and associated SESs, are effectively highlighted through contrasting codes of environmental stewardship and related framings of changing climates.

As voluntary organisations reliant on (often) generous donations of participants' time, the practical operations of Kūaotunu's informal environmental initiatives are also constrained by limited access to material resources. The activity scope of most participating groups were thus defined by their respective budgets, as well as by their volunteer recruitment, demanding additional volunteer time to seek out and apply for external sources of funding to cover the material requirements of their core practical operations. 'We have to fundraise too, so that also takes time to put together' – Beau (ORG). It is because of these limitations on their operations,

[43] This whakataukī or 'proverb' speaks to Māori perspectives of time, where the past, the present and the future are viewed as intertwined, and life as a continuous cosmic process (Rameka, 2016).

that ECGs are arguably unable to move beyond their current 'coping' strategies of living with the variability of the present – whereby resilience is predominantly associated with maintaining the status quo (Barbehön, 2022). While on the one hand the relative focus of Kūaotunu's ECGs is associated with detailed knowledges of current SESs, a lack of resources generally inhibits the translation of this knowledge into planning too far ahead into the future. A limited investment in informal local ECGs by formal resource governing agencies can also critically undermine their legitimacy within the local community (Helfgott, 2018; Wells & Anasti, 2020). As well as jeopardising potential avenues of funding available to ECGs, their marginalisation by government organisations is equally undermining of the collaborative relationships on which democratic community planning for adaptation critically depends.

Under conditions of diminished powers, we might consider what drives the latent agency of the continued operations of Kūaotunu's ECGs. Returning to Institutional Logics, I noted a shared and guiding logic across conservation organisations, groups and individuals, that frames stewardship activities on Kūaotunu. Here, a dynamic interplay between coastal commons (as shared resources) and communal stewardship logics (involving communities of practice) appears to contribute to the emergence, organisation and persistence of ECGs, and their strategies for responding to local environmental variability and change. As noted previously, elements of *Mātauranga Māori* worldviews and its legacies within local landscapes are also frequently recognised across ECGs. This was specifically apparent in the recent collaborations between ECGs, ratepayers and indigenous *iwi* at Opito Bay to address depleted scallop stocks, and by extension, redress imbalances in the coastal SES. Likewise, Ngāti Huarere continue to advocate for the environmental protection of Whangapoua Harbour by developing their own forms of monitoring and contemporary stewardship, involving relationship building with the disparate land ownership of the wider catchment. In recognising stewardship as a dynamic transitional process, Mathevet and colleagues conceive 'biocultural' pathways as steering local social-ecological adaptations through variations of customary care (Mathevet et al., 2018).

Accordingly, diverse manifestations of stewardship logics are derived from the alternative interests, values and philosophical approaches to conservation within Kūaotunu's pocketed communities. These differences were clearly on display at the local Environmental *Hui* organised at Kūaotunu in 2021, alongside a resistance by most groups to being pooled within the proposed 'Biosphere Hub'. And at the same time, a set of perceived, shared threats of gold mining, over-fishing and over development has provided an impetus for networking and collaboration between ECGs on Kūaotunu over the years. The inherent flexibility of these groups to form and reform around environmental issues as they manifest is equally reflected in their ability to informally cohere and collaborate around shared concerns. Since environmental stewardship is additionally motivated by the social belonging fostered through network connectivity (Bennett et al., , 2018; Bramston et al., 2011) the practical collaborations between ECGs, involving learning through the sharing of combined knowledges, are adaptive traits that may make a critical contribution towards the social-ecological resilience of the wider peninsula community.

Typically running counter to the dominant capitalist logics and constituting rhythms of western society, a logic of environmental stewardship is liable to suppression within many contemporary organisations (Dahlmann & Grosvold, 2017). So that, when retirees abandon former working lifestyles to inhabit Kūaotunu's rural beach settlements permanently, they are given the opportunity to 'reconnect' with environmental cycles and rhythms through the immersive practices of local conservation work and social interaction. This alternative timekeeping of retirement and recreational rhythms with natures cycles is distinguished locally as 'Coromandel Time'. But in fostering reciprocal connections between society and physical environments, a logic of environmental stewardship is highly contextual and therefore subject to dynamic change (Mathevet et al., 2018; Gümüsay et al., 2020).

Where capitalist market logics have taken hold at Kūaotunu – e.g. through the ongoing residential development of beaches for second-home ownership - human-environment reciprocity has been compromised by 'territorialising rhythms' (Andrea Mubi & Mattias, 2018; Brighenti & Kärrholm, 2018). This has seen repeated Coastcare efforts grapple with legitimacy within the wider home-ownership of Matarangi, while dune restoration is privately pursued to protect the golf course. In such cases, even a strong organisational lead and stewardship logic may struggle to overcome the politically entrenched capitalist ethos of beachfront property ownership (Dahlmann & Grosvold, 2017; Wells & Anasti, 2020). The limited collaborations reported between local Coastcare groups on the Coromandel's east coast beaches (other than as co-ordinated through TCDC or WRC) also signals differences between the stewardship functions of Council-co-ordinated Coastcare activities with grassroot ECGs. The customary stewardship activities of local *iwi*, such as NHWT, have also remained largely independent of local environmental conservation groups.

When we contrast the motives and capacities for environmental stewardship between local volunteer initiatives and TCDC-driven operations, there is a clear distinction between their underlying ideologies. With Mathevet et al. (2018) identifying a primary division between 'reformist' and 'radical' forms of stewardship, we can apply these categories to the formally mandated extrinsic operations of local government and the intrinsic and informal operations of grassroot custodians. In terms of institutional logics, we can likewise distinguish between a pro-environmental logic associated with addressing societal level environmental change, through externally managed corporate interventions, and an embedded logic of care privileged to collectives of Kūaotunu's local inhabitants in the context of its constituting political, socio-cultural and ecological dynamics (Puig de la Bellacasa, 2015 from Gesing, 2021). TCDC-initiated local Coastcare groups operate somewhere between the two, in being practically aligned with resident ECGs but operationally steered towards TCDC's agendas.

6.5.2 Statutory Planning Interventions

Local Councils in ANZ are additionally subject to contending logics reflective of their multifaceted jurisdictional roles, not least in balancing spatial planning and development with resource management and environmental stewardship. In this capacity, TCDC is invariably working within a range of temporal settings, notably including in the reconciliation of budget and election cycles

alongside the linear trajectories of strategic policy planning. Here, the timeframes for reviewing and operationalising Council's strategic planning frameworks – 10-years for its Long-term project planning and potentially longer for iterations of District Plan policies – appear incompatible with planning for adaptation to escalating scenarios of largely unknown altered future states. And while ostensibly informed by an environmental stewardship logic, the governance of natural resources by territorial authorities is critically dictated by revolving national and local politics foreshadowed by corporate logics. Although formally centred around a democratic commons logic of the 'state', the business development operations of Local Councils are ultimately influenced by prevalent market logics and associated fiscal parameters that are equally subject to both annual cycles and ongoing volatility.

As a territorial authority, TCDC are formally required to address future climate-related change within planning policies, alongside their core 'business as usual' operations (Schneider & Glavovic, 2022). This potential temporal conflict of agendas has been highlighted within the long-term adaptive pathways (AP) planning under the SMP initiative, in which the ongoing development of coastal settlements on several of the Coromandel's east coast beaches is actively contributing to their erosion potential by undermining natural dune processes. With dune restoration now recognised as a first line of defence against coastal erosion and rising sea levels for the majority of Kūaotunu's beaches under the SMP project, the renewed imperative for coastal restoration measures creates a heightened challenge for TCDC.

While ostensibly leading the way in promoting and facilitating community-based dune restoration as an interim nature-based defence against active coastal erosion within Coromandel's beach settlements since 2018, the Coastcare activities of TCDC maintain an additional focus on protecting coastal settlements and their associated public infrastructures as much as on ecological restoration. With beaches concurrently providing noteworthy assets as 'strategic natures' to the district in terms of revenue generated through tourism and second-home ownership, the ecological framings of their restoration, through affiliations of TCDC with Coastcare, might be construed as specious (Gesing, 2021). But as a bridging initiative between coastal communities and TCDC, Coastcare operates as an outlier of existing governance systems, limited by both budget and labour resources in its practical endeavours to keep apace with the accelerating dynamism of coastal processes. Working within TCDC's statutory timekeeping and governance agendas, Coastcare employees are typically residents of Coromandel's east coast beaches and therefore directly participant in the lived rhythms of coastal processes, while being acutely aware of relational conflicts involved in local politics. This includes in perceived limitations to TCDC's support to many of Kūaotunu's grassroot ECGs involved in coastal restoration - a number of whom also face entrenched opposition from second home owners. In conjunction with their ongoing consenting of coastal developments, the 'stewardship' functions of TCDC are consequently called into question by many resident environmental initiatives on the Kūaotunu Peninsula.

Concurrently, the strategic development of the SMP project, by overseas environmental engineering consultants, has been couched in terms of protecting local infrastructural assets and civil safety, as much as community resilience and well-being. Here, Robins (2004) notes that policy

makers will often opt for technocratic solutions focused on aspects of the biophysical environment as opposed to addressing themselves to social impacts. In the case of the SMP project, an objective technological focus on climate and coastal processes is borne out of its Coastal Hazard Management framing by TCDC and consistent with ministerial guidelines (Craddock-Henry etal, 2023). Accordingly, the proposed development of engineered sea defences have been prioritised as projects under the SMP initiative in order to protect the largest population centres of Thames and Whitianga.

With infrastructural asset management agendas steering the SMP initiative, its priority projects are strongly orientated towards TCDC's present operational responsibilities, while coastal settlements on the east coast are 'given time' through dune restoration measures that concurrently allow residential development to backfill. In effectively 'projecting' adaptation to coastal hazards into the future for Kūaotunu's rural coastal settlements, the SMP project is seen to progress with the development of engineered sea defences within Coromandel's townships in the present, largely with public support[44].

While TCDC's Coastcare initiative offers an alternative imperative by which to action adaptation to changing coastlines within the present for Kūaotunu's rural beach communities, it is challenged locally where it is neither community led nor supported (Grandin, 2023). And as TCDC are charged with planning for future (climate) change under national directives, they are concurrently constrained by the divisions within their jurisdictional agencies in the present, contributing to the siloing of activities, funding and interests observed today (Reinekoski et. al., 2023). Compounded by ratepayer resistance to accommodating change, local Councils are inherently compelled to confront the future within the political interests of the here and now. As latent stakeholders in local Coastcare activities, as well as administering several public conservation reserves on the Kūaotunu Peninsula, DoC face similar tensions (as well as funding limitations) in practically transitioning their field operations towards future scenarios of change with public support. Many of Kūaotunu's grassroot ECGs have specifically formed in recent years to practically address these local voids of statutory governance within local beach settings. This has provided an alternative avenue to practically engaging local communities with environmental change as well as contributing to social cohesion (as well as division) and resilience through their informal networks. The iterative open-ended adaptive stewardship premise of grassroot ECGs attributes them with unique local knowledge and awareness of change including through monitoring of seasonal rhythms, while potentially contributing locally specific adaptation innovations.

But with Kūaotunu's ECGs already reporting variable levels of support from statutory authorities in their current operations, it is revealing that the development of the SMP initiative - a process ostensibly framed around stakeholder participation - has not deliberately sought out those groups already active in coastal restoration activities – including through Coastcare. This is particularly stark since various forms of restoration activities have been ongoing at Kūaotunu's beaches since

[44] https://thames-coromandelcaps.ireport.royalhaskoningdhv.com/

the 1980's. As such, the suggestion that dune restoration be embraced as a provisional form of coastal adaptation under the SMP project appears somewhat rhetorical. Local *iwi,* whose involvement in coastal governance extends back even further in time, were likewise marginalised in the consultation process. Somewhat surprisingly then, TCDC have won an Local Government award for their SMP project, largely based on the merits of its traditional methods of community engagement. Meanwhile, the focused dune restoration efforts of the KDCG, since being formally incorporated in 2022, have been alternatively recognised by the CRTNZ in their 2024 national awards. Grown out of a local Coastcare collective, the success of this group is at least partly attributed to the facilitating roles provided by TCDC with WRC in their combined efforts to practically engage local communities in coastal adaptation to changing conditions within the present – and should be recognised as such. Like many other ECGs on the Kūaotunu Peninsula, KDCG were not, however, directly engaged in the SMP project process.

*6.5.2 **Timely Governance Interactions***

Despite TCDC being an early adopter of AP planning from amongst Local Government within ANZ (alongside their concerted Coastcare co-ordination efforts) there is already an inherent time-lag established between the strategic planning functions of TCDC and the voluntary stewardship practices of Kūaotunu's local ECGs. Here, fundamental differences in the temporal orientations of grassroot stewardship practices contending the experienced realities of social-environmental change within the present are contrasted with the future focus of TCDC's SMP project based on abstracted knowledges of simulated probabilities. While Council's fast-tracked delivery of the SMP project in the context of a global pandemic appears consistent with an accelerating pace of global environmental change, it is otherwise at odds with the reflective processes of incremental acclimatisations attributed to the more leisurely stewardship practices of ECGs that are intrinsically bound into local understandings of 'Coromandel time'. While challenging the affective recreational pastimes of Kūaotunu's beach settlements, the SMP project is further removed from the reciprocal time and place traditions of *Mātauranga Māori*. But rather than being portrayed as inherent contradictions within Kūaotunu's beach localities, these diverging temporalities are seen here to reflect the current organisational cultures to be accommodated within inclusive adaptation planning processes in the redress of changing climates within the present (Grandin, 2023). The question then becomes: how can climate governance be effectively aligned with the multiplicity of temporal rhythms in which it operates?

While appearing to highlight cyclical versus linear framings of time, alongside their contrasting sources of knowledge, the asymmetries observed in the formalised adaptive responses of Council versus local grassroot stewardship initiatives and that of *Mātauranga Māori* may alternatively be attributed to differences in scale. Here, planning policy iterations are alternatively seen as subscribing to broadly cyclical 'regulatory lifecycles' in (selectively) relating both past and future to the present (Barbehön, 2022). With the stepwise framing of the AP model involving an iterative process of reflection and refinement in adapting to future scenarios of incremental change, it therefore holds a key potential to align grassroot initiatives and their associated temporalities with the strategic planning agendas and timings of territorial authorities. Concurrently seen to be

working in parallel and at odds with each other within Kūaotunu's rural coastal settlements, the opportunity for APs to benefit from the local insights and innovations of grassroot organisations through distributed responsibilities within a strategically enabling and supporting framework remains largely unrealised. And although the potential for collaborative community-based planning has been appropriately recognised in AP models within ministerial guidelines to Local Government in the context of their coastal hazard planning responsibilities, its implementation remains largely ad hoc (Craddock-Henry et al, 2023).

To date, the focus of the district-wide SMP project on technocratic solutions, in locations other than Kūaotunu, is consistent with TCDC's current operations in their coastal hazard management planning domain. Problematically, APs based on projected scenarios of rising sea levels (SLR) and coastal erosion inevitably create a sense of impending loss and associated resistance in many beach residents, which runs counter to fostering community resilience. This is compared with the social and communal benefits associated with voluntary participation in local environmental conservation initiatives that have the potential to actively contribute to both local SES and community resilience. It is on this basis, that Krick (2022) suggests that self-organised advocacy groups should earn a key mandate to represent local views in democratic participatory governance and decision-making. In the case of Kūaotunu's ECGs, the relative depth of their contextual knowledges of processes of social-environmental change, alongside their ongoing practical adaptations, may contribute key innovations to adaptation planning at the community level. (Lockie & Wong, 2018). Critically, while coastal adaptation pathways pre-empt timed responses to social-environmental change once pre-defined thresholds are reached, ongoing processes of acclimatisation allow for continuous adaptations - with seasonal frameworks providing a key reference.

Accordingly, the strategic governance of local adaptations at higher order levels needs to be able to accommodate the inherent complexity of local communities within their contextual SESs in order to be relevant (Frame & Cradock-Henry, 2023). But, since the SMP initiative has largely failed to co-ordinate with the partially autonomous governing profiles of Kūaotunu's beach settlements and the practical rhythms of their local timekeeping, the interests and insights of resident grassroot organisations, in particular, remain largely under-represented through their resistance to external 'interference'. Similarly, the exclusive cultural values and intergenerational insights privileged to Kūaotunu's legacy of indigenous *Māori* spanning hundreds of years have been largely marginalised through the fast-tracking of the SMP project process by TCDC.

Including because of the 'urgency' to respond to the indeterminate impacts of changing climates, effective adaptation will likely require co-ordinations of multiple actions in time, reflective of the plurality of temporalities at play (Fincher et al., 2015). On one level, the iterative basis of the AP model, on which the SMP are based, anticipates this multiplicity of activities and associated actors in and over time. Here then, Council's parallel Coastcare initiative is seen to offer an activity basis for temporally aligning a range of Kūaotunu's stakeholder groups in time and place through a 'selective rendering of future change into the present', based on a shared logics of environmental stewardship (Grandin, 2023, pg.7). Specifically in providing a bridging organisation between TCDC

and local resident ECGs on the Coromandel's east coast beaches, Coastcare is effectively linking strategically planned adaptation pathways to voluntary conservation stewardship activities in the context of rapidly changing coastal environments.

