Rivers, residents, and restoration: Local relations to the Waimatā River, Aotearoa New Zealand

Danielle Cairns

A thesis submitted in fulfilment of the requirements for the degree of Master of Science in Environmental Science, the University of Auckland, 2021

Abstract

Relational values incorporate a sense of place, identity and wellbeing that may motivate (or demotivate) individuals to engage with restoration activities. A mixed-methods approach explores local relations to the Waimatā River in Gisborne, a river of historical significance in many ways, including being the first meeting place between Māori and pākehā in Aotearoa New Zealand. The contemporary river suffers from high sedimentation rates, declining water quality, and poor biodiversity. Extensive forestry operations and agriculture are primary land uses in the upper catchment. Various farms and lifestyle properties make up the lower reaches, prior to (sub)urban developments within Gisborne itself and the associated port. The river is a cherished and frequently used space for recreational activities, including various paddling sports. Questionnaires and semi-structured interviews seek to explain perspectives upon the river among residents in different parts of the catchment, assessing how relations influence perceptions of current restoration activities. The majority of residents were unsatisfied with the current state of the river. Relations to the river have changed over time, particularly for longer-term residents (> 10 years). As the perceived health of the river declined over time, so did interactions with it, while emotional connections to it strengthened. Where residents lived within the catchment and how they interacted with the Waimatā River influenced their concerns and aspirations for it. Concerns and aspirations in the upper catchment were linked to forestry impacts, whereas residents in the mid and lower catchment were more concerned with swimmability, water quality, and aesthetic appeal. Time spent interacting with the river positively influenced mental and physical wellbeing. Drawing on lived experiences with the river, interview findings reveal various roles played by the river in residents' lives. Strong themes of responsibility and governance emerged, with forestry companies, Gisborne District Council, and agricultural practices held responsible for the river's current state. Prospectively, incorporating local knowledge in the design and implementation of restoration activities could enhance long-term prospects for success through programmes that sustain public support for and engagement with conservation initiatives.

Acknowledgements

Thank you to my supervisors Gary Brierley and Gretel Boswijk. I cannot thank you enough for your patience, inspiration, wisdom, feedback and effort in helping me produce this thesis. I could not have done this without you both. Thanks also to my supervisor Jane Groom from Auckland Council.

Thanks to Lois Easton, Laura Watson, and Dame Anne Salmond from the Waimatā Catchment Restoration Project and Waikereru Ecosanctuary for their local knowledge in the Waimatā River and guidance in carrying out this research. I can't wait to see the future of the Waimatā River.

Thank you to Auckland Council for financial support through the Masters Student Partnership and the New Zealand Rivers Group for financial support during this research.

To the other SoE research students at UoA, thanks for the chats when we weren't in lockdown, in particular Khendra Harvey for all the trips down to Gisborne and time on (and in) the Waimatā River.

Lastly, a massive thanks to my family and friends for your loving support. Thanks for looking after me, proofreading, and making sure I left my computer occasionally.

Table of Contents

List of Figures

List of Tables

Glossary

Aotearoa	New Zealand
Awa	River
Hapū	Subtribe
Hongi	Māori greeting
Iwi	Tribe
Kai	Food
Kaitiaki	Guardian
Kaitiakitanga	Stewardship
Mana	Power
Mana whenua	Indigenous people with rights over land
Manākitanga	Generosity, hospitality
Māori	Indigenous people of New Zealand
Maunga	Mountain
Mauri	Life force
Ora	Wellbeing
Pā	Māori village or fortified settlement
Pākehā	Non-indigenous people of New Zealand
Rohe	Territory, boundary
Tairāwhiti	Gisborne
Tangata whenua	People of the land
Taniwha	Supernatural beings that reside in oceans, rivers, lakes, or caves
Taonga	Treasure
Tapu	Sacred
Te ao Māori	Māori worldview
Te ao Pākehā	Pākehā / Non-indigenous (New Zealand) worldview
Tūpuna / tīpuna	Ancestor
Tūranganui-ā-Kiwa	Poverty Bay
Tūrangawaewae	Foundation, place to stand
Wairua	Spirit
Waka	Canoe
Whakapapa	Genealogy, identity
Whakataukī	Proverb
Whānau	Family