While recognising this important bridging potential of TCDC's Coastcare initiative, Council has apparently failed to engage locally co-ordinated coastal conservation efforts on the Kūaotunu Peninsula with the SMP process, including through Coastcare, for individual beach communities. As well as undermining the participatory premise of AP approaches in identifying key steps in the adaptation process and locally determined triggers, the existing practices of resident grassroot ECGs are already pro-actively engaged in ongoing monitoring for social-environmental change (Craddock-Henry & Frame, 2021). In the context of contending interests and values of their resident communities, most of Kūaotunu's ECGs are partially representative of both their residential base and environmental concerns founded in an reciprocal stewardship ethos. In this capacity, the relatively narrow (and recent) focus of externally managed coastal restoration activities through Coastcare is unable to act as a surrogate for local ECGs and their associated knowledges in the context of compounded social-environmental change. Here then, it is suggested that the multiple rhythms and temporalities of seasonal frameworks providing orientation to local experiences of social-environmental change and the associated adaptations of Kūaotunu's ECGs might found an important basis to monitoring and sharing in knowledge of ongoing change as part of an authentic process of collaborative AP planning.

With democratic participation in AP planning processes involving a shift towards shared governance responsibilities for local communities, Kūaotunu's ECGs are likewise, well placed to contribute. In order to do so effectively, more enabling forms of governance are required to facilitate the capabilities of existing ECGs (O'Riordan et al., 2014; Termeer et al., 2017). With ECGs currently constrained in their potential to transform their ongoing activities to fit social-environmental change and the adaptive planning of TCDC largely focused on 'managing' significant events and triggers, it follows that there may be productive opportunities to integrate approaches to the mutual benefit of Kūaotunu's resident communities. Facilitating the local adaptation efforts of ECGs, alongside Coastcare efforts, may concurrently offer enhanced pathways to building social resilience from the ground up through the integration of ongoing practical processes of acclimatisation with step-wise adaptations over longer intervals (Fincher, 2015). Development of the existing SMP framework through an inclusive process involving genuine pluralism might then offer a collaborative pathway to future transformational change based on more flexible, 'modest' and enabling forms of governance (Termeer et al., 2018). In the context of APs, 'good governance', as participatory and deliberative, critically relies on good process (Patterson, 2019). For the SMP project, a deliberative attunement to the multiple rhythms and temporalities at play in the context of social-environmental change within Kūaotunu's organisationally diverse beach communities, is seen as an important next step in planning for co-ordinated adaptations to future climates. With fundamental differences in perspectives observed from within a relatively narrow population demographic at Kūaotunu, the imperative for

participatory and deliberative governance approaches in adaptation planning for discrete beach settlements is effectively highlighted.

In Summary:

- The diverging social-political agendas of transient governance arrangements displayed in informal versus authoritative resource management practices at Kūaotunu are associated with different understandings and temporal framings of timely social-environmental change including as highlighted here through seasonal variability.
- These disparities are partially reflected in the manifestation of ECGs to address perceived imbalances in present conditions - including as resulting from statutory management responsibilities - for future benefits, with reference to past states. This shared stewardship logic is synonymous with a practical attunement to dynamically changing human-environmental rhythms, while being positively associated with SES resilience through ongoing processes of acclimatisation.
- *Mātauranga Māori* provides a foundational reference to contemporary stewardship practices at Kūaotunu, involving complex references to changes in seasonal patterns that are variously manifest within its different beach environments involving unique governance arrangements.
- The distributed governance agendas of TCDC reflect multiple conflicting roles and responsibilities that are inherently problematic to co-ordinating adaptation strategies *for* local beach communities under the SMP project. Specifically, prescriptions of dune restoration as a provisional nature-based solution to retreating coastlines have been ongoing at Kūaotunu under resident conservation initiatives, while some beach residents remain resistant to change.
- Extended processes of engagement and collaboration are required across the community level, including in the linking of ongoing adaptations of grassroot ECGs into deliberative adaptation planning efforts towards longer-term innovations and transitions, while concurrently building social resilience.

6.6 Testing the Waters : A Reflection on Engaged Participation

In landing the critical analysis outlined above within an imperative to recognise the 'seasoned' wisdoms and practical innovations of local ECGs within Kūaotunu's beach communities as potentially formative to adaptive transitions to broader social-environmental change, I defer below to the insights provided by the Focus Group Workshop in scoping potential collaborations between stakeholder parties. A synopsis of my findings is subsequently outlined in the opening of the concluding Chapter 7 that follows, as a premise to developing a set of recommendations from its key insights alongside a reflection on the localised lessons of my research.

With the timing of the 2023 summer cyclones following the provisional reporting of the SMP project in late 2022, I was provided with a unique opportunity to reflect with key representatives from participating ECGs on a significant 'unseasonal' climatic event in the context of adaptation planning. As well as serving my own research purposes, the Focus Group Workshop (FGW)

enabled participants, including from local and regional Councils, to share their experiences in a neutral setting. As I facilitated discussions between participants on how ECGs are variously working with ongoing change, and following a group conversation on the experience of the summer cyclones for the wider Kūaotunu community, I became increasingly aware of the valuable opportunity it provided to participants to reflect. Although generally familiar with one another, the FGW provided a setting in which representatives of participant ECGs were able to explore and discuss shared issues in a 'round table' format and specifically in the company of statutory agents. Here, the relatively small number of attendees (13) facilitated a candour in conversations that is captured within the workshop summary record that was also provided to participants (see *Appendix **D***). In this way, the FGW significantly built on the interventionist objectives of the research, by giving participants the opportunity to voice and reflect on their experience of seasons in the context of a direct experience of significant change.

While participating ECGs were seen to be mostly 'coping' with accommodating gradual change from year to year through process of acclimatisation (as resources allowed), their resilience was quickly 'overwhelmed' by the sudden onsets of Gabrielle-Hale. Not only in their direct experience of the back-to-back storm events as local residents, representatives of local ECGs were specifically overcome by the additional remedial 'works' required in the aftermath of both storms in both beach reserves and conservation habitats. Already limited in material resources and manpower, there was a common perception amongst ECG member representatives of being substantially setback in the trajectories of their core activities. Although informally networked amongst themselves, through a 'culture of connectedness', this shared vulnerability to significant change by participating ECGs was partially attributed to a lack of support from within the wider community, including by local authorities.

Concurrently, local government representatives directly involved in local coastal restoration projects shared in their frustrations of underfunding alongside variable engagements with coastal communities - as reflected in volunteer turnout. On this point, all parties were agreed that education on beach processes was central to engaging resident communities in restoration efforts as an interim response to changing coastlines. Learning how to better cope with extreme events was also identified as a common aspiration, which is supported by the recent 'Report of the Government Inquiry into the Response of the North Island Severe Weather Events'(2024).

I have reflected since that the contribution of the workshop at the end of my research was also indicative of the mutual trust that I had established through the course of my time in the field with these participants, alongside their vested interests in bringing about positive change for the Kūaotunu Peninsula. In being personally invited to attend the workshop, participants also understood that their input was specifically valued – noting here that I went to reasonable lengths to find an appropriate date and time to accommodate everyone. And as volunteers giving up their unpaid time to attend, I was equally aware that if attendees felt insufficiently engaged, they would not have showed up. Likewise for employed representatives of invited statutory authorities, their shared investment in the FGW demonstrated a general support for collaborative engagement.

Accordingly, participants were empowered to contribute in the belief that an equitable sharing of local knowledges could be potentially constructive. And while I was unable to follow up on the learning contributions of the FGW with all participating groups, it is expected (and as suggested by unsolicited feedback following the event) that it was the process of the workshop itself, as much as the knowledge it produced, that provided benefit to participants in the spirit of authentic participation.

A very practical application would be….if that actually means the powers that be and the communities were able to work together better and respect each other more. Even if one really good thing came out of it – Sam (ORG).

CHAPTER

07

CONCLUSION

Primary Research Question:

In what ways is seasonality constitutive of place and the relative capacities of local communities to register and respond to broader patterns of social-environmental change?

7.1 Synopsis of Findings

As an exploration of local understandings of seasonality within the diverse settings of Kūaotunu's beach settlements, the research has found somewhat ranging interpretations of seasons from amongst its participating local ECGs. Influenced by unique groupings of individuals within discrete coastal embayments, the changing seasons are variously experienced in and over time through the routine enactment of communal practices in familiar contexts. With notions of place conceived as open-ended emergent relational processes, we can also appreciate how the temporal rhythms of wider society are additionally implicit in influencing local seasonality as much as by the formative lifestyles and institutional biographies of inhabitants. At Kūaotunu, patterns of seasonality are strongly dictated by the dynamics of domestic and international tourism, alongside second home ownership and retirement rhythms, as much as by cosmic natures and environmental phenomenon. With reference to the rhythm work of Henri Lefebvre, this research has come to see seasonality construed as *unique assemblages of relational rhythms giving way to dynamic seasonal architectures configured of both human and non-human elements in time and place*. A shorthand for this can be to construe seasons as 'polyrhythmic temporal frameworks' that are variously contributed to, and uniquely experienced by individuals and groups within different contexts.

Local manifestations of seasons then offer divergent communities common orientation to apprehending how broader processes of climatic, environmental and social change might influence the physical weather patterns and ecologies of their dwelling places. This is specifically relevant at Kūaotunu, where recent residents must draw on past contexts and lived experiences against which to reconcile current patterns and changes. Here, the annual transitioning of the seasons is seen to provide a key reference from which to build situational familiarity over an interim timeframe, while drawing on wide-ranging past experience and insights (including from elsewhere). In their function as polyrhythmic temporal frameworks, seasons thereby provide composite calibrations of stability, while emphasising variability and change over the course of and between collective human lifetimes. For indigenous *iwi*, such as Ngāti Huarere, knowledge of local seasonal rhythms was once inherent to sustaining a reciprocal ecological balance in human-environment relations as well as providing for future generations through a *Mātauranga Māori* view of the world. In returning to their ancestorial homelands, endowed with practical insights from previous generations, Ngāti Huarere descendants observe the adverse effects of contemporary lifestyles and land uses as fundamentally undermining this critical balance.

Although a different premise to customary *Mātauranga Māori*, the local environmental initiatives studied in this research represent contemporary forms of land stewardship that are variously

focused on reconciling imbalances within local SESs. As paradigms of human-environmental relations, seasonal rhythms are intrinsically manifest within the range of SESs encountered at the coastal interface and thereby form an important focus of co-ordinated conservation efforts. Concurrently, relational tensions exist at the coastal juxtaposition of land and sea environments involving the contending foci of the ongoing development of beach settlements at Kūaotunu with seasonal tourism. As for much of the Coromandel's east coast, the sheltered beach environments that have compelled residential development and recreational tourism over a number of decades are now under serious threat from predicted sea level rise and net erosion.

For many locals active in coastal conservation activities, the undermining of natural beach processes is attributable to the over-development of beach settlements and associated population swells on one hand, and globally-induced climate change on the other. With environmental groups active on the Kūaotunu Peninsula since its development into beach settlements from the 1960's, globally-scaled climate change is a relatively recent 'issue' to contend. Practically, local groups have continuously formed, self-organised and evolved over time to respond with nature-focused solutions to local environmental concerns as they arise, by variously drawing on their adaptive capacities. In line with Lefebvrian concepts of 'autogestion', the function of these groups is often addressing key gaps in the formal statutory management of local environmental reserves.

While limited by the scope of their voluntary-based resources, local environmental initiatives are inherently focused on maintaining local SES function according to their own agendas and skillsets. Practically, the routine activities of local resident environmental groups are premised on continually monitoring and adapting to changes 'with nature' from within their available means. Such ongoing adjustments to changing conditions are consistent with theories of continuous change developed within organisation studies. Not least in their practical accommodation of restoration activities around seasonal tourism, local ECGs are also adapting to changing conditions from one year to the next through incremental processes of seasonal acclimatisation. Thus, in the short term, the communal stewardship actions of local ECGs are considered important in effecting locally relevant adaptations that are attuned to accommodating changes in local conditions as they manifest. With a flexibility to form, self-organise and disband in the short-term while transitioning towards more transformative pathways, local ECGs contribute a stealth facet of adaptive capacity, while being generally resistant to external management. As such, the enduring stewardship imperatives of local environmental initiatives at Kūaotunu have arguably been contributing towards building SES resilience from the ground up over several decades.

The continuous adaptive operations of Kūaotunu's local ECGs can be contrasted with the district-wide scheduling of APs under the SMP project by TCDC. While the ongoing activities of local ECGs are practically focused within the present, the SMP project is largely driven by future agendas, including in the management of existing Council assets. Although TCDC are selectively attuned to the seasonal and longer-term rhythms of coastal processes through their work in coastal hazard management, the monitoring behind this work largely falls to WRC. In parallel with TCDC's recent efforts in championing voluntary dune restoration, as a nature-based solution to change, through

local Coastcare groups, some independent environmental initiatives appear to have been unwittingly marginalised through this implicit focus on beaches as 'strategic natures'. That is, valuing beaches as physical buffers against impending coastal hazards, rather than adopting an holistic long-term view on the functional worth of integrated coastal SESs. At the same time, tensions between contending local environmental and economic interests are highlighted in TCDC's ongoing consenting of coastal residential developments alongside its facilitation of voluntary dune restoration projects as an interim response to projected coastal erosion and rising sea levels. Anecdotally, local ECGs were underrepresented as participants at public consultation events hosted by TCDC at Kūaotunu during the development of the SMP project[45].

As TCDC now contends how to resource extensive dune restorations around its east coast beaches, as an interim step prescribed through the SMP project, there is an apparent disconnect between the governance and timing of its 'fast-track' adaptation planning and the practical operations of self-organised local environmental initiatives already undertaking this work. With participants from local ECGs frequently contributing to scheduled dune restoration activities through Coastcare, as well as working across their own initiatives and agendas, these grassroot initiatives demonstrate key traits of adaptive governance, including in the inherent flexibility in their operations, distributed efficiencies and recognising the importance of collaborative relationship management (Gupta et al., 2010; Ostrom, 2010; Thiel & Moser, 2018). Importantly, local environmental initiatives display an ability to learn and adapt their operations by informally sharing practical experiences through local communities of practice and thus nurturing the currency of locally relevant knowledges and expertise. At Kūaotunu, these shared experiences of seasonality have also founded broader practical collaborative initiatives across communities such as the voluntary scallop *rāhui* at Opito Bay.

While operating under conditions of great uncertainty, not least in the context of changing climates, there is an inherent alacrity to the sustained practical activities of local environmental initiatives. This is contrasted with the 'problematised' predications of rising sea levels and coastal erosion on which the SMP project and its community consultation processes were based. Without access to the sophisticated scientific modelling of global climate systems that formed the knowledge base of the SMP, participants of existing local ECGs appear to share in common perceptions of imbalances in local human-environmental systems, including as seen through the lens of discordant seasonal rhythms. Based on their richly layered contextual knowledges of polyrhythmic relations at Kūaotunu, participants of local ECGs are able to reconcile changing conditions in local SES, including from season to season as well as from one year to the next.

With *Mātauranga Māori* endowing a foundational cultural worldview for sustainable inter-generational governance in ANZ, there is arguably an implicit ethos of nature 'conservation' tethered to the national identity. A longstanding culture of local voluntary conservation initiatives have additionally established a tradition of environmental stewardship frequently arising (as at

[45] Based on my personal observations at the events I attended – without reference to any formal attendance records collected by TCDC.

Kūaotunu) to address shortfalls in statutory governance operations (Logan, 2016). Manifest in unique forms of contemporary environmental stewardship, I contend that the familiarity bred through a practical and rhythmic engagement with the local environment – according to a seasonal pattern - is an inherent part of collectively detecting and responding to broader patterns of social-environmental change for core inhabitants of the Kūaotunu Peninsula.

As government agencies are increasingly challenged with contending the issues of the present alongside future uncertainty, the opportunity to engage with existing community conservation initiatives and agendas seems obvious. In the current case, the limited collaborations between TCDC with its wider resident base in both understanding and planning for future change, in combination with the resistance of grassroot initiatives to being externally managed, amounts to something of a stale mate. But temporal misalignment is also at the heart of their alternative responses to change. Specifically, in local groups accommodating change within the current timeframes, periodicities and frequencies of an ongoing coastal environmental stewardship, while TCDC contends projected change as a future threat while reacting to extreme events within the present.

With resilience seen as a key attribute of inherently adaptive systems, the capacity of local ECGs to self-organise or *acclimatise* around perceived (temporal) imbalances in local SESs can be considered a key capacity for climate adaptation through seasonal acclimatisation. But rather than competing with the strategic interventions of formal governance, the continuous adaptations of local environmental initiatives may be seen as an important compliment in combining top-down and bottom-up organisational approaches and temporalities. In order to meet constructively in the middle, it is increasingly suggested that more enabling forms of governance be adopted by authorities such as TCDC (Termeer et al., 2017). Specifically, an acknowledgement of the local forms of 'experiential expertise' and practical innovations that are attributed to local volunteer environmental conservation initiatives would assist in legitimising their activities in the context of strategic planning with (not *for*) communities, in times of change through adaptation planning. An effective means of engaging with these situated experiential knowledges is important for both scoping and developing locally appropriate ways to accommodating ongoing change versus managing accumulating risks. Here, modest modes of governance are required to facilitate the ongoing activities and innovations of grassroot environmental initiatives, while publicly demonstrating support for their critical contributions of local knowledge and expertise towards adaptation planning. This advocacy is concurrently seen by participants of Kūaotunu's local ECGs as both engaging and educating communities in local environmental issues in the context of adaptation planning and building SES resilience at the local level. Here, stewardship practices thereby offer a binding premise to overcoming social 'differences' in the context of a highly valued coastal environment threatened by both internal and external forces of change. The associated benefits to social wellbeing that result through a communal engagement in environmental stewardship activities are increasingly reported (Dacks et al., 2021; Masterson et al., 2019; Molsher & Townsend, 2016; Simpkins & Lemyre, 2018; Wolf et al., 2013).

7.2 Research Insights

In providing an in-depth study of local environmental initiatives in beach settlements on the Coromandel's Kūaotunu Peninsula, the research set out to explore the local experience of social-environmental change apprehended through seasons. Engaging a phenomenology of practical experience with relational theories of place in a rhythmanalytical approach, the research findings highlight the role of local temporalities in deciphering ranging scales and processes of social-environmental change from within rurally-based coastal communities of place. Conducted in parallel with the development of the strategically planned district-wide SMP project by TCDC, my research also interrogates the relative interactions and contributions of formal environmental governance orders towards adaptation planning responses at the community level.

Distilling key insights from the research that might form the basis of future applications in adaptive planning and governance, I set out below five emerging propositions that advance scholarship across the disciplinary fields entwined in this study. Although derived from the specific circumstances of my case studies, involving local environmental stewardship initiatives within an affluent rural coastal setting subject to social-environmental change, I suggest that these key findings are transferable to rural coastal communities more generally within ANZ, as well as within other western (and particularly colonial) cultures. In this way, the research offers particular insights towards tailoring the flexible governance of, and planning for a diversity of rural coastal communities living with uncertain trajectories of social-environmental change.

a) Seasonal frameworks provide a common reference by which to contextualise social-environmental change across scales

In defining seasons as complex and place-based assemblages of intersecting social-environmental rhythms, seasonal frameworks can be seen as highly informative of locally changing conditions over relatively short timeframes as well as over the longer term. This is particularly relevant in 'recreationally' based coastal communities such as Kūaotunu, comprised of diverse tenures and cultures, where a common reference or framework for apprehending change is required. The leisure-based lifestyles afforded to the majority of participants has likewise contributed to the viability of most ECGs. Owing to this flexibility, the practical experience of those routinely participating in local ECGs was seen to contribute enhanced insights into local manifestations of seasonal rhythms and their changing dynamics over time. The contextualisation of local knowledges through organised environmental practices was specifically seen as important in sharing insights, including through informal communities of practice across groups. In this way, locally-based environmental groups (and resident collectives) were seen to monitor change, such as the seasonal ebbs and flows of sand budgets between years, alongside longer-term depletions in scallop stocks. In both cases, the intuition of local groups consistently aligned with expert surveys in contextualising both the nature and scale of apparent change over time. With external formal governance agencies primarily focused on managing the predicted effects of globalised social-environmental change, Kūaotunu's local ECGs were seen to rationalise observed changes

through local imbalances in human-environment relations and how these emerge and manifest over time, including through the lens offered by seasons as polyrhythmic temporal frameworks.

b) *Adaptation to continuous change, through organised acclimatisation, depends on a structured routine practical familiarity with the (processual) rhythms of place*

While local, regional and national governments make strategic plans for developing future-orientated adaptive pathways on behalf of local communities, it appears that locally organised environmental groups are concurrently pitching their own agendas for responding to local manifestations of change. The practical basis of their dedicated operations, often under conditions of great uncertainty (including resource limitations) involves ongoing processes of adjustment – including through seasonal transitions - as well as in responding to unexpected events. Consistent with theories of continuous change within organisational studies, I suggest that in the context of changing climates, these incremental processes of practical seasonal 'acclimatisation' might make a substantial contribution in transitioning local communities towards accommodating incremental change, as it occurs, from the ground up. Here, the research highlights the integral processes of place in contriving locally dynamic institutional-organisation arrangements and specifically the informal grassroot organisations that are formative to environmental stewardship practices alongside associated social resilience. With an holistic Institutional Logics approach able to account for informal environmental agency (stewardship) at the ground level, the research extends institutional-organisational theory beyond the core entrenched logics of western society. Drawing parallels with relational understandings of place as emergent and processual within contemporary human geography, acclimatisation is equally able to account for the more-than-human temporalities of seasonal adaptations inherent within coastal SESs.

c) *The reciprocal basis of locally organised environmental stewardship practices are inherently adaptive in monitoring and responding to changes in SES*

At Kūaotunu, the formation and self-organisation of local environmental initiatives was seen as a direct response to perceived imbalances in local SES function - resulting from the human activities of local residents and visitors, as well as from the inactivity of statutory management interventions. Both responses are adaptations to changing circumstances in themselves, with local ECGs apparently 'triggered' into action through a common logic of local environmental stewardship. An embodied stewardship logic is construed here as inherently contextual and ultimately dynamic, ever-changing relative to the shifting temporal patterns of a place (Mathevet et al, 2018). Once established, the ongoing operations of local environmental stewardship initiatives are seen to continuously adapt to local manifestations of change, both in terms of the ebbs and flows of seasonal tourism, physical cycles of sand and sea, reproductive cycles of native and exotic animals and plants, as well as contending the combined impacts of successive summer cyclones and winter storm events. This continuous entrainment of ECGs to variable social-environmental rhythms is thereby seen as inherently adaptive to local circumstances, developed collectively as a learned skill premised on embodied stewardship practices. In short, the skill to

acclimatise to shifting conditions and temporalities is a key element of adaptive capacity, and an associated resilience, at the local scale. The institutionalised stewardship functions of governing agencies, including DoC, WRC and TCDC are otherwise seen to be driven by externalised 'best practice' principles as a basis for monitoring and responding to future scenarios of change.

d) As a localised premise to adaptation, incremental acclimatisations are inherently synonymous with building social resilience and innovation

As well as fundamentally displaying an inherent flexibility to adapt to changing circumstances, ongoing processes of local acclimatisations are associated with nurturing both resilience and innovation within local ECGs. The extent to which this resilience might be extended to more culturally diverse and politically divided communities in the context of changing climates elsewhere remains to be seen. However, the local environmental initiatives that have provided the focus of this research were seen to assiduously contribute to local SES resilience through practical innovations in their current conservation activities - often in the face of local opposition. Examples from the research case studies include experimentations with the relative timing and methods of weed and pest control alongside hydrological management within coastal wetlands. Innovations equally apply to securing alternative sources of funding for independent groups from one year to the next, alongside the recruitment of volunteers. It is through such innovations that local ECGs are effectively living with change in the present, by updating practices from the recent past, with a view to future improvement. Informal collaborations between group members are additionally seen to foster innovation and experimentation through communities of practice. This is compared with the strategic focus of the SMP initiative in projecting abstracted scenarios of change yet to be experienced into future-focused responses and responsibilities - invariably involving more substantive changes in practices - with reduced opportunities for experimentation along the way. An over-dependence on externalised governance agencies in the planning and organisation of adaptation pathways is equally associated with reduced community 'buy-in' – as observed in reduced participation rates in the SMP process at Kūaotunu.

e) Informal processes of continuous adaptation to gradual change may be formative to longer-term strategies of transformational change

While highlighting fundamental differences between the operational practices of formal governing agencies with local grassroot initiatives in Kūaotunu's highly contested coastal environments, the research has also revealed the potential synergies of their timed contributions towards long-term processes of social transformation. Here, the incremental adaptations of grassroot initiatives to ongoing social-environmental change is seen to foster social resilience at the same time as establishing critical thresholds to significant adaptive responses – potentially requiring renewed co-ordinations of approaches and timelines. At this point, the combined resources and authority of local governments to convene communal responses with heterogenous communities becomes strategic. But rather than being seen as 'incidental' to strategically planned adaptive interventions, the ongoing activities of informally organised grassroot initiatives and collectives could well provide formative orientation and critical timings

to adaptations at the community level – including through accumulated contributions of situationally appropriate skills and knowledges over time. Here, the historic dune care initiatives that have formed the basis of this research at Kūaotunu, are exemplary of this long-term contribution of practical environmental knowledges. The challenge then is for formally established governance systems to a) recognise and b) facilitate the role of informal grassroot initiatives as integral ***processes*** in planning for adaptation ***with*** local communities – as opposed to seeing locally organised groups of varying orientations as mere participants to scenarios of externalised management.

7.3 Theoretical Contribution

In providing an in-depth empirical study on how seasonal change is variously experienced, interpreted and enacted by self-organised ECGs from within neighbouring beach communities on the Kūaotunu Peninsula, the research expands on a number of existing concepts and theories with which it engages. Commensurate with the grassroots perspective of its case study approach, the conceptual framing of my research sits alongside the 'disruptive' transdisciplinary thinking at the peripheral intersections of mainstream theories. Specifically, by drawing from across disciplines, including human geography, sociology, anthropology, ecology and organisation studies, the research set out to extend the reach of existing theories on the adaptive potentials of local social-ecological systems to globally-scaled forces of change. Drawing heavily on the relational phenomenology of practical experience developed in anthropology by Ingold (2000), social practice (developed by Schatzki in the 1990's) and related theories of communities of practice (notably by Wenger, around the same time) are combined with a shared phenomenological experience of seasons, as polyrhythmic temporal frameworks, in providing local orientation to broader systems of social-environmental change (Shove, 2012). Leveraging a formative linking of practice ontologies with dynamic organisational-institutional processes, logics and systems of change, the research effectively highlights the latent role of resident grassroots organisations in their timely detection and monitoring of seasonal change through small-scaled adaptations of their routine practices. Recent concepts of Practice Driven Institutionalism, as championed by Smets and colleagues (2012-2017) on the back of Friedland & Alford's Institutional Logics (developed in the wake of neo-institutionalism in 1991) then attribute agency to practical processes of change from the grounded levels of social organisation.

Akin to the incremental 'micro-level' adaptations isolated from within organisation and management studies (including by Weik, 2019 & Termeer, 2017), the 'seasonal acclimatisations' tendered by the current research involve the ongoing adaptations of rhythmic practices by grassroots organisations in time and space. Associated with situated knowledges of and a temporal attunement to locally manifest patterns of change, the practical acclimatisations of the environmental conservation groups studied here additionally offer nuanced insights into the reciprocal stewardship logics involved in responding to broader systems of social-environmental change through local SESs. At the same time, theories of politically contested places from within human geography (notably by Massey, 1999) are also invoked by local resistance to environmental stewardship practices in the context of changing conditions – contributed by the

local populus. Here, the successive offerings of sociologist Henri Lefebvre through his seminal work on the production social spaces and subsequent rhythmanalysis approaches (in the 1990's) have contributed significantly to the design, methodology and interpretation of my research findings. Critically, the potential of ongoing processes of acclimatisation by grassroots-scaled operations to contribute to the broader transformation of social practices over the longer-term is compelled by Lefebvre's theories of autogestion and local resistance to capitalist systems through revolutionary rhythms.

Bringing contemporary organisational theories of dynamic context-dependent institutional processes (and logics) alongside the emergent properties of place, grassroots organisations are attributed a foundational role in strategic adaptation planning and governance within the present. In the context of projected scenarios of changing climates, the immediate focus of independent grassroot organisations living with the effects of social-environmental change in the here and now, through ongoing revolutions of experimentation and innovation, are seen to offer a vital lead in fostering adaptive capacity and associated social resilience from within communities of place. Here, the research additionally links environmental stewardship practices, alongside political ecology, with extended SES resilience in ecologically-orientated theories of adaptation to social-environmental change. Adding to the challenge to existing hierarchical approaches to adaptation planning *for* local communities based on conventional statutory government-led authoritative structures, the current research effectively legitimises the wisdom invoking deliberative participatory planning and governance alternatives. Not least in giving precedence to the variable lived experience of change as a basis to effective adaptation planning with diverse communities, authentic participatory planning is also needed to capture local surveillence of social-environmental change and the seasoned judgements behind enacting timely responses.

7.4 Practical Applications

With adaptive governance effectively construed as a distributed responsibility between local stakeholders, it is expected that there will be potentially ranging scenarios of institutional-organisational arrangements emerging within different contexts, involving different scenarios of change. It is further expected that 'experimental' partnering of governance modes will foster creative innovation and learning feedback as part of building local resilience - specifically including through the legitimate contributions of diversely profiled local groups - to formalised processes of adaptation planning and their associated timeframes.

Building on the five propositions developed through my research findings in 7.2 above, I outline below four key recommendations aimed at facilitating authentic deliberative adaptive governance practices within diverging contexts of accelerating social-environmental change involving strategic orientation to local temporal frameworks.

A Monitoring with Seasonal Frameworks

With much still unknown about the mechanisms and effects of changing climates across scales, seasonal frameworks offer common orientation to both the detection and calibration of social-

environmental change at multiple levels. Seasonality thereby provides an important opportunity to collate knowledges of changing climates from a range of sources, spanning the cumulative awareness and know-how of mixed communities to that resulting from externalised scientific inquiry over both short and long-term timeframes. Crucially, the current research suggests that the discrete seasonal knowledges of local experiential 'experts' hold the key potential to contribute insights that might otherwise go overlooked by the externally driven agendas (and associated timings) of objective scientific monitoring, as well as being reflective of locally-held values and customs. In this way, the intimate knowledges of seasonal change afforded to local residents are not just supplementary to schedules of expert monitoring, but potentially foundational to identifying detailed accounts of what is changing - where, how and over what timeframe – as well as their interacting effects within and between years. In ANZ, the customary knowledges of indigenous *Māori* is already recognised as pertinent to contending local scenarios of social-environmental change, while customary forms of citizen science are gaining currency within community planning initiatives.

Creative forums are therefore required to facilitate, accommodate and co-ordinate diverse formats of place-based knowledges - and their customary timeframes - in deliberative adaptation planning, with seasonal frameworks contributing a common template to establishing locally emerging patterns of change.

B Temporalising Communities of Place

An appreciation of the idiomatic temporalities of place is seen as integral to accessing and understanding local institutional-organisational cultures in order to effectively engage with local communities in authentic participatory planning processes. Contributed by knowledge of historical patterns and future expectations within and between organisations and groups, the temporal 'profiling' of local communities is aimed at establishing current tempos as well as the nature of activities of both interest and concern within a particular place. In the Coromandel, the popularised 'Coromandel Time' denotes a leaning towards nature based cyclical time in clear defiance of the contrived tempos of accelerated 'city life'. In responding to accelerating forces of social-environmental change, this colloquial 'laid back' tempo, is construed as a widely valued resource under threat. At the same time, a practical attunement to the interacting rhythms of place, both social and environmental, potentially provides resident collectives with enhanced insights of processes of change, through their particular areas of interest. In this way, an understanding of local organisational-institutional arrangements, including through analysis of their current rhythms and practices, may assist in identifying priority issues of concern in planning for appropriate responses to social-environmental change. Again, seasonal rhythms are important in offering common references to calibrating the changing dynamics of human-environmental interactions that are implicit in detecting and responding to evolving processes of social-environmental change from within discrete communities of place.

In the current research seasonal knowledges are afforded to participants by the flexible timings (and relative comforts) of retirement lifestyles on the Kūaotunu Peninsula, while residents of

other coastal communities in ANZ are expected to engage with seasonal rhythms through ranging lifestyle and occupational agendas and interests.

C Timely Governance Collaborations

Representative adaptation governance initiatives must be carefully timed and co-ordinated to the particular temporal patterns that matter for resilient communities. Failure to account for local timings could see efforts wasted, or in extreme cases, maladaptive to local circumstances. Consistent with an expectation for communities of place, and their distinct institutional-organisational temporalities, to uniquely experience variable forces of social-environmental change, through rapidly changing climates, is the need for situationally appropriate approaches to local adaptation planning. With the input of local organisations seen as foundational to this process, it follows that their participation in community-based collaborative planning forums will likewise require situationally appropriate methods of engagement. Where local adaptation planning is neither community-led nor instigated, then creative means of effectively capturing the spectrum of representative interests and concerns (and associated temporal frameworks) uniquely attributed to particular communities and their residing organisational cultures is considered key. In addition to designing creative forums by which to facilitate collaborative and innovative planning processes, their timing/scheduling needs to provide the opportunity for a diversity of organisational cultures and expectations to be able to contribute meaningfully. It is important to recognise here that in most cases, the externally imposed timetables of local (and national) government planning agendas are unlikely to transpose seamlessly onto the diverging temporalities and demographics of contemporary coastal communities.