1 Introduction

1.1 Introduction to Thesis

River restoration is as much of a social process as it is a scientific and technical one (Eden & Tunstall, 2006; Fryirs & Brierley, 2009). In the ever-growing field of restoration, social issues are commonly addressed downstream of science, with literature highlighting the need to change this. Evidence shows that management interventions that are solely technical and exclude public involvement risks the success of intervention and often further disconnect communities from the environment (Spink et al., 2010). The absence of communal discussion in the planning and implementation of restoration can cause negative feelings of exclusion and discontent, which may risk the possibilities for future rehabilitation and further sever nature-human relationships (Åberg & Tapsell, 2012, 2013; Petts, 2007). For river restoration to be socially desirable and considered worthy of support, it needs to work to restore relationships between people and the land, integrate social aspirations for the system, reflect cultural values and attain a sustainable balance between ecological and societal needs. To do so, social relations to river systems need to be understood and incorporated into the planning of restoration practice. If designed effectively with ecological, social, and geomorphic goals in mind, restoration projects can generate benefits socially and environmentally and promote further support for environmental conservation (Åberg & Tapsell, 2012; Petts, 2007; Smith et al., 2016).

This thesis seeks to explore relations to river systems looking at the Waimatā River in Gisborne, New Zealand and discuss how these relations shape perceptions of restoration and aspirations for the future river. The Waimatā River has suffered high erosion rates, poor water quality, and biodiversity loss due to forestry and agricultural practices in the upper (rural) catchment (Cullum et al., 2017; Salmond et al., 2019). A restoration project is in its early stages of implementation in the upper catchment to improve the degraded river system (Waimatā Catchment Erosion Management Project [WCEMP], 2019). Although research has been conducted in the catchment regarding scientific and historical aspects, no formal research has involved local residents, relations to the river and its restoration. A mixed-method approach has been employed to provide baseline knowledge on environmental relationality and the

changes in this across space and time (Johnson & Onwuegbuzie, 2004). Findings can be used to inform effective management by the local Council, restoration project, and other groups with an interest in the river. Broader findings of the influences of perceptions contribute to global understanding of how people relate to river systems situated in a New Zealand context (Eden & Tunstall, 2006; Johnson et al., 2018).

This chapter provides an introduction and overview of the thesis. Understanding local relations to river systems and the influences on these are essential factors in designing effective restoration projects which are supported by the public. The importance of this and the approach for this research are explained in the rationale for this research. An introduction to the Waimatā River and its social and environmental history is provided. The research question and objectives that have guided this study are outlined with an overview of the thesis structure.

1.2 Research Rationale

Scientists and river managers are increasingly becoming aware of the need for social considerations and engagement in river restoration projects (Eden & Tunstall, 2006). Despite extensive research into the scientific aspects and outcomes of restoration work, spanning ecology, water quality, and geomorphology, little comparable research investigating the social aspects of restoration exists (Johnson et al., 2018; Westling et al., 2009). While literature is beginning to expand to include this work internationally, restoration projects do not always reflect this. Many restoration projects continue to focus exclusively on scientific outcomes and exclude local aspirations and knowledge (Johnson et al., 2018; Petts, 2007).

Research into social aspects of restoration concludes that unless there is a want for restoration interventions amongst residents and ownership of the issue exists, such projects will never be managed effectively (Petts, 2007). Management interventions that fail to seek public involvement in planning and implementation stages risk successful long-term outcomes of restoration due to a lack of support (Buijs, 2009; Petts, 2007). Alternatively, those projects designed with local knowledge and aspirations alongside that of science have been shown to generate social and environmental benefits and promote further support for environmental conservation within the area (Åberg & Tapsell, 2012; Smith et al., 2016). To improve river

condition through effective restoration work, it is necessary to understand local relations to rivers and what residents' perceptions of restoration are. This raises questions on how people value river systems, how values shape the connections they have to rivers and how these drive perceptions of restoration.

Relational values, those that emerge from a relationship with the environment, incorporate a sense of place (emotions one attaches to a place based on experiences with it), wellbeing, and identity (Gould et al., 2015; Tadaki et al., 2017). Values, along with sociocultural factors (e.g., age, length of residence, cultural traditions) shape individual perceptions and acceptance of restoration projects (Mould et al., 2020). Therefore, research into the relations between people and rivers and the factors that shape them are important in designing practical restoration projects that generate public support.