D Facilitating Adaptive Modalities

While the administrative bodies of local-regional governments are charged with the implementation of planning for local adaptation to future climate scenarios, this research has shown how the routine operations of locally based organisations may make a foundational contribution to this process. Within the Kūaotunu Peninsula case-study, we have also seen the local Council operationally (and temporally) conflicted in its adaptation planning by the current interests of its ongoing development consenting activities alongside local coastal restoration activities. Local grassroot organisations are alternatively 'privileged' with a singular focus and associated identity orientated towards their activities within the present. Supporting a combined planning framework involving both 'top-down' and 'bottom-up' approaches, the role of higher-order governance, also acting as key stakeholders within local community planning, becomes critical in both accommodating and facilitating an equitable representation of community-based organisations. As such, modest modes of regulatory intervention are required, while potentially necessitating external facilitation in order to accommodate a diversity of potentially contending community stakeholders in deliberative adaptation planning. Beyond an initial engagement, adaptation planning is seen as an evolving collaborative endeavour between participating governance levels involving ongoing recalibrations in responding to changing circumstances. And while existing DAPP models provide a framework for strategically responding to critical thresholds of social-environmental change, they are yet to provide for ongoing processes of acclimatisation

within the present. In order to effectively accommodate the co-ordinated efforts of multiple actors in, as well as over time, adaptation pathways need to anticipate the multiple temporalities involved in sustaining incremental adaptations over single 'fixes' in future spaces (Fincher, 2015).

7.5 Local Lessons

The research offers lessons specifically targeted to stakeholders involved in the adaptive governance of coastal communities on the Coromandel Peninsula. In promoting the role of local grassroot organisations as integral to foundational processes of adaptation, their involvement goes beyond an expectation of democratic participation. In the alignment of local adaptation efforts in the present with the planned strategic interventions of local government contending future change, timely temporal co-ordinations are considered key to good governance – with due process taking precedence over unknown project outcomes and inputs (Patterson, 2019).

In contexts such as the Kūaotunu Peninsula, where the impacts of climate change are not yet perceived to be as 'urgent' compared to other coastal communities on the Coromandel, there are clear opportunities for local government to experiment with facilitating collaborations with existing environmental initiatives in contending social-environmental challenges in the interim. While TCDC have made substantive investments in promoting and co-ordinating coastal restoration as a nature-based response to existing coastal hazards through Coastcare, this initiative still needs to be reconciled with the timed activities and agendas of its constituent beach communities in steering adaptive pathways under the resilience agendas of its SMP project. In this way, I have suggested that Coastcare on the Coromandel functions as an interim bridging organisation between TCDC and local grassroot ECGs in provisionally establishing a stewardship basis for collaborative adaptation planning. Although conservation agendas my not provide an appropriate basis for adaptation planning in coastal communities outside of Kūaotunu, here at least, the relative diversity and prominence of environmental initiatives are considered partially representative of resident values, including where these are locally contested. The proliferation of environmental initiatives across Kūaotunu's discrete beach settlements, alongside their narrow population demographics, also established a sound comparative basis to the current research.

In the context of dune restoration provisionally providing a practical nature-based solution to addressing existing coastal hazards identified by the SMP project, the environmental reach and educational resources of the Coastcare initiative (including through CRTNZ) offers an additional bridging function between resident communities with TCDC and local ECGs. Moreover, the opportunity for TCDC to practically engage with an extended residential base in beach restoration activities on the Kūaotunu Peninsula, including through the Coastcare initiative, should also be seen as foundational to a long-term investment by beach communities in the SMP process – exploring future scenarios, such as managed retreat.

Concurrently, the meaningful facilitation of deliberative governance needs to adequately provide for the practically informed grassroot level of expertise, alongside the lay experiences of a wider residency, versus an overdependence on universally applied top-down formulae and models in the development of adaptation planning at the community level. At a base level, this requires

attunement to the timed activities and associated organisational cultures by which a community is both defined and accessed. At Kūaotunu, we have learned that collaborative planning for the coastal hazards threatening its beach communities specifically needs to provide for the practical knowledges of change acquired from its extensive networks of ECGs contributed over time, including that of indigenous *Māori*. In acknowledging the local specificity of their practical expertise, participants of some ECGs at Kūaotunu continue to recognise the strategic role of local government in facilitating responses to broader change at the district-wide level, specifically through the SMP process, alongside the educational reach of the Coastcare initiative. As conceptually contributed from the FGW summary (*Appendix **D***): small-scale locally based groups are most effective as pieces in a bigger puzzle.

Supporting a nested panarchy concept of adaptive governance systems extending across levels that is synonymous with SES resilience thinking, a broader structuring of inclusive adaptation planning spaces is seen as necessary in the accommodation of diverging stakeholders and their organised practices across scales. Here, the research suggests that new approaches are required by which to creatively co-ordinate the inherent rhythms of an authentic community adaptation planning process in a timely manner. At Kūaotunu, with resident ECGs and Coastcare initiatives already actively participant in coastal processes, the next steps of the SMP project might yet provide the conditions for resilient transitions at the community level - one bay and one season at a time.

7.6 Further Inquiry

Since seasonal acclimatisation has been suggested as an inherently interim form of adaptation to continuous change by local environmental groups observed at Kūaotunu, this phenomenon warrants further exploration over extended timeframes and within variable contexts to confirm its potential contribution across the wider settings of local adaptation planning in ANZ. Understanding the local conditions that give rise to particular community initiatives forming, self-organising and enduring in the context of broader patterns of social-environmental change is also considered key to evaluating their potential capacity to acclimatise.

Studies exploring how the self-organised activities of particular local interest groups or collectives contribute to broader definitions of community resilience – especially from within heterogenous and politically contested communities – would also assist in developing appropriate engagement strategies within and across different levels of governance as part of a creative community-based planning process. The orientation of local groups within broader institutional fields and governance settings is likely to be an important consideration in appraising their relative contributions to community resilience, including through local and broader networks of communities of practice.

Contrasting case studies of coastal communities in diverse settings of social-environmental change might further examine whether different combinations of governance intervention facilitated alternative scenarios of community adaptation planning in order to optimise local innovations. A number of experimental approaches are already being explored in adaptation

planning projects around the Waikato region, involving various collaborations of local communities with local and regional Councils, including with local *iwi/hapū*. Alongside TCDC's SMP initiative, these projects provide excellent opportunities for exploratory learning at both community and regulatory levels of adaptive planning and governance.

While I was fortunate to engage with representatives from Ngāti Huarere in my research endeavours, their perspective is not assumed to represent *iwi* perspectives more generally from outside of the Whangapoua area. The broader potential of *Mātauranga Māori* to contribute foundational intergenerational knowledges (including seasonal) to understanding local processes and temporalities of social-environmental change is already being explored within ANZ (Bailey-Winiata et al., 2024; King et al., 2008; Reid et al., 2024; Taiapa et al., 2024; Wehi et al., 2020). How these indigenous repertoires of knowledge might be respectfully acknowledged and accommodated within democratic processes of planning to adapt to future change should already be a critical concern for environmental governance at all levels in ANZ.

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APPENDICES

CALENDARS: Co-production of seasonal representations for adaptive institutions

Information Sheet

CALENDARS studies how different groups of people and organisations - from schools, to farmers collectives, local councils or art festivals - organise their activities over the year according to ideas of 'normal' seasons. Considering the rapid social and natural changes we face in the places we live, the project looks at changes to the way people are thinking about and experiencing seasons in these organisations. **The key question is whether peoples' seasonal representations are in sync with the seasons they actually experience now, and therefore, whether these representations are useful for guiding peoples' yearly activities?**

Two case studies have been selected for this research: The Coromandel Peninsula and Bergen in Norway. In both places, CALENDARS researchers are pairing with key organisations and groups to together study their ideas of seasons. Going further, CALENDARS will work with these people to review their seasonal practices and devise updated calendars. This means working alongside them to reflect on how they could adjust their seasonal rhythms, and for this work we will engage artists. We intend to foster creative spaces for scientists, people in organisations, and artists such as carvers, musicians, painters or film makers to rethink the seasons.

Ultimately, CALENDARS wants to advance understanding of how seasonal ideas steer the way we live, and how they can become part of adapting to seasonal change. Equally important is engaging a tight-knit group of interested people in the case studies, in thinking about the changes they can make to their daily practices to bring them in sync with the seasons.

For more information go to: https://www.uib.no/en/calendars-project

CALENDARS guiding principle is to nurture research collaboration between the project scientists and the organisations in the case studies; to 'co-produce' the research. Key to this is ensuring the project yields real mutual benefits, both to the scientific research and the organisations CALENDARS works with. To this end, we want locals to collaborate with us as co-investigators throughout the process, from designing the research, to carrying it out, and making use of the findings.

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In practical terms, our collaboration could begin in February/March 2020, with a pilot interview, lasting about an hour, in a place of your choosing. This would give us a first look at how seasons steer what you do, and give you a first look at our research.

If there is enthusiasm to progress, then the first phase of the project will run roughly from April 2020 to March 2021. Over this time, CALENDARS researchers might conduct another interview, but more importantly, we hope to take part in certain activities over the year where we can talk to people and see how you do things. The purpose of this phase is for us to uncover the ideas of seasons that steer what you do; some of these ideas might stand out very clearly, but others might be so much a part of your organisation that they are taken for granted and not talked about.

Phase two would begin around June 2021, when we would like to bring certain people together for a workshop (perhaps up to one day long). This workshop will be a space where people from your organisation can look at their seasonal ideas, how they are changing, and together discuss whether these ideas are fit for the seasons actually faced today.

Phase three will start near the end of 2021 and run on to June 2022. You will be invited to sit with an artist (we have resources for this) to produce a new representation of the seasons that is meaningful for you and/or your organisation. You can choose what this will look like – a painting, a film, a sculpture, a play – and you will be able to keep it afterwards. This is a creative opportunity for you to imagine better ways of thinking about seasons.

It is important to us that this be a long term collaborative relationship, so we need to work with locals and organisations that can foresee participating all the way through to Phase 3 in 2022.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 19/56. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

CALENDARS COROMANDEL PhD RESEARCH:

Seasonal rhythms in practice : how institutions adapt to local environmental change

Information Sheet

The Calendars project

CALENDARS studies how different groups of people and organisations - from schools, to farmers collectives, local councils or art festivals - plan their activities over the year according to ideas of 'normal' seasons. Considering the rapid social and natural changes we face in the places we live, the project looks at changes to the way people perceive and experience seasons within these organisations. **The key question is whether peoples' seasonal representations are in sync with the current seasons being experienced, and therefore, whether these representations are useful for guiding peoples' yearly activities?**

Two case studies have been selected for this research: The Coromandel Peninsula and Bergen in Norway. In both places, CALENDARS researchers are pairing with key organisations and groups to study their ideas of seasons. Going further, CALENDARS will work with people to evaluate their seasonal practices. This means working alongside groups to reflect on how their seasonal rhythms could adjust to change. We intend to foster creative spaces for scientists, people in organisations, and artists such as carvers, musicians, painters or film makers to help with rethinking the seasons.

Ultimately, CALENDARS wants to advance understanding of how seasonal ideas steer the way we live, and how they can become part of adapting to seasonal change. Central to this is engaging a tight-knit group of interested people in the case studies, in thinking about the changes they can make to their daily practices to bring them in sync with the seasons.

For more background information go to: https://www.uib.no/en/calendars-project

My PhD research forms a discrete part of the CALENDARS project by focusing on conservation-based institutions located on or connected with the Coromandel's Kuaotunu Peninsula. Conservation groups are uniquely placed to observe and monitor the relative nature and timings of seasonal changes based on natural phenomenon and indicator species, through the routine practices of their environmental activities. It is anticipated that the detailed insights of locally-based conservationists into changing seasonal rhythms may critically extend our knowledge of seasons beyond that of standardised scientific inquiries.

The Kuaotunu Peninsula is host to a number of conservation initiatives ranging from informal grassroots organisations through to DOC. Reflecting the diverse interests of the resident community with their local environment, this diversity also establishes the broader Kuaotunu Peninsula as an ideal location for the place-based socially orientated research.

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CALENDARS guiding principle is to nurture research collaboration between project scientists and case study institutions in the 'co-production' of research. Key to this is ensuring the project is mutually beneficial to participants as to the research team. To this end conservation participants are invited to collaborate with the research process as 'co-investigators', with capacity to shape the research process along with its findings. An important part of this collaborative arrangement will involve my volunteering time to actively participate in conservation activities (eg. planting & weeding) alongside participants during the field-based research phase as a way of observing seasonal practices in action.

In practical terms, the research process will involve both interviewing and observing groups of participants, based around their conservation practices over the course of a calendar year. Provisional interviews may be carried out individually or in groups and lasting approximately one hour in a place of participants choosing. The interviews are intended to provide initial insights into how seasons might steer the conservation activities of particular conservation groups in different locations on the Kuaotunu Peninsula, as well as familiarising participants with the research.

The seasonal calendars discussed during provisional interviews can also provide the basis to establishing the timing and frequency of observing and participating in the conservation activities of a particular group. Typically, this would be based around routine planting, maintenance, seed collection, bird-call, pest control activities and/or attendance at relevant planning meetings for specific conservation events. Observing participants in the field over the course of the year will help us to identify the less obvious aspects of seasonal practices and seasonality that may be overlooked (or are otherwise difficult to articulate) through interviews. Interim informal 'walking/working' interviews may also form part of the field observation process, along with participant-driven photographic records and the potential to involve a local filmographer.

The final phase of the research is designed to culminate in an invited workshop event, planned to be held in Kuaotunu over the Winter of 2022. The workshop will ideally bring participating conservation groups together with local artists in order to creatively review and collaboratively evaluate current seasonal practices and rhythms on the Kuaotunu Peninsula alongside their potential to change and adapt.

It is important to us that this be a long-term collaborative relationship, so we need to be able to work with organisations that can foresee their participation through to 2022.

Should you have any questions, please do not hesitate to contact CALENDARS Coromandel PhD Candidate, Kerstie van Zandvoort on: 021 041 7102, or email: K.vanZandvoort@massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 19/56. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

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Calendars Kuaotunu Research Group Interview Structure

A Introduction & Background

- History with Coromandel & Kuaotunu – personal & institutional
- Overview of Coromandel/ Kuaotunu Climate & Environment
- Motivations Ideologies & World Views
- Future perspective

B General perceptual understanding of Seasons & Seasonality

Seasonal patterns

a) What is your understanding of the seasons and seasonality in NZ?
b) How is this the same/ different to local seasons and seasonality in Coromandel/Kuaotunu?/ How would you explain Kuaotunu's seasonality to a visitor?

Seasonal change

c) How do you distinguish between the seasons you have identified? What are your references/ indicators?
d) What are the fixed/recurring elements of seasons and what changes/varies?
e) Do you see seasons as changing between year to year as well as between seasons and how does this look for the future?

C Institutional practices, activities, rituals, events & customs

Imagine if I was to shadow you over the course of a calendar year, consider:

a) How might your institutional practices change with the seasons?
b) What would be the key seasonal 'markers' for these transitions and how are these monitored?
c) Have you observed any changes in seasonal markers between years? Either gradual or distinctive change?
d) How have your practices responded to this change?

From this, what would be key seasonal practices for me to be able to observe/ participate in?

D Planning the Seasonal Calendar

e) When does the year start for you?
f) How does your institution organize its activities within a calendar year and what are the key influences on this and variables/ determining factors?
g) Are there any particular social events, rituals or customs that are used to mark the seasons/ distinguish the seasons from within your institutional culture?
h) How are the seasons marked in your personal life?

Walking Interview (Individual) Topics Template

A Background

- History with Coromandel & Kuaotunu – personal & institutional
- Overview of Coromandel/ Kuaotunu Climate & Environment
- Motivations Ideologies & World Views
- Future perspective

B General perceptual understanding of Seasons & Seasonality

Seasonal patterns

f) Understandings of seasons and seasonality in NZ?
g) Understandings of local seasons and seasonality in Coromandel/Kuaotunu?

Seasonal change

h) What are the fixed/recurring elements of seasons and what changes/varies?
i) Do you see seasons as changing between year to year as well as between seasons and how does this look for the future?

C Institutional practices, activities, rituals, events & customs

i) Outline your institutional practice
j) How do these practices change with the seasons in timing/frequency?
k) What seasonal differences and changes do you notice over the course of a calendar year in carrying out these practices?
l) Do these changes vary between as well as within years?
m) How have your practices responded to this change?
n) How are observations and changes communicated and evaluated within your institution?

D Planning the Seasonal Calendar

o) When does the year start for your institution and personally?
p) How does your institution organize its activities within a calendar year and what are the key influences on this and variables/ determining factors?
q) Are there any particular social events, rituals or customs that are used to mark the seasons/ distinguish the seasons from within your institutional culture?
r) How are the seasons marked in your personal life?

Calendars Kuaotunu Regulatory Institutional Interview Structure

A Introduction & Background

- History with Coromandel & Kuaotunu – personal & institutional
- Motivations Ideologies & World Views

B General perceptual understanding of Seasons & Seasonality

Seasonal patterns

- What is your understanding of seasons on the Coromandel and Kūaotunu how this relates to local climates and ecosystems
- How is this the same/ different to local seasons and seasonality in Coromandel/Kuaotunu?/ How would you explain Kuaotunu's seasonality to a visitor?
- How has your job/role changed/refocused your understanding of seasons at a local level?

▪ ***Seasonal change***

- What does a year look like in seasons? What are the relative patterns/distributions transitions and starts/ finishes?
- Do you have a preferred season/ time of year?
- What are the fixed/recurring elements of seasons and what changes/varies?
- What local environmental changes are you aware of/ have you observed?
- Do you see seasons as changing between year to year as well as between seasons and how does this look for the future? SMP?

C Institutional practices, activities, rituals, events & customs

Imagine if I was to shadow you over the course of a calendar year, consider:

- How do seasons influence your practices and over the course of the year?
- What are the key seasonal 'markers' (phenomenon/conditions/events) of your practices over the course of the year?
- How have your practices been able/unable to respond to any seasonal or other environmental changes observed/ detected?
- How do you learn from/ share with others about seasonal & environmental change through practice? Both in dealings with the community/ within Council and across Council/ Government organizations

- How does CoastCare contribute a citizen science/community perspective and is this shared with Council?
- How do CoastCare operations and community engagement contribute to the current SMP process?

D Planning the Seasonal Calendar

- When does the calendar year start/ renew for you?
- How does your institution organize its activities within a calendar year and how does that influence and correspond to the seasonal nature of your work activities?
- Are there any particular social events, rituals or customs that are used to mark the seasons/ distinguish the seasons from within your institutional culture?
- How are the seasons marked or planned for differently in your personal life?
- What season/ time of year do you look forward to the most and why?

Calendars Kuaotunu Iwi/ Hapu Interview Structure

A Introduction & Background

- Whakapapa – relationships to people and place
- Background to Ngati Huarere ki Whangapoua
- Mautauranga Maori perspective
- Past, present & future

B Seasonality & Calendars in Symbols and Practice

- How do you see the calendar year in terms of Maramataka – lunar cycles? What shape is the year? When does it start/renew? Matariki?
- How do you see seasonal cycles or phases within the year?
- How are seasons specific to Whangapoua and Ngati Huarere?
- What are some key signs/ Tohu that you use?
- What practices are associated with specific seasons?
- How are local seasons celebrated/ marked through customary rituals?
- How is the year traditionally planned around seasons?
- How is this reconciled with the Gregorgian calendar?

C Changing Seasonal Knowledges and Future Outlook

- Do the local seasonal tohu still hold true? Are they still monitored through customary practices or are they changing?
- How is environmental knowledge shared and passed on within your hapu? Both customarily and in present times.
- How is this different from other iwi/hapu?
- How does this knowledge compare with western ideas of seasons and seasonality? Commonalities and differences.
- How is indigenous knowledge being applied to present day environmental issues including climate change?
- What is the potential contribution of this knowledge for the future?

Calendars Kuaotunu Regulatory Institutional Interview Structure : DOC

A Introduction & Background

- History with Coromandel & Kuaotunu – personal & institutional
- Motivations Ideologies & World Views

B General perceptual understanding of Seasons & Seasonality

- What is your understanding of seasons on the Coromandel and Kūaotunu and how this relates to local climates and ecosystems on the East Coast?
- How do Kūaotunu's habitats/species differ in their seasonal/annual/ long-term cycles? How does this relate to human activities?
- What are the other patterns/cycles/temporalities at play within local ecosystems? Eg. Tourism, Funding, Cyclones, Species migrations, Pests etc.

C Practices, Monitoring & Processes of Change

- How does DOC accommodate seasonal change and variability in ***planning***?
- How does DOC accommodate seasonal change and variability in ***practice***?
- What are the key seasonal 'markers' (phenomenon/conditions/events) of your practices over the course of the year?
- How is environmental change monitored by DOC? Within and external to practices? How/is seasonal variability captured within this?
- How/is local knowledge of environmental change typically shared between DOC with other statutory authorities and local communities?

D Planning for Future Scenarios

- How is DOC planning for future change at national and local levels?
- How is this shared with/contributed by other statutory authorities?
- How is community monitoring and expertise currently accommodated in planning?
- What are the opportunities and constraints to future planning?
- What are the major issues and concerns for Kūaotunu for DOC?

Calendars Kuaotunu Regulatory Institutional Interview Structure : WRC

A Introduction & Background

- History with Coromandel & Kuaotunu – personal & institutional
- Professional biography
- Motivations Ideologies & World Views

B General perceptual understanding of Seasons & Seasonality

- What is your understanding of seasons on the Coromandel/Kūaotunu and how this relates to coastal ecosystems elsewhere in the Waikato?
- How do Kūaotunu's coastal habitats/species differ in their seasonal/annual/ long-term cycles? How does this relate to human activities?
- What are the other patterns/cycles/temporalities at play within local ecosystems? Eg. Tourism, Funding, Cyclones, Species migrations, Pests etc.

C Practices, Monitoring & Processes of Change

- How does Coast Care accommodate seasonal change and variability in ***planning*** *&* ***practices***?
- What are the key seasonal 'markers' (phenomenon/conditions/events) of Coast Care/WRC practices over the course of the year?
- How is environmental change monitored by Coast Care/WRC? Within and external to practices? How/is seasonal variability captured within this?
- How/is local knowledge of environmental change typically shared between WRC with other statutory authorities and local communities?

D Planning for Future Scenarios

- How is WRC planning for future change at national and local levels?
- How is this shared with/contributed by other statutory authorities?
- How is community monitoring and expertise currently accommodated in planning?
- What are the major issues and concerns for Kūaotunu/Coromandel for WRC?

CALENDARS : Kūaotunu Regulatory Institutional Interview Structure
WRC/ Coast Care

Summary lines of questions:

- Professional background: motivations and ideologies
- Understandings of local seasonality at Kūaotunu : social and environmental
- Other rhythms and cycles of influence within the wider coastal environment
- Group dynamics and co-ordination of Coast Care activities at Kūaotunu and across wider Waikato
- Planning and practicing seasonality in Coast Care operations at Kūaotunu
- WRC / Coast Care monitoring of local environmental change – at seasonal and other scales
- Coast Care monitoring and 'adaptations'
- Communicating insights with other authorities and local communities
- Future directions : key opportunities and issues for WRC/Coast Care in Kūaotunu and wider Coromandel/Waikato

CALENDARS : Focus Group Workshop Facilitation

Introduction

Also, remember to commit to memory the most basic form of pepeha first

Tēnā koutou, ko Kerstie au,

He rangahau au i Te Kunenga ki Purehuroa

nō Te Kauaeranga au, Tēnā koutou katoa

in case you have to say this without any preparation, or you may be nervous and decide to just stick with the small version.

Tēnā koutou katoa
Ko Ingarangi
te whakapaparanga mai
engari
Ko Te Tara-O-Te-Ika-A-Maui te kāinga
Kei Te Kauaeranga au e noho ana
He rangahau au i Te Kunenga ki Purehuroa
Ko Kerstie au
Tēnā tātou katoa

Welcome :

Nau mai, Haere mai! Welcome! And thank you for giving up your time to participate in this workshop and in Carrie's case for giving up her house!

The original plan was to hold the workshop out of the Kūaotunu Hall – but unfortunately the one date that eventually worked for everyone clashed with scheduled maintenance works to the Hall! So, a huge thank you to Carrie for stepping in on my behalf!

This also sets the tone for the workshop where we are going to be looking at **Adaptive Planning** with local Environmental Groups.

And because you are all here representing various local environmental initiatives you are showing a commitment to the Kūaotunu Environment as well as an openness to working with others – both of which are needed for this workshop session to be constructive.

I am aware that some of you have been involved with adaptation planning through Councils SMP to varying degrees. Although the workshop ties in with TCDCs work on the SMP, which is why we have Jamie from TCDC here, it is being held independently for the purposes of my research based on the Kūaotunu Peninsula. Although it requires familiarization with Kūaotunu it does not assume any prior knowledge of the SMP – although I'm sure Jamie will be happy to answer any questions on this….!

At the same time, the discussions we are going to have are ***not*** designed to be representative of the wider Kūaotunu community ***or*** its environmental groups. But by working with representatives from the groups I have specifically engaged with for my research, it is a bit of a pilot study involving a unique mix of people, hopefully sharing a unique set of insights and ideas within the adaptation space.

It also gives me the opportunity to try out a few things on you all!!

So thank you for volunteering!

Our Focus :

So, what are we going to be looking at specifically over the next three hours?

Topic : *The role of local Environmental Groups in Adaptation Planning on the Kūaotunu Peninsula*

There is increasing recognition that Environmental Change, including projected scenarios of Climate Change, is uniquely experienced from place to place and community to community. And that recognising and responding to change involves local as well as expert knowledges.

Through ongoing restoration and maintenance activities, local environmental groups are inherently monitoring and responding to change. At a basic level this involves changes from season to season – which is where my research has been focused with individual groups. But I am also interested in how these seasonal practices and monitoring pick up and respond to longer-term changes over time – including social forces of change.

Grassroots environmental initiatives are equally important in offering routes for the local community to engage with one another as well as the local environment in collectively responding to and planning for broader change.

The SMP process has independently identified coastal restoration as first step in adaptation pathways, which is already being done to varying degrees on Kūaotunus beaches. There are also other groups working on wetlands etc. that contribute to the natural buffer against flooding and inundation.

We are wanting to explore what work is already being done, how environmental groups are responding to changing conditions and what initiatives groups are independently working towards in terms of future scenarios – as well as any issues that make this work difficult.

The workshop has been designed as a focused conversation as a way of sharing ideas and perspectives rather than working towards decisional outcomes and actions.

At the same time, it is hoped that we will be able to identify some common ground and consensus in acknowledging the work you are already doing while being able to move forward with your mahi in the context of change.

Any questions before we get onto introductions?

What has Summer 2023 taught us about living with Change?

What is a typical Kūaotunu Summer?	What was different about Summer 2023?
Pressure on infrastructure	Less people
Hot temperatures	Closed roads
Diseased flora and fauna in natural habitats (due to heat)	Wet (opposite to drought) = high water table
Sharks	Trees & branches down (winds)
Jellyfish (bluebottles & stingers)	Increased growth in plants generally including natives and weeds
Spinafex	Increased beach erosion
Dotterels & Oystercatchers	Record cyclone events
Pohutukawas	Different fruiting and seeding patterns in native plants
Summer Cyclones	Garden losses
Summer microclimate is different from Whangapoua to Whitianga	Flooding
Increased plant growth and weeds	General anxiety amongst people
More boats, people and rubbish	Chemical damage to plants in unflooded areas (salinity?)
Increased pests	Wind damage to new/young plants
Recreational fishing	Tracks lost/ damaged
Nesting dotterel & Kiwi need protecting	Oystercatchers @ Otama failed to nest
Dry/ drought conditions	Dead seabirds washed up @Matarangi
Beach swimming & ice creams	Increased plant disease because of humidity
	Less outdoors activities
	Less sun
	Extended tidal movements
	Damage to property

How did Summer 2023 affect you?

Concerns	**Activities**
• Pressure on 'workers/agents' (volunteers/council workers etc) • Proliferation of weeds • Overwhelming amount of works required • Little to no progress made (in group activities/projects) • Increased time & cost implications • Negative public opinion/ perception of restoration work as failing (highlighting lack of awareness/knowledge) • React versus adapt • Self-interest vs. wider perspective	• Remediation requiring more physical works • Repairs – mainly to fencing and track access • Increased weeding operations required • Seed collection (availability & timing) affected – especially Spinafex = very difficult • More people/activities and hours required • Responding, recovering and reacting instead of improving (TCDC)
Observations	**Feelings**
• How quickly things can change and need to adapt even in an environment you think you know • Negative attitudes towards beach restoration projects, including people who were formerly supporters • Lack of knowledge/ awareness of SMP • Some volunteers came through to put in more hours in the wake of cyclones • Having to change the way we do things • Need to scale up planning around Gabrielle-type events • Lack of support from agencies	• General frustration • Feeling of hopelessness • Feelings of loss • People responded very emotionally • Negative & despondent feelings • Stress all around

• Knee-jerk reactions from agencies that resulted in loss of support • Make hay while the sun shines = make best use of good weathers • No acknowledgement of where dunes did work and hold up = sharing the story • Resources stretched too thinly = generating tensions and stress • Lack of data/ measurement data = missing in improving knowledge. Frustration over lack of historical data/information to refer to.	

What were the key impacts on the Kuaotunu Peninsula?

Socially	**Environmentally**
Chronic disruption (overall)	
Lack of people (visitors) = good and bad consequences	Loss of secondary bush growth
Disruption to work plans for environmental groups	Loss of ecosystems (dunes)
Isolation of community from health services	Proliferation of weeds
People's perceptions/ reactions and 'unsettled' emotional states	Flooding & inundation (including to property)
Economic disruption including loss of income/ revenue to individual businesses as well as cost of public remedial works	Less pests (in valleys)
Increased community cohesion (positive)	Additional remedial works required in native habitats
Storm damage to property public & private (& repair/cost implications)	Publicity/ highlighting issues as a result of Cyclone experience
Loss of/ compromised infrastructure (ongoing)	Damage to dune systems
Increased anxiety and aggression (espec. through social media)	Shoreline erosion and habitat loss = although expected

How has the community responded?

- A lot of panic
- Huge underlying stress for properties/ businesses (on the back of Covid)
- Double stress for second-home owners = people with two houses – both of which may have been flooded
- Increased engagement (good and bad) is still engagement
- Kūaotunu communities have been generally cohesive and strongly supportive of each other during the Cyclone periods. Pulling together differently from how they might have previously = improved cohesion. Very different to Whitianga experience as a large town.
- Waning support for coastal restoration - highlighting a lack of awareness/ knowledge

What does this tell us about adaptation?

- Tough decisions need to be made through compromise
- EG @ Otama forestry and subdivision practices highlighted as inappropriate
- Public understanding. Or don't want to?
- General education/ awareness of coastal processes (including managed retreat) needed
- Small connected communities pull together. 'Culture of connectedness'
- Environment groups are important environmental lobbyists
- Insufficient funds and resources currently
- Land use and planning needs to be improved

How might we approach future change?

- Implement SMP – don't put off
- Change in approach needed based on improving systems and operations
- Learn from examples of good practice elsewhere (globally) on conserving water/ agriculture etc
- Planning needs to be future-focused. Take a long-term approach for future generations
- Prioritise protecting the environment in planning & decision-making
- Government assistance, including financial needed

How are Local Environmental Groups Working with Change?

Current Practices	**Changing Systems**
• Predator/weed control • Local community involvement • Plantings • Working bees • Plant supply/eco-sourcing • Track development • *Local knowledge & skills base* • *Communication & collaboration*	• Funding sources & availability • Climate/ environmental change • Volunteer availability and recruitment • Community/public awareness • Weed control • *Social media working against groups* • *Leadership & changing roles* • *Resistance to change*
Future Aspirations	**Underlying Issues**
• Increased knowledge/understanding (community/public) • Communication/collaboration • Community/ agency engagement • Expansion of environmental operations • Strategic planning and management • Development of skills etc • *Recording and managing data on progress over time* • *Increased volunteer membership*	• Funding • Time constraints • Resources (material, time & financial) • Social media • Volunteer availability (recruitment & ageing) • Agency transparency • Respect for agencies/ politics • Managing relationships • *Divided communities*

WAVE ANALYSIS SUMMARY

Current Practices

Predator & Weed Control	• Predator control & elimination • Education on trapping • Sourcing free bait • Maintaining traps
Community Engagement	• Common community goals • Social focus • Involving local community • Well supported (CoastCare & MBET) • Empowering volunteers
Communication & Collaboration	• Membership : social media & networking/ website and emails • Promoting dune care within the community • Collaborating with diversity of other organisations/agencies
Planting & Weed control Practices	• Regular working bees • Extensive coastal plantings between Whangapoua and Whangamata
Track Development & Maintenance	• Recreational & trapping tracks development & maintenance
Bush Monitoring	• Forest observations (through trapping)
Beach Maintenance	• Beach push-ups
Seed Sourcing & Plant Propagation	• Ecosourcing seeds locally for propagation within local nursery

Changing Systems

Funding	• Funding stress x6 • Rising costs of funding projects
Volunteers	• Volunteers hours available • Volunteer availability x5 • Volunteer ageing • Recruitment & retention
Changing Climate	• Sea level rise • Flooding & inundation • Increasing and more severe/ extreme weather events x4 • Damage to property/ environment & infrastructure
Leadership & Turnover	• Changing roles within organisations x2 • Ageing residential population not being replaced in key roles
Divided Communities	• Apathy vs. resistance within non-participatory community • Ranging levels of awareness/ knowledge on coastal processes and environmental issues x3
Social Media	• Making everyone experts = keyboard warriors
Pest Species	• New animal & plant pest species with expanding ranges/distributions • Periodic surges/ explosions of pest populations • Biosecurity compliance issues
Plant Supply	• Unreliable seed sources for native plant propagation • Changing requirements for plants : propagation & planting
Resistance to Change	• Local community • Agencies & organisations

Future Aspirations

Weed & Pest Management	• Predator-free reserves • PFHC • Completed trapping networks • Invasive weeds controlled/eradicated
Habitat Restoration & Enhancement	• Enhance native flora with appropriate companion species • Enhance native flora and fauna • Demonstrate resilience of restored ecosystems • Develop management plans for reserves • Expediate progress of works to increase ecosystem resilience to changing climate
Community engagement/ Volunteer membership	• Expansion of works through increased labour availability • Delegation of roles within groups through increased membership and skills base • Less hui more dui • New leaders • Expanded volunteer base • Engaging with youth • Employ additional labour for more difficult/specialist works • Wider community engagement
Nursery Operations	• Finding efficient way to propagate and grow spinifex • Expand nursery to be able to supply more plants
Relationships	• Balancing expectations • Improved communication & collaboration • Increased understanding/ appreciation of volunteer agency/influence
Education	• Natural instinct to care for the land in the first instance • School education & integration • Increased awareness of importance of and support for coastal restoration initiatives • Change in culture/thinking to put natural environment first in all decision-making
Coastal Restoration	• Maintain & rehabilitate dunes • Manage public access to dunes