This research has been conducted and written through a geographic lens. Geography is broad. It deals with both the natural and the human world and is centered around making connections between people, place, and space and 'telling a story' (de Blij, 2012). Therefore, it is not purely a 'social' science, and for this reason, almost anything can be studied from a geographic perspective (Anderson, 2004). Because of its all-encompassing nature, geographers are particularly well placed to observe and evaluate the complicated relationships between human societies and natural environments (de Blij, 2012; Kearns et al., 2015; Murphy, 2006), which arise when investigating local relations to the Waimatā River. Health geography is used to link human wellbeing to the characteristics of place and explores how everyday interactions and practices influence wellbeing (Kearns & Moon, 2002). Consequently, the research has been framed through a geographic lens that shapes the methodology's nature and subsequent responses.

A mixed-methods approach consisting of questionnaires and semi-structured interviews with residents offers unique insight into the story of the Waimatā River and its residents. Employing a mixed-methods approach to research can reduce some of the problems associated with singular quantitative or qualitative methods (de Waal, 2001; Johnson & Onwuegbuzie, 2004). Quantitative data provides a broad picture of relations and attitudes across the catchment, complemented by personal stories and relationships from qualitative interviews (Kazi & Kahlid, 2012; Newcomer et al., 2015). Broad findings of relations to rivers and the factors that influence

these can contribute to relationality literature from a river-based perspective and broadly inform management strategies.

1.3 The Waimatā River

The Waimatā River, located in Gisborne, New Zealand, is an ideal location to explore local relations to the river and perceptions regarding its restoration (fig. 1.1). Flowing through the centre of Gisborne City and the location of the Gisborne Port, the Waimatā River has always played a central role in the lives of local residents and is a landmark rich in local history. The foreshore of the Tūranganui River (created by the confluence of the Waimatā and Taruheru Rivers) marks the landing place of the Māori voyaging waka (canoes) *Horouta* and *Tākitimu* in the 1300s. This area also marks the first meeting place of Māori and pākehā (non-Māori New Zealander) in 1769, following the arrival of Captain James Cook in New Zealand. Today its popularity for recreational activities such as waka ama, kayaking, rowing, and swimming means that interaction with the river continues since the first interaction with waka in the 1300s (Spedding, 2006).

Figure 1.1: Location of the Waimatā River (in blue) from its headwaters into Gisborne City

The diverse catchment of the Waimatā River begins in the steep hill country of the Gisborne area. Once an area of native forest cover, the upper catchment is now predominately active forestry plantation and agricultural land used for sheep and beef farming. Downstream the catchment transitions into lifestyle blocks of increasing urban density, before becoming (sub)urban area in its lower reaches. Here the lower Waimatā catchment is densely populated by houses and the river is heavily used for recreational purposes (Cullum et al., 2017; Reeve, 2015).

The health of the Waimatā River has degraded since the colonization of the area by Europeans in the early 1800s. Large-scale forest removal and conversion of the steep hill country in the headwaters of the river to pine forest plantations and sheep and beef farming has resulted in high rates of erosion (fig. 1.2), high nutrient quantities, downstream damage from forestry slash (fig. 1.3) and poor ecological quality of the river (Cullum et al., 2017; Gundry, 2012; Reeve 2015). *E. coli* bacteria measurements in the catchment site are within the worst 25% of all New Zealand river water quality monitoring sites, providing issues for aquatic life and residents who interact with the water for recreational purposes (Gundry, 2017; Land Air Water Aotearoa [LAWA], 2020).

Figure 1.2: Tributary confluence on the Waimatā River showing the high levels of sedimentation entering the river from forestry and agricultural land (Author's own)

Figure 1.3: Debris from forestry in the upper catchment deposited on Waikanae Beach at the mouth of the Tūranganui River following a rainfall event (Grunwell, 2015)

Changes to the lower catchment such as the development of the port and its continued uses; the blasting of Te Toka-ā-Taiau, a sacred rock near the river mouth; the loss of an ancestral fishing place, Te Wai o Hīharore; and relocation of Te Poho-o-Rāwiri, their marae (communal or sacred place) have impacted local hapū (subtribe) Ngāti Oneone and connections to their ancestral river (Gundry, 2017; Salmond et al., 2019). Despite close relations between local residents and the river and its location through the heart of the city, management of the Waimatā remains a short-term utilitarian approach (Salmond et al., 2019).

A community-based restoration project has been designed and is in its early stages of implementation in the catchment. In its current stage, the project aims to work with landowners in the upper catchment with plans to move down the catchment as the project progresses (WCEMP, 2019). Research has been conducted regarding the geomorphology, biodiversity, land use, and history in the catchment however, no formal research has involved residents and local relations to the river and its restoration. With restoration work underway, understanding these relations will be beneficial to its operation and continuation.