	• Long-term coastal restoration planning
Planning & Governance	• Better frameworks to increase resilience and adaptation to environmental change • Implement Coastal Adaptation Plan • Independent thriving Kaupapa • Grassroot organisations better supported • Community-led adaptation planning
Recording & Managing Progress	• Improve recording and management of data to track historic and future changes • Monitoring & capturing our story of change over time • Documenting/ recording ngahare changes because of our mahi
Funding	• Increase funding to groups • Funding of external contractors

Underlying Issues

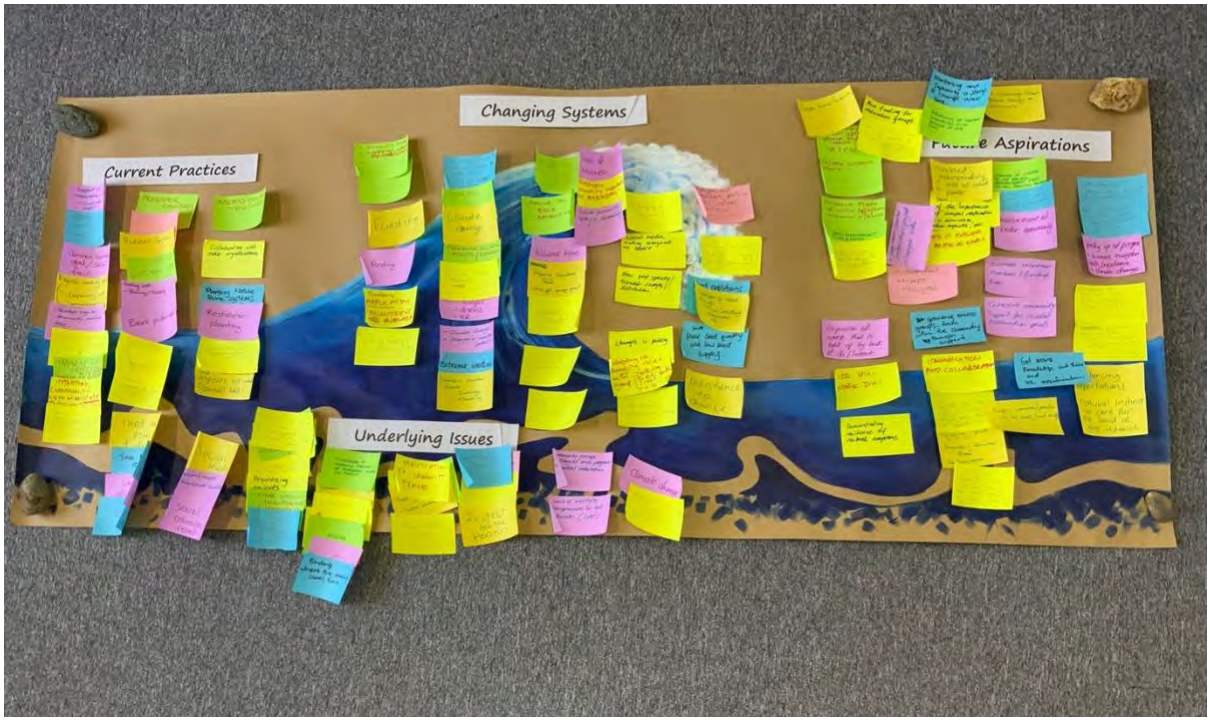
Time	• Need more hours in the day x4
Social Media	• Keyboard warriors x2
Relationships	• Social cohesion & respect • Respect for people/ individuals within organisations & agencies
Education	• Understanding the issues • Wider community indifference & ignorance
Politics & Governance	• Policy – public disconnect • DOCs 'Divesting' strategy • Project prioritization • Summer storms puts everything else on hold • Limited 'agency' of people • Perception/ opinion of TCDC • Transparency from agencies
Funding	• Insufficient funds x8 • Competing for funds with other work-streams • Tolerance of predator control methods for funding
Social/ Community	• Ageing volunteer base • Lack of volunteers – especially for difficult works • Small resident communities • Motivation & commitment lacking
Environmental Change	• Climate Change x2

Summary of Key Insights

- Environmental Groups are not at the forefront of change. They are holding the fort 'coping' in current culture of carrying on living as we are. Adaptation is not the way to change our environmental problems. We need to change the way we live.
- But EGs are making a stand/difference. Important that we keep doing what we are doing. From a community engagement as well as environmentally. Because we need to engage people in these local environmental issues.
- People need to change the way we work together. Reciprocal support needed between local groups and Council.
- Some inefficiencies inherent in many small groups instead of working collaboratively. Need to find a balance and so that potentially more could be achieved.
- Good skill-sets exist in many local community groups but requires skilled management to optimise. Local groups need to be supported or to be able to access support to leaders and prevent burn-out. Because volunteers are not a typical employee contract/arrangement – requires particular skills to manage.
- Need to improve networking and access to other support groups – Predator-free Hauraki Coromandel as an example. Share resources and experiences.
- Bringing together community initiatives to support each other, while maintaining their independence. No umbrella arrangement required.
- There are some people who will always be resistant to becoming involved and contributing to environmental issues.

Summary of Key Takeaways

- Shared passion to maintain and grow environmental group works
- Small-scale locally based groups are most effective as pieces in a bigger puzzle
- Methods of volunteer engagement/recruitment and retention need to improve. Maybe need to stop seeing them as volunteers and look at another model?
- Volunteering public helps/ is part of the public education process in environmental group works – including coastal restoration.
- Issues with engaging youth and family aged volunteers and recruitment is particularly problematic on the Kūaotunu Peninsula. Families are too busy and youth can't afford to be engaged for 'free'. And youth base is getting smaller on the Kūaotunu peninsula – leaving ageing/ retirement population as primary volunteer workforce.
- Maybe need to look at school engagement further to get kids/families interested in helping long-term as part of school projects/ curriculum of connecting with local environment.



Showing above the ‘wave analysis’ table runner (drawn by a local Thames artist) that was the focus for workshop discussions on how local environmental groups are working with change in and over time at Kūaotunu.

CALENDARS PROJECT**: Coromandel Kuaotunu Research Group Observation Record** **Date/Time:**

Location:

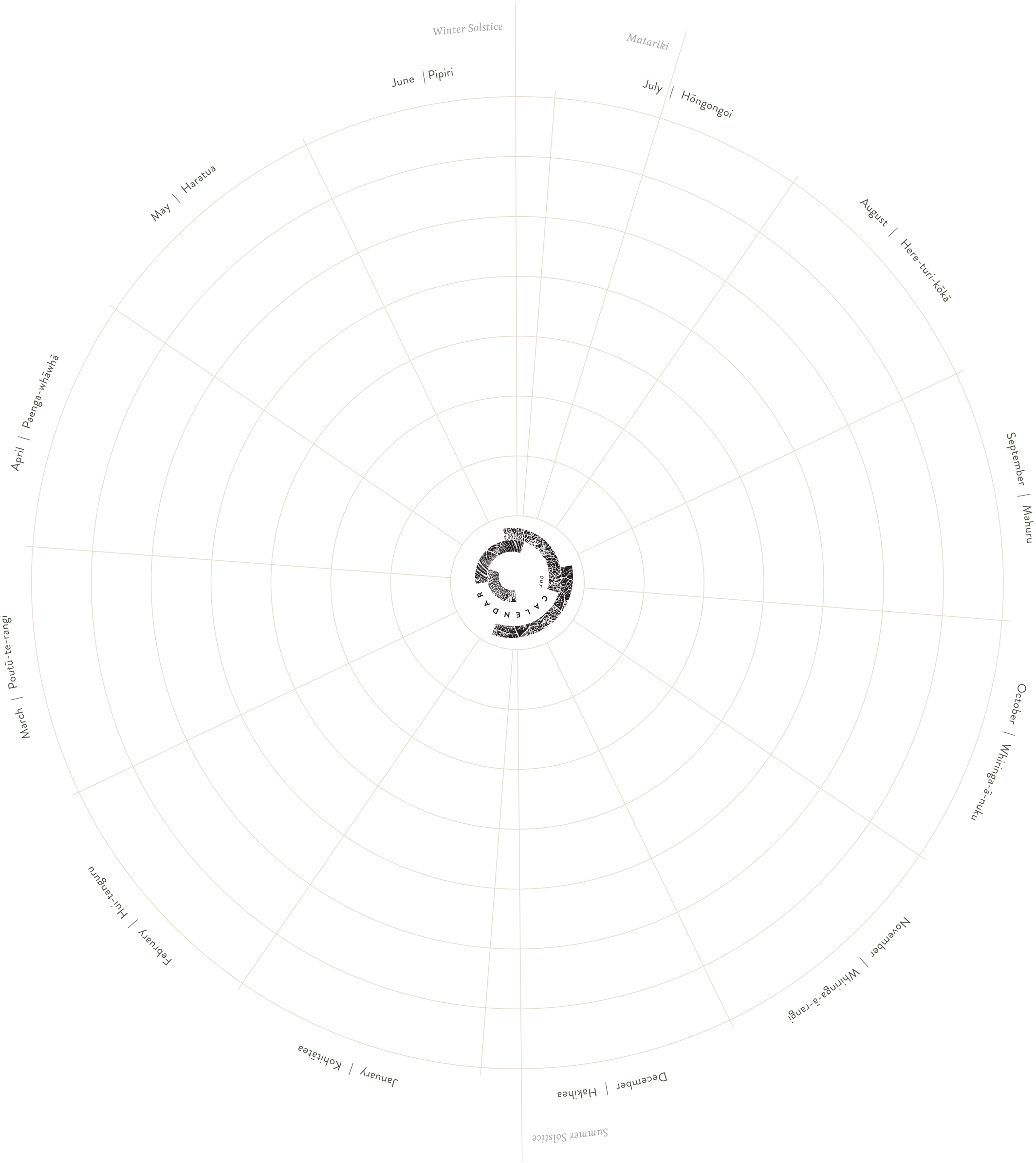
Activity/ Event:

Conditions:

SCENE *Physical & Social Arrangements*	
ACTORS & AGENTS *Group dynamics* *Hierarchies & Categories*	
OBJECTS & ARTEFACTS *Tools & Objects*	
OBJECTIVE & FOCUS *Motivations & purpose*	

SCHEDULING ROUTINE/ RITUAL *Timing/ patterning in relation to other activities*	
MOOD/AFFECT/FEELINGS/AMBIENCE *How is this expressed overall & individually?*	
PARTICIPANT COMMUNICATION/ INTERACTION	
RHYTHMS & PROCESSES Episodes/life cycles or socialization processes (social & physical) evident	

Key Conversations



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND
erc
European Research Council
CALENDARS

Participant/s:								
Interview ID		White female 50-60yrs		Maori Male 60's		White Male 60+		White Female 50-60yrs
Institution		Retired Permanent resident (10+yrs)		Retired permanent resident of Ngāti Huarere descent		Semi-retired permanent resident		Retired semi-permanent resident
Date		ORG Committee Member		Ngāti Huarere ki Whangapoua Trust		Nursery Trust Manager		KDCG Committee Member
Place		42 Years owning a bach in Otama		60+ years since growing up in Whangapoua		20+ Years as a permanent resident		35yrs visiting Kūaotunu
Time								
Duration								
	STRUCTURAL DIMENSIONS	**Seasonal Perceptions** (perspectives and references)		**Seasonal practices, observations & experiences**		**Seasonal Changes**		**Adaptive Responses (**resilience, adaptation & transformation)
		In Māoridom, it's not just ownership. Its kaitiaki - we care about the environment. The land is, I guess that's the most physical part. So it's what we sort of relate to…that when we go into the ngahere - the bush, it's about going in there and appreciating what nature is about and trying to preserve it….because it's not ours - we are temporary - it's permanent. And if we can pass it on in a better condition and teach our future generations to do that - the earth and world should last a lot longer. And It's people as well. If we can educate people by living how we want and how we live and set an example for the next generation, that it's not a possession, it's a tenancy, really.		*When it should be done, is if you're relating it to seasons. To me, when it closes off that lagoon is the breeding season for everything. It's full of little mussels, its full of the white bait or its full of birds, everything like that. So, it definitely is part of the natural cycle of it. If we interfere with it, well, you're interfering with the whole….Natural cycle of it*		*Yes, I think I think the big thing is the seasons are changing and they're changing quite dramatically NOW, whereas through my younger days those changes weren't really noticeable. But change seems to have speed up. You know, it's like that incremental curve that you see in that there's more volatility in our seasons now. And more extremes noticed in the weather. And for us, you know, I guess in the nursery we try and compensate for what the weather's doing.*		*So, we're saying to ourselves, well, is there any harm in growing some of those plants earlier and carrying them in the nursery longer and actually providing a bigger, stronger plant at the end of the time for us to put in the dunes? So, with the big order of knobbys that we did, we actually planted them in the autumn. And we have to look and say, OK, is the effect of doing that advantageous to the planting programme, or is the disadvantageous: are they too big? Are they curling over at the top? You know, it looks to us at the moment that we can provide a bigger, stronger plant if we take them through longer than squeezing the growing time down. So those are some things that we look at. Kit*
APRIORI THEMES	*Place-based Factors*	*Socio-Cultural Factors*	*Institutional practices & rhythms*	*Observations and experiences*	*Environmental Change*	*Social Change*	*Experiential learning and interpretation*	*Adaptation*
EMPIRICAL THEMES	*Shared references to community motivations and benefits alongside environmental objectives identified by alll. In spite of recent and historic tensions in community relations at Otama.*		*Strong seasonal patterns to planning and carrying out conservation activities in relation to summer tourist season as much as by natural cycles.*		*Environmental change directly linked to social changes and cultural differences.*		*Experiential learning, including through sensory. Citizen science without prior knowledge and background. Alongside observing and learning from others.*	

APPENDIX G : **‘Hybrid Sample’ of the Template Analysis Matrix used with the combined research data**

APPENDIX H : **Massey University Human Ethics Code : Principles Applied to CALENDARS Project & PhD Research**

Ethics Principle	CALENDARS Project General **(Approved)**	PhD Specific **(Applied)**
Autonomy	*We will ensure that we collaborate with all research participants equally, with openness, tolerance, and respect. Information sheets and consent forms will always be provided to participants with time to consider, review and sign before engaging in any research activities, to ensure participants free and informed consent. We will not use any methods that withhold information about the purpose and/or procedures of the research. Following the Massey Ethical Code and the Privacy Act 1993, confidentiality will be assured according to a robust Data Management Plan. We will give attention to participants conflicts of interests in participating and ensure that any potential burden of research participation is distributed as fairly as possible.*	Specific information sheets and associated interview questions have been produced for this PhD research, while utilising the generic consent forms of the CALENDARS Project. Concurrently, prospective participants are to be informally briefed on the nature and scope of the PhD research prior to confirming their engagement Confidential data is managed through the CALENDARS Project.
Avoid Harm	*The CALENDARS project is designed so as to avoid harm to participants and project researchers, and project researchers will do everything in their power to ensure this. Through collaborative relationships between the project's researchers and institutional actors, participants will be empowered to become active 'co-investigators' in framing, designing, carrying out, analysing and disseminating the research. Through this process, those who participate can actively shape the project in a way that protects their interests and avoids harm. In this way, the project will avoid physical harm, and any psychological harm or damage to anyone's reputation, dignity and relationships with others. Confidentiality will be ensured according to the Data Management Plan.*	The nature of the research avoids scenarios for physical and psychological harm to either participants or researchers. The collaborative nature of the research is designed to respectfully invest in relationships with and between participants – the majority of whom will already be known to one another as Kūaotunu locals. While some conflict amongst locals is inevitable, the ethnographic fieldwork is designed to work with participating groups/organisations individually. The Focus Group Workshop event will subsequently be facilitated around common conservation interests, while being creatively designed to foster the evaluation of alternative views. Confidential data is to be managed through the CALENDARS Project.
Benefits	*Benefits for participants, as well as for the wider community, are derived from the co-production aspect central to CALENDARS. Participants are actively involved; from framing the research and designing how it is conducted, to analysing the findings and sharing this information. Consequently, participants are also in control of the benefits that the research will bring. In practical terms, these can range from a more nuanced understanding of how to structure activities based on seasons to being engaged in citizen science and collecting data that can be used for purposes that contribute to climate adaptation.*	In addition to the broader benefits to participants intended by the CALENDARS Project, my research is designed to specifically benefit participating groups/organisations through the practical conservation labour that I volunteer as a method of observing participants in the field. In the planning of my research, I have been conscious to ensure, as far as is practically possible, for a reasonable distribution of my volunteer time between participating groups – certain tasks for which are inevitably more labour intensive than others.
Justice	*Benefits of research participation will be fairly distributed to all research participants and the wider community. This will be achieved through an inclusive approach that gives participants the opportunity to decide how the results will be disseminated. Options include creative work produced in collaboration with local artists, weather stations provided to local schools, and also how and where the research findings are published. Research participants will be given full control over the information and data that they bring to the project and will also be given the opportunity for editorial input into publications.*	While some groups/organisations are likely to benefit from more comprehensive insights into their seasonal rhythms than others, the collaborative sharing and evaluation of the research, including through the Focus Group Workshop has been specifically designed to ensure a fair distribution of benefits to participants, with potential applications for the wider community. The recruitment of coastal conservation initiatives from Kūaotunu has otherwise been designed to provide all resident groups/organisations with the opportunity to actively participate in the research, facilitated by the compact physical geography of the Kūaotunu Peninsula itself.

Ethics Principle	CALENDARS Project General **(Approved)**	PhD Specific **(Applied)**
Special Relationships	*This research will honour the ethical norms generated by the special relationships that the researchers have or that may develop through the course of the research through full transparency and a declaration of relationships before the fieldwork stage commences. This will include the relationships that have developed over time by being place-based. The relationships to institutions, communities, activities, objects, and places will be discussed and any 'red flags' identified in order to avoid ethical obligations and permissions that would not exist otherwise.*	The established professional relationships I hold with local Council (TCDC) staff has provided me with an introduction to the Coromandel Coastcare project, as a central focus of the research. It is acknowledged that my professional credibility and associated skills have benefited this engagement, while preceding introductions to local conservation groups made through the Coastcare initiative. By maintaining an open transparency of professional connections and affiliations, in my dealings with all participants throughout the course of my research, I have thereby avoided the potential for conflicts of interest. At the same time, I have continued to be guided in managing my relationships with research participants by the ethical codes of my professional background. My dealings with statutory agencies during the course of my research have additionally provided for their ongoing input and feedback into the research process to ensure an accurate reflection of all interests. Although I have a working and recreational knowledge of the Kuaotunu Peninsula in my professional and personal capacities respectively, I have otherwise had no prior involvement with the local conservation institutions involved in my research.
Whakapapa	*CALENDARS has initiated conversations with a Māori scholar at Massey University to be included in the internal advisory board. Trusting relationships with key informants who have legitimacy within the Māori community have begun as part of planning pilot interviews in 2020. We will employ a cultural interpreter to be part of these interviews. Reciprocity to iwi, hapū, whānau and Māori communities will be demonstrated through empowerment of participants to fully own all intellectual property shared with the CALENDARS project and also by being in control of all benefits derived from the research. Interviewees will be given opportunities to decide which information disclosed can be shared*	In seeking to represent a Mātauranga Māori perspective at the outset of my research, I have respectively sought out the three local iwi with intersecting rohe over the wider Kūaotunu area. In the process of engaging with Ngāti Huarere ki Whangapoua, through the Ngāti Huarere ki Whangapoua Trust, I have respectfully been led by the reciprocity of my interactions with core representatives both in the field and in korero held over the course of our engagement. As for all participants, representatives of Ngāti Huarere were provided with the opportunity to review and revise all recorded data, before being approved for use in my analysis.
Tika	*The purpose of involving iwi, hapū, whānau and Māori communities is to ensure Māori traditional seasonal knowledge and practices is considered alongside other seasonal understandings on the peninsula. The traditional relationship of Coromandel tangata whenua to the local seasons is central to understanding the local seasonal experience. In doing so, the researchers will do everything possible to honour the rights and interests of Māori and to contribute to building Māori capacity and welfare across the research stages and roles. For non-Māori-specific institutions, the same efforts to build capacity and welfare amongst these groups apply. This will be achieved through the co-creation process in which participants will be included in every aspect of the research.*	The research respectfully aims to benefit all participants as part of the wider Kūaotunu community – but specifically by acknowledging the legacies of its indigenous iwi including Ngāti Huarere, Ngāti Hei and Ngāti Tamaterā. Although the Kūaotunu Peninsula is currently 'unoccupied' by tangata whenua, my research has been proactive in seeking to engage with local iwi/hapū from the wider vicinity, in order to capture local traditional Mātauranga Māori knowledges of seasonal rhythms and practices from within the broader definitions of the Kūaotunu Peninsula. Ngāti Huarere were respectfully invited to share in the Focus Group Workshop, alongside other conservation group representatives and local agencies in order to be able to represent their Mātauranga Māori perspectives in local deliberations about changing seasons at Kūaotunu.

Ethics Principle	CALENDARS Project General **(Approved)**	PhD Specific **(Applied)**
Manākitanga	*Here the CALENDARS project's cultural and social responsibility gets brought to the fore. This will be honoured by treating all participants, their culture and their knowledge with utmost dignity and respect. By being sensitive to locally specific cultural protocols and traditions, and upholding the integrity of both the knowledge held as well as those who hold the knowledge, this research will hold its cultural and social responsibility in the highest possible standing. Practically, relative to Māori interviewees, their dignity and respect will be ensured through employing a cultural interpreter, and through guidance from the Māori scholar in the projects internal advisory board, including in the particular interview format.*	The project is specifically designed to be sensitively attuned to embracing cultural differences manifest in the value interpretations and practical pursuits of particular conservation organisations/groups to seasonal rhythms. In this way, participants from all backgrounds and cultures are treated with equal respect in both the conduct, evaluation and dissemination of research findings. Ngāti Huarere were respectfully invited to share in the Focus Group Workshop, alongside other conservation group representatives and local agencies in order to be able to represent their Mātauranga Māori perspectives in local deliberations about changing seasons at Kūaotunu.
Mana	*The CALENDARS project emphasises distributive justice and equity as core principles of the research. Māori participants will be in full control of their knowledge; through using a local cultural interpreter, and through the projects guiding principles of co-production, they will also be in a position to ensure that the benefits derived can be shared in a fair and equitable manner, both within their own iwi, hapū, whānau and Māori communities as well as with people in other institutions on the Coromandel. Through the co-production of research, we ensure that the research benefits will be directly accrued and shared by the Māori communities themselves, as an evolving understanding of their relationship to nature in their 'turangawaewae'; the local place to which they are connected and from which they are empowered. The research will endeavour to strengthen Māori culture, values, practices and language by bridging the 'old' (traditional knowledge and understandings of seasons) with the 'new' (how seasons are experienced in today's world) and also with the future (seasons under an altered climate). The guarantee of intellectual property rights and the storage of iwi-owned data on iwi data bases further contribute to the protection of Māori interests and therefore the principle of mana.*	Access to the local knowledge and seasonal traditions of Mātauranga Māori is seen to provide a valuable contribution towards evaluating the currency of seasonal rhythms on the Kūaotunu Peninsula and additionally considered of great potential relevance to conservation practices through their 'turangawaewae'. The research has sought to evaluate the seasonal traditions of Ngāti Huarere alongside that of current conservation practices as part of a mutually beneficial co-production of seasonal knowledge. The trajectories of traditional Māori knowledge provides valuable insights into seasonal changes through time, particularly when considered alongside current coastal conservation practices on the Kūaotunu Peninsula. While in the process of returning to their ancestral homelands, the Ngāti Huarere ki Whangapoua Trust were interested to explore their intergenerational customary seasonal knowledges through the research process.

Kerstie van Zandvoort

PhD Candidate

CALENDARS Project

School of People Environment & Planning

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Student ID:

Coastal Adaptation Pathway: Opito Bay

Policy Unit 92, Management Area E5

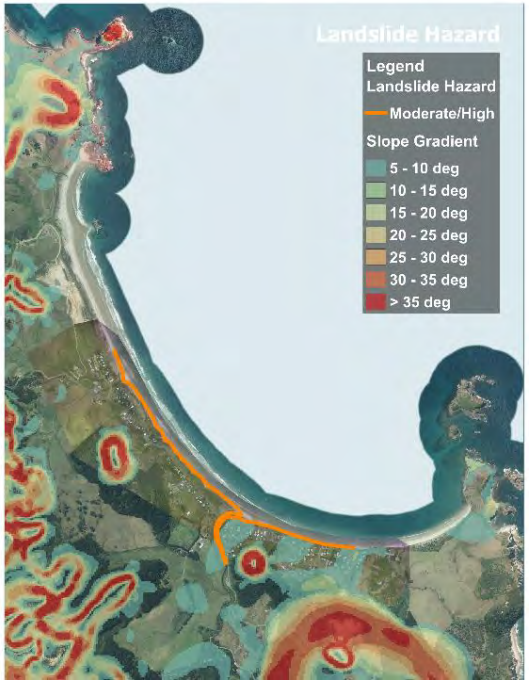
Introduction

Opito Bay is a 3.2km wide embayment on the Coromandel's east coast, which features the 4.2km long, sandy, north-east facing Opito Bay Beach. A dune system extends along most of the beach; however, its landward edge has been modified (mown; or built upon). The bay is characterised by low density residential and rural development. Black Jack Road, which transitions into Opito Bay Road at the Stewart Stream bridge, provides the primary access between Opito Bay and the remainder of the Coromandel. The Mercury Islands are approximately 8km offshore.

During the SMP project's scoping phase, this location was not identified as an 'at-risk' location (in the context of the wider Coromandel Peninsula), so inundation and erosion modelling/mapping was not undertaken. However, inundation information is available via WRC's *Coastal Inundation Tool (waikatoregion.govt.nz)* and TCDC District Plan Current Coastal Erosion and Future Coastal Erosion Lines are also available.

The Hazards

Sea Level Scenario		Sea Level (MVD-53)
Present Day	MHWS	1.1m
	Max Tide	1.3m
	Lower Storm Tide Range (Estimate)	1.4m
	Upper Storm Tide Range (Estimate)	2.1m
Future Projected 0.5m Sea Level Rise	MHWS	1.6m
	Max Tide	1.8m
	Lower Storm Tide Range (Estimate)	1.9m
	Upper Storm Tide Range (Estimate)	2.6m
Future Projected 1.0m Sea Level Rise	MHWS	2.1m
	Max Tide	2.3m
	Lower Storm Tide Range (Estimate)	2.4m
	Upper Storm Tide Range (Estimate)	3.1m



The Risk

Type	Year/SLR	Storm	Exposure	Vulnerability	Consequence
Erosion	2020	1% AEP	Low	Low	Minor
Erosion	2120	1% AEP	Moderate	Moderate	Moderate
Inundation	0 m SLR	1% AEP	Low	Low	Minor
Inundation	1.2 m SLR	1% AEP	Moderate	Moderate	Moderate

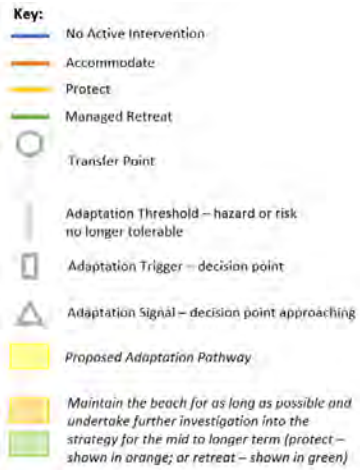
The Response

At the option assessment stage, the following adaptation options were considered:

Policy	Option
Be Prepared	Provide regular information to affected stakeholders on hazards, risks and management measures.
Be Prepared	Implement hazard warning systems and prepare emergency response plans.
Accommodate	Maintain natural defences through dune management; maintenance of sediment supply; maintaining foreshore vegetation and wetlands; and managing stock access to the foreshore.
Accommodate	Retrofit (including raising) buildings and infrastructure.
Managed Retreat	Changing planning practices.
Managed Retreat	Relocate assets.

On further examination, the 'Protect' option relating to the implementation of 'soft-engineering' practices was also considered.

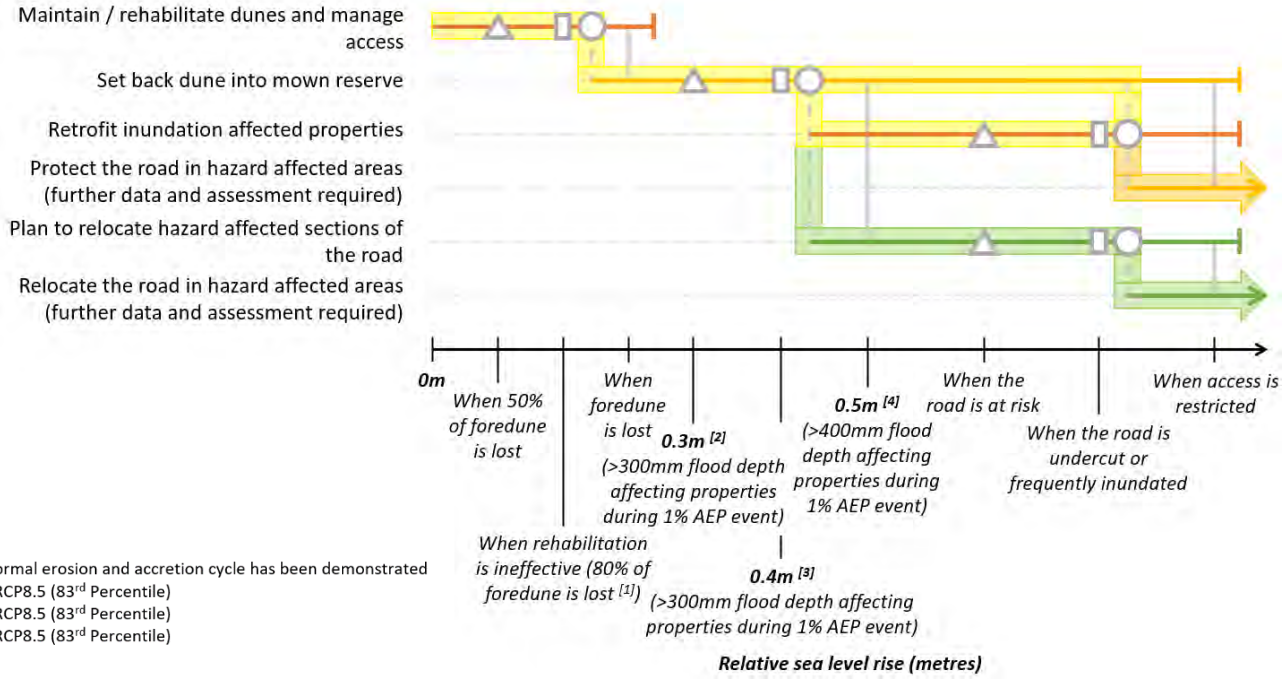
Adaptation Pathway



Strategy

The adaptation strategy advocated for Opito Bay relating to erosion is to maintain natural defences through planting native dune species and managing access. In time, with climate change this is not expected to be sufficient to limit erosion on its own. Therefore, if/when 80% of the foredune has been lost (and a recession trend outside the normal erosion and accretion cycle has been demonstrated), soft engineering measures should be implemented; setting the dune back into the reserve. Measures such as these will require management and potentially continued push-ups, planting and even reprofiling over time. With continued climate change, these measures are also predicted to become ineffective or uneconomic. At this point a decision will need to be made, based on further information, as to whether to relocate the road or to defend it.

With respect to inundation, with 0.4m of sea level rise, some properties are predicted to be affected by 1% AEP storm events, and in some cases will need to be raised.



[1] and a recessionary trend outside the normal erosion and accretion cycle has been demonstrated
[2] Approx. 34 years into future based on RCP8.5 (83rd Percentile)
[3] Approx. 43 years into future based on RCP8.5 (83rd Percentile)
[4] Approx. 50 years into future based on RCP8.5 (83rd Percentile)

Coastal Adaptation Pathway: Kuaotunu

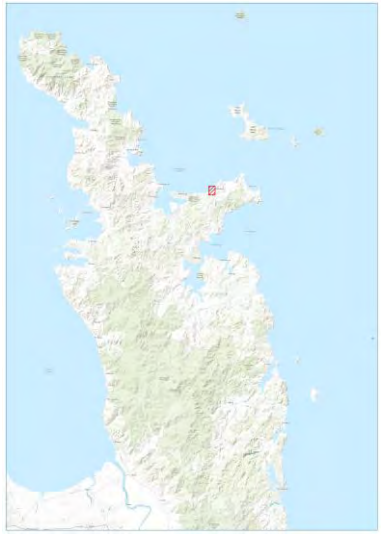
Policy Unit 86, Management Area E4

Introduction

Kuaotunu Beach is a sandy pocket beach on the Coromandel's east coast. Kuaotunu River outfalls at the eastern end of the beach. SH25 runs through the Policy Unit, generally following an alignment parallel to the coastline until it turns inland and crosses the river near its mouth.

Between the highway and the beach is a modified dune system, with some cleared open space reserve, and a few coastal properties. Landward of the road, there are further residential properties and open space.

The District Plan's Current and Future Coastal Erosion Lines are available for this location and show that the properties seaward of SH25 are at risk from erosion; see photo from July 2008 storm. Push-ups helped to restore the dune in this location.