1.4 Research Question and Objectives

As discussed in the rationale for the project, this thesis aims to investigate relations with rivers in order to address the main research question:

How do residents relate to the Waimatā River, and how do these relations shape their perceptions of restoration?

Based on this broad research question, four main objectives for this research are identified:

- To investigate how residents interact with and value the Waimatā River across the catchment.
- To assess residents' aspirations for the future Waimatā ecologically, environmentally, and aesthetically and their significance.
- To investigate the factors influencing attitudes and perceptions towards restoration across the catchment.
- To show how societal aspirations can be incorporated alongside scientific considerations in the development of a catchment restoration plan.

1.5 Thesis Structure

Local relations to the Waimatā River are explored through the eight chapters of this thesis. Chapter Two positions this thesis in the context of relevant literature, reviewing current research on social relations to rivers and river restoration.

Chapter Three outlines the methodological context of the research conducted, providing an overview of the quantitative and qualitative research methodologies used and their justification and ethical considerations. Chapter Four then describes the regional context of the study, illustrating the social history of the river, its biophysical attributes, contestations, and restoration of the river to provide an understanding of the background and current status of the river.

Chapters Five and Six, respectively outline the questionnaire and interview analysis results collected from residents and river users across the area. Chapter Five offers a broad overview of respondents' perspectives shown through quantitative data, exploring interactions, values, perceptions of health, and aspirations for the future Waimatā. Chapter Six illustrates the personal stories of the river told through the eyes of a select number of residents, detailing their

interactions, relations to the river, and comprehensive perceptions of health and restoration. The following chapter discusses the themes offered in these two chapters, building upon the ideas that have emerged.

The final chapter reflects on the initial objectives for the research and the consequent findings. In drawing together the main findings of the study that were developed over the previous three chapters, the key contributions of the research are offered.

2 Literature Review

2.1 Introduction

This chapter positions the research of this thesis in the context of wider river restoration and place attachment literature identifying the importance of understanding social relations to rivers and incorporating such findings into restoration work. The chapter begins by considering the social importance of blue spaces such as rivers, how people relate to these spaces, and the factors influencing these relations. The attachment people feel to a place, or environment is explored and how this connection shapes perceptions of restoration of that space. Such connections are then explored through a New Zealand context, looking at ancestral connections to river systems, meanings of ecosystem health, and past and future management of New Zealand rivers.

In recent decades there has been an increase in awareness of anthropogenic impacts on river systems. Unsustainable management and land use have severely impacted rivers over time (Garcia et al., 2019). In response, the term 'river restoration' has become commonly known and practiced globally, targeting degradation and improving river systems' overall states (Friberg et al., 2016; Paterson-Shallard et al., 2020). Also referred to as 'river rehabilitation' or 'enhancement', river restoration seeks to improve geomorphic, hydrologic, and ecological processes within fluvial systems impacted by human actions using various methods (Eden & Tunstall, 2006; Spink et al., 2010). It is primarily seen as a scientific endeavor rather than a social one, and literature often refers to the concept as being 'ecological restoration' as its focus is often grounded in ecological and morphological terms of physical success (Eden & Tunstall, 2006). As within many environmental contexts, social issues such as indigenous knowledge, local perspectives, and social impacts are commonly addressed 'downstream' of science in the planning, implementation, and monitoring stages of restoration (Petts, 2007).

Humans show strong cultural, emotional, and spiritual connections between themselves and the natural environment (Paterson-Shallard et al., 2020). For many, environments such as rivers are an important part of their identity, developed and shaped by their ancestral relations, interactions, and life experiences, and nostalgic connections (Brierley, 2020). River systems play

vital roles in individuals' mental and physical wellbeing through the ecosystem services they provide in the form of recreation, resource provision and cultural values amongst others (de Bell et al., 2017; Völker & Kistemann, 2011). Despite a recent increase in literature recognising the need for integration of social goals and perspectives into management practices, many projects remain primarily focused on scientific aspirations and outcomes. Research into the integration of sociocultural relations and aspirations is needed to provide a basis for management (Lave et al., 2014; Paterson-Shallard et al., 2020; Wohl et al., 2015).