The Hazard

The Risk

Type	Year/SLR	Storm	Exposure	Vulnerability	Consequence
Erosion	2020	1% AEP	Low	High	Moderate
Erosion	2120	1% AEP	Moderate	Extreme	Major
Inundation	0 m SLR	1% AEP	Low	Low	Insignificant
Inundation	1.2 m SLR	1% AEP	Low	Low	Insignificant

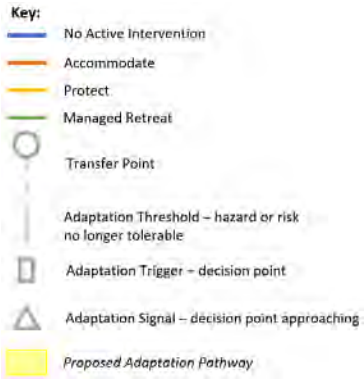
The Response

At the option assessment stage, the following adaptation options were considered:

Policy	Option
Be Prepared	Provide regular information to affected stakeholders on hazards, risks and management measures.
Be Prepared	Implement hazard warning systems and prepare emergency response plans.
Accommodate	Maintain natural defences through dune management; maintenance of sediment supply; maintaining foreshore vegetation and wetlands; and managing stock access to the foreshore.
Managed Retreat	Changing planning practices.
Managed Retreat	Relocate assets.
Managed Retreat	Provide accommodation space (e.g. space for habitats).

On further examination, the 'Protect' option involving adopting soft-engineering practices was also considered.

Adaptation Pathway



Strategy

The adaptation strategy advocated for Kuaotunu is to maintain natural defences through planting native dune stabilising species and managing access. With climate change this is not expected to be sufficient to limit erosion on its own. Therefore, if 50% of the foredune is eroded, planting should be enhanced by push-ups. Measures such as these may require management and potentially continued push-ups, planting and even reprofiling over time. In the long term, with continued sea level rise, these measures are also predicted to become ineffective or uneconomic. If they do, there is likely to come a point in the future when some coastal properties will need to be moved back/relocated or removed (and it is suggested that the trigger for this is when buildings are at risk of being damaged by a 1% AEP storm). This solution is advocated over the construction of hard defences in this location to maintain the natural beach in the long term.

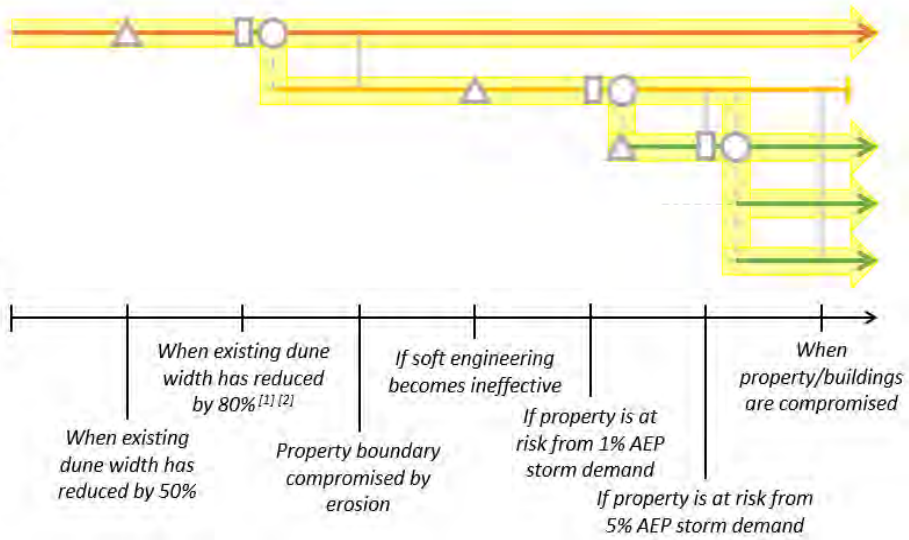
Maintain / rehabilitate dunes and manage access – strategy required regarding replacement of macrocarpa trees

Enhance the dune through push-ups and native planting

Change planning practices in preparation for the relocation of hazard affected assets and properties

Relocate assets in hazard affected areas

Provide space for nature in hazard affected areas where there is no existing development or where assets are relocated



[1] and a recessionary trend outside the normal erosion and accretion cycle has been demonstrated
[2] The width of the dune varies along the length of the beach

Coastal Adaptation Pathway: Matarangi Beach (West)

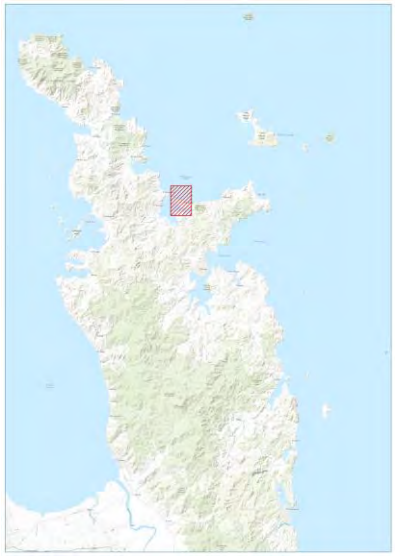
Policy Unit 79, Management Area E3

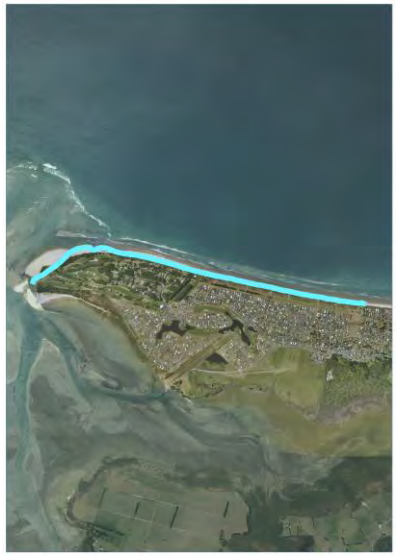
Introduction

Matarangi Beach is a Holocene dune ridge barrier spit system, influenced by a fluvial supply of sediment and, at its western end, the ebb tide delta/estuary entrance. It is one of the Coromandel's popular sandy east coast beaches.

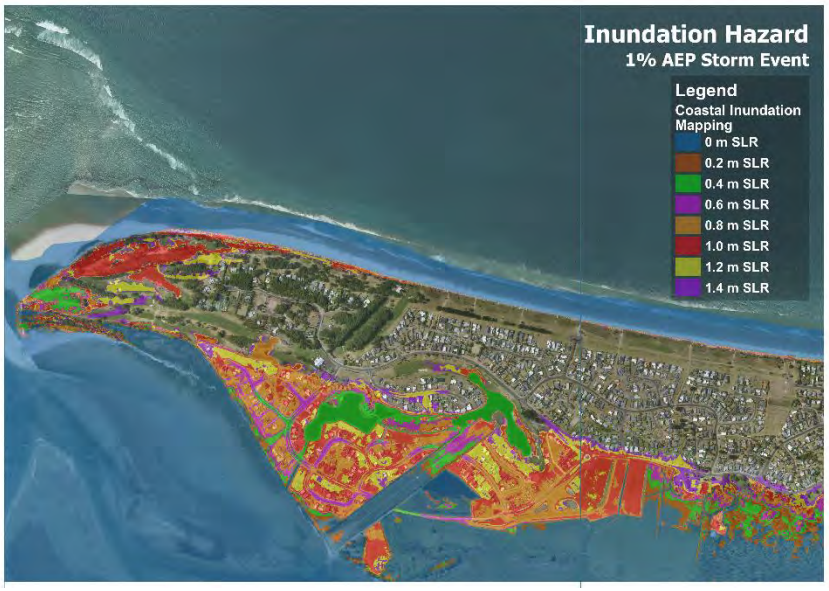
Development in the middle and at the western end of the beach is set back from vegetated dune system. During the planning for the residential development of Matarangi, the dynamic nature of the spit was acknowledged and therefore the area at the western end of the beach was designated as green space (now a golf course) to allow natural processes to continue.

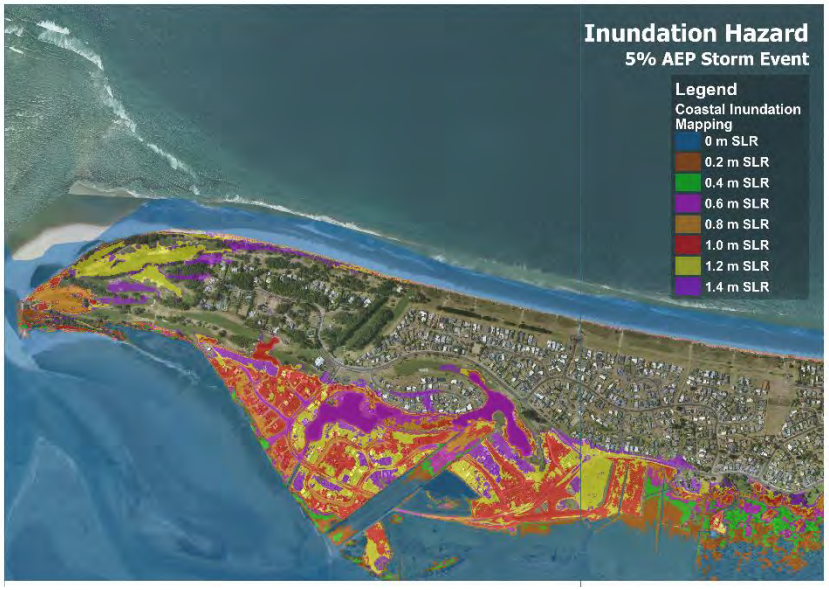
In general, the coastal hazards for this Policy Unit are limited.





The Hazards





The Risk

Type	Year/SLR	Storm	Exposure	Vulnerability	Consequence
Erosion	2020	1% AEP	Low	Low	Insignificant
Erosion	2040	1% AEP	Low	Low	Minor
Erosion	2070	1% AEP	Low	Low	Minor
Erosion	2120	1% AEP	Moderate	Moderate	Moderate
Inundation	0 m SLR	1% AEP	Low	Low	Insignificant
Inundation	0.4 m SLR	1% AEP	Low	Low	Insignificant
Inundation	0.8 m SLR	1% AEP	Low	Low	Insignificant
Inundation	1.2 m SLR	1% AEP	Low	Low	Insignificant
Inundation	0.4 m SLR	5% AEP	Low	Low	Insignificant
Inundation	0.8 m SLR	5% AEP	Low	Low	Insignificant
Inundation	1.2 m SLR	5% AEP	Low	Low	Insignificant
Inundation	0.4 m SLR	King tide	Low	Low	Insignificant
Inundation	0.8 m SLR	King tide	Low	Low	Insignificant
Inundation	1.2 m SLR	King tide	Low	Low	Insignificant

The Response

At the option assessment stage, the following adaptation options were considered:

Policy	Option
Be Prepared	Provide regular information to affected stakeholders on hazards, risks and management measures.
No Active Intervention	No action necessary or advocated.
Accommodate	Maintain natural defences through dune management; maintenance of sediment supply; maintaining foreshore vegetation and wetlands; and managing stock access to the foreshore.
Managed Retreat	Provide accommodation space (e.g. space for habitats).

Strategy

The adaptation strategy advocated for the western end of Matarangi Beach is to maintain natural defences in the area in front of the foreshore reserve. This should include rehabilitating the dunes through push-ups, planting and potentially the use of sand traps (fencing) when and if necessary, and managing access (i.e., through designated access routes).

At the end of the spit, it is important that natural processes are allowed to take their course because of the dynamic nature of this environment and the interaction between the spit and the harbour mouth, harbour/harbour channels, and beach.

Coastal Adaptation Pathway: Whangapoua Beach

Policy Unit 75, Management Area E1

Introduction

Whangapoua, and more specifically Whangapoua Beach, is one of the Coromandel's many popular sandy east coast beaches, lying between the New Chums Beach headland and Opera Point.

The vegetated dune system generally diminishes as you move south-east along the beach, from an approximate 20 m width at the northern end of the beach to a less than 10 m width in the south.

The beach is free from hard structures but is generally understood to be at risk from coastal erosion over its length. The photo included here was taken following the July 2008 storm event. Push-ups and planting since have helped to restore the dune in this location.

The Hazard

The Risk

Type	Year/SLR	Storm	Exposure	Vulnerability	Consequence
Erosion	2020	1% AEP	Moderate	Moderate	Moderate
Erosion	2040	1% AEP	High	Moderate	Moderate
Erosion	2070	1% AEP	High	High	Major
Erosion	2120	1% AEP	Extreme	Extreme	Extreme
Inundation	0 m SLR	1% AEP	Low	Low	Insignificant
Inundation	0.4 m SLR	1% AEP	Low	Low	Insignificant
Inundation	0.8 m SLR	1% AEP	Low	Low	Insignificant
Inundation	1.2 m SLR	1% AEP	Low	Low	Insignificant
Inundation	0.4 m SLR	5% AEP	Low	Low	Insignificant
Inundation	0.8 m SLR	5% AEP	Low	Low	Insignificant
Inundation	1.2 m SLR	5% AEP	Low	Low	Insignificant
Inundation	0.4 m SLR	King tide	Low	Low	Insignificant
Inundation	0.8 m SLR	King tide	Low	Low	Insignificant
Inundation	1.2 m SLR	King tide	Low	Low	Insignificant

The Response

At the option assessment stage, the following adaptation options were considered:

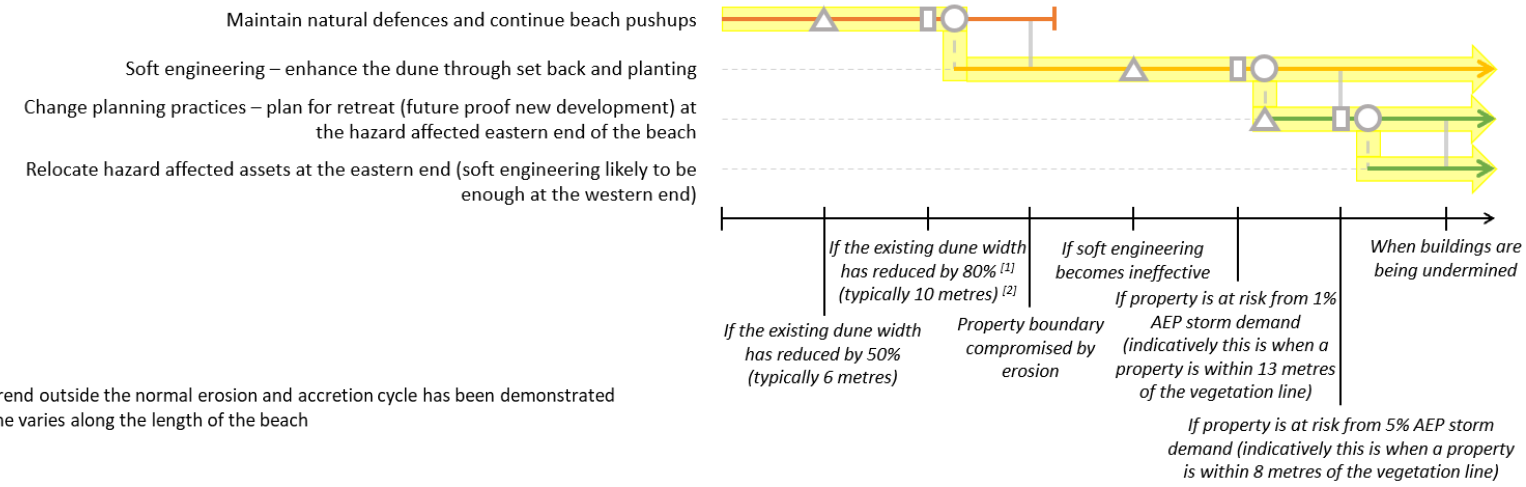
Policy	Option
Be Prepared	Provide regular information to affected stakeholders on hazards, risks and management measures.
Be Prepared	Implement hazard warning systems and prepare emergency response plans.
Accommodate	Maintain natural defences through dune management; maintenance of sediment supply; maintaining foreshore vegetation and wetlands; and managing stock access to the foreshore.
Protect	Enhance natural defences through beach re-profiling (push-ups).
Protect	Enhance natural defences through relocating sand within a sediment compartment (sand back passing) or through adding material to the beach (beach nourishment).
Protect	Construct an artificial reef.
Managed Retreat	Changing planning practices.
Managed Retreat	Relocate assets.

On further examination, the 'Protect' option relating to 'soft-engineering' practices was also considered.

Adaptation Pathway

Strategy

The adaptation strategy advocated for Whangapoua Beach is to maintain natural defences through push-ups and planting dune stabilising species. With climate change this is not expected to be sufficient to limit erosion on its own. Therefore, if 80% of the dune width is eroded and maintenance is ineffective, soft engineering measures should be implemented; setting the dune back into the reserve and undertaking dune planting. Measures such as these may require management and potentially continued push-ups, planting and even reprofiling over time. In the long term, with continued sea level rise, these measures are also predicted to become ineffective or uneconomic. If they do, there is likely to come a point in the future when some properties at the eastern end of the beach may need to be relocated or removed (and it is suggested that the trigger for this is when buildings are at risk of being damaged by a 1% AEP storm)[1]. This solution is advocated over the construction of hard defences in this location to maintain the natural beach in the long term.



[1] and a recessionary trend outside the normal erosion and accretion cycle has been demonstrated
[2] The width of the dune varies along the length of the beach

[1] In theory, the storm demand (or storm bite) associated with a 1% AEP storm event could remove 13m of beach in this location. Hence it is proposed that once the erosion scarp is within 13m of a building (and the dune is not stable or building) this risk needs to be acknowledged and should act as a trigger to 'plan for retreat'. The trigger for 'retreat' itself could be when the storm demand associated with a 5% AEP storm event is within reach of a building, but at this point personal risk appetite will play a part in decision-making (albeit the residual risk should be acknowledged).