2.2 Social Importance of Blue Space

Water is considered one of the most important resources, both as a functional asset (ecosystem services) and as an aesthetic landscape element (Kaplan & Kaplan, 1989; Völker & Kistemann, 2011). 'Blue space' (water landscapes such as rivers, lakes, and seas) plays a vital role in landscape perception and preference, with landscape perception more likely to be positive where a body of water exists (Völker & Kistemann, 2011; White et al., 2010). Views of water are often rated as positive, attractive, and fascinating. Aspects of sensual perception of blue space are the sound of water, its clarity, colour, motion, and context (Völker & Kistemann, 2011). While research on the social benefits of 'green spaces' has been thoroughly reported, blue space is becoming recognised for its influence on human health and wellbeing in addition to having aesthetic value (Coleman & Kearns, 2015; de Bell et al., 2017).

Despite some exceptions (Triguero-Mas et al., 2015), the presence of blue space has been found to provide emotional, recreational, and direct health benefits among those who interact with such spaces (de Bell et al., 2017; McDougall et al., 2020; Völker & Kistemann, 2011). Water bodies improve environmental conditions by enhancing thermal comfort, reducing the urban heat island effect, and improving soundscapes by buffering anthropogenic noise (McDougall et al., 2020). They encourage water (swimming, rowing) and non-water (walking, running) based physical activity, which positively impacts physical health associated with the prevention of cardiovascular illnesses, obesity, and cancer (Völker & Kistemann, 2011). Water also provides a therapeutic space for engagement; mental immersion in 'waterscapes' promotes stress reduction, reduced anxiety, and mood enhancement. A strong sense of place associated with water bodies and the social interactions they provide can also positively influence wellbeing (Dadvand et al., 2016; Gascon et al., 2017; McDougall et al., 2020).

Water has been identified as being a favorite place to spend leisure time and recreation, however, the perceived quality of the system has been found to negatively influence its perceived value and interactions (Regan & Horn, 2005). Poor environmental quality is a deterrent of use for both children and adults (McDougall et al., 2020). Doi et al. (2013) found interaction with blue spaces was more likely where and when water quality was good; swimmers, boaters and anglers were less likely to use environments of poor water quality (de Bell et al., 2017). Their perception of this was influenced not only by chemical indicators but also their perceived preference for temperature, flow, and visibility (McDougall et al., 2020). This preference for natural landscapes could explain why rural residents visit blue space more frequently than in urban areas where ecosystems are more heavily degraded (de Bell et al., 2017). Blue spaces are more valuable to communities and public wellbeing when they are 'healthy' and desirable. These findings indicate the need for protection and restoration of freshwater environments and management, which considers societal needs, particularly in urban and peri-urban spaces (de Bell et al., 2017; McDougall et al., 2020).

2.3 Restoration and a 'Healthy River'

Scientific and public concern for river condition resulting from anthropogenic factors such as land use change, urban development and agricultural practices has led to the increase in restoration projects (Tunstall et al., 2000). Restoration is defined as the process of returning an environment to its 'former condition' (Hikuroa et al., 2021). The restoration of river systems has been questioned due to the changing nature of the landscape through time and difficulty in determining what a 'former condition' and what a 'healthy' river is (Blue, 2018). Societal relations are the critical element that has commonly been overlooked yet remains fundamental to the success of restoration work (Eden & Tunstall, 2006). From a geographic perspective, however, social, physical, and biological processes in a river system are inseparable and cannot be isolated (Lave, 2014; Ashmore, 2015).

Blue (2018, pp. 462) states, "It is easy to talk of improving river condition. It is more difficult to pin down exactly what this means". Different disciplines have different ideas of a 'healthy' river which complicate the 'vision' of restoration projects (Blue, 2018). To an ecologist, a healthy river is one of a diverse species favouring natives over introduced species, while to a fisherman, a healthy river is abundant in exotic game fish. A swimmer, on the other hand, would not be concerned with species abundance and diversity, instead they would seek a river of clear water.

A geomorphologist may look for a river unconfined by anthropogenic barriers with 'space to move', frequently adjusting its planform, a town planner, however, would prefer a stable channel, immune to erosion, unmoving and strengthened by plantings on its banks (Blue, 2018; Chapman, 1992). Therefore, it is important to understand the underlying notions and values that constitute a healthy river and how this should happen.

2.4 Importance of Values

Human and ecological values have become important concepts in managing ecosystems (Tadaki et al., 2017). Values drive river management strategies; however, the question commonly remains, whose values set up visions for river systems? To move towards inclusive management that integrates local perspectives and aspirations, it is essential to understand the values placed on river systems by different people and stakeholders (Mould et al., 2020). Values are diverse and can be understood differently across biophysical sciences, social sciences, economics, and indigenous or local knowledge perspectives. When looking at environmental management and the influential values that motivate participation, values can be understood as instrumental, intrinsic, or relational (Brierley, 2020; Mould et al., 2020; Tadaki et al., 2017). Research into environmental values commonly focuses on instrumental (use-based and nature's contribution to people, e.g., water supply and food resources) and intrinsic (inherent, nature itself, e.g., its ecological processes) values (Moore et al., 2018; Mould et al., 2020). Relational values, those that emerge from a relationship with the environment, incorporate a sense of place (emotions one attaches to a place based on experiences with it), wellbeing, and identity (Gould et al., 2015; Tadaki et al., 2017). These are "preferences, principles, virtues based on meaning-saturated relationships" (Chan et al., 2018, pp. A3). When employing this view, values research is not simply about how much people prefer one environment or scenario over another; it is about what different environments mean to different people (Mould et al., 2020).

2.5 Relational Values and Restoration

Values and consequently people's relations to river landscapes shape their individual perceptions and acceptance of restoration projects. Mould et al. (2020) describe relational values as holding power to motivate or demotivate individuals to accept and participate in river management and restoration. Sociocultural factors and lived experiences influence values and

differ with age, gender, political affiliations, socioeconomic status, cultural beliefs, and geography (Smith et al., 2016). Indigenous groups have strong connections to river systems, developed through ancestral relations (Morris & Ruru, 2010). For Māori in NZ, their relationship with rivers transcends the material to embrace spiritual and cultural dimensions. Rivers are tightly entwined with Māori whakapapa or identity and carry their unique life force; the relationship with rivers, therefore, differ across iwi (tribes) and hapū (Clapcott et al., 2020; Harmsworth & Awatere, 2013; Paterson-Shallard et al., 2020; Ruru, 2018). Degradation of the river's overall state adversely affects the ecosystem and local people through their connection to the river, ability to practice manākitanga (generosity and hospitality) and any reliance on the river for resources (Paterson-Shallard et al., 2020). Therefore, maintaining a healthy state of rivers and protecting connections to them are important in river management. Restoration and management initiatives are commonly accepted when these sociocultural factors and influences are considered (Eden & Tunstall, 2006).

2.6 Place Attachment and Restoration

Place attachment (the emotional bond between person and place) and the meanings people attribute to river landscapes have implications for management and restoration decisions. In vulnerable environments experiencing degradation, 'sense of place' or attachment is often linked to solastalgia, the distress felt in response to environmental change or loss (Albrecht, 2005; Yazd et al., 2020). Water-related landscapes have been found to produce stronger attachments between people and the environment when compared to other landscape types, and with this comes solastalgia (Garcia et al., 2019; Ryan, 2005). Solastalgia can be future-orientated; those that suffer it may seek to engage in collective action that provides comfort and communion, such as involvement in restorative work (Albrecht, 2005). For others, strong attachments and resistance to change can lead to increased conflicts regarding the landscape and changes to it. While many studies have observed a positive perception of restoration (Åberg & Tapsell, 2013), others have reported negative relationships between place attachment and public acceptance of restoration (Garcia et al., 2019). For example, strong personal connections to the Rhine were observed in the Netherlands, with importance placed on protecting cultural heritage and accessibility to landscapes. This resulted in opposition to floodplain restoration plans, particularly prior to implementation, which stemmed from perceived threats to sense of place and agriculture (Buijs, 2009; Garcia et al., 2019).

Length of residence positively influences the strength of place attachment and perceptions of restoration. Hay (1998) stated that a true sense of place could only be developed by those that were raised in that place or had lived there for many generations. These strong senses of place were observed in individuals with generational connections to the land in New Zealand regardless of being pākehā or Māori. Kyle et al. (2004) also found that residents with the strongest sense of place held generational, cultural, and social ties to the land and community. Those that had resided in areas longer had a sense of responsibility and perceived themselves as 'creators' in the place (Liu et al., 2021; Stedman, 2006). In comparison, those with limited residency or a superficial sense of place (tourists, transients, or newcomers), could not develop true attachment to a place or share the values of the real community as they had not contributed to its creation. Any attachment held was labelled an 'inauthentic' relation (Hay, 1998; Lewicka, 2011). Newcomers were also found to base any degree of place attachment on the quality of the environment, in contrast, long-term residents grounded their attachment in social bonds related to the place (Soini et al., 2012). Alam (2011) and Larson (2004) found those near to the river and those with the residency longer than ten years exhibited greater support for restoration, including a willingness to give both money and time to restoration efforts (Westling et al., 2014).

Place attachment and relational values are as crucial as the biophysical characteristics of the landscapes themselves in defining people's preferences for river restoration (Garcia et al., 2019; Westling et al., 2014). It is therefore important that these are considered in restoration and management initiatives on river systems.

2.7 Integration of Social Values into Management

The failure to integrate social considerations into restoration projects is often regarded as one of the key reasons for the ineffectiveness of projects in the long-term due to a lack of initial and ongoing public support (Alam, 2011; Eden & Tunstall, 2006; Smith et al., 2016). A lack of support and feelings of stewardship amongst local communities and local governments can obstruct restoration projects' ecological and physical success (Booth, 2005; Smith et al., 2016). Interfering in people's living spaces without communal involvement can produce feelings of alienation and a lack of responsibility for environmental changes (Pickup et al., 2004). Vining, et al. (2000) argued this to be the cause of the public's negative response and opposition to

restoration practices. Spink et al. (2010) confirmed such findings; their study on river works in the Upper Hunter catchment in Australia revealed inadequate communication and limited understanding of river management practices hindered relations and a sense of ownership between residents and the river. Past management was believed to be solely technical and failed to incorporate social values and aspirations, giving little consideration to local knowledge. The integration of local knowledge and perspectives and greater transparency of practices are important considerations in effective implementation of restoration practices, achieved through incorporation of insights from environmental histories, development of stronger ties between natural and social scientists, and acknowledgement of the role of humans within, not separate to the environment (Alam, 2011; Smith et al., 2016).

Short-term actions in restoration designed to produce social benefits can increase public support for the work to achieve ecological improvements in river systems. Positive interactions between people and their natural environment can promote further support for environmental conservation. Collaborative approaches to river restoration enable diverse ways of knowing and values and bridge the gap between 'expert' knowledge and the public. This can generate feedback loops in which communities and governments assign public resources to support further restorative action (Paterson-Shallard et al., 2020; Smith et al., 2016).

2.8 The New Zealand Situation

The 425,000 km of rivers in Aotearoa make rivers a critical part of the country and its history (Stewart-Harawira, 2020). River systems in New Zealand hold unique values and strong connections exist between them and people, particularly tāngata whenua (people of the land). To Māori, rivers, or awa, hold rich layers of meaning and are important figures in their own lives and those of their ancestors (Stewart-Harawira, 2020; Te Aho, 2010).

In Te Ao Māori (Māori worldview), the ancestral parents from whom all Māori descend from, Ranginui, the sky father, and Papatūānuku, the earth mother, were one being, until their children, the ancestors of all parts of nature (forests, fish, wind etc.), separated them (Salmond, 2017; Stewart-Harawira, 2020). Water bodies such as rivers and lakes are the tears of Ranginui mourning his separation from Papatūānuku. In this cosmological account, water is the source of ora (wellbeing). The water cycle is the centre of the relationship between the pair, constantly exchanged through mist and rain to give life to their children (Salmond et al., 2019).

For Māori, the health of awa is intrinsically connected to the mental, physical, and spiritual wellbeing or ora of their people (Stewart-Harawira, 2020). Water is fundamental and described as the 'life-blood', having the quality to instill someone or something with mauri (life force), expressing the sacredness of water (Salmond, 2017). In contrast to Western ontologies, which place people as separate to and in control of the natural environment, te ao Māori positions people as part of the environment and connected with all beings (Parsons et al., 2019). Through this, humans are born into the world with the responsibility of being kaitiaki (guardians), responsible for the maintenance of mauri, wairua (spirit), and mana (power) of their environment and consequently rivers (Parsons et al., 2019; Stewart-Harawira, 2020).

Colonisation of Aotearoa by the British in the mid-1800s has had major impacts on Māori and their relations to rivers (Harmsworth et al., 2016). Loss of access to and degradation and commodification of sacred rivers and their ecology has occurred since colonization, along with loss of identities and cultural practice (Robb et al., 2015; Stewart-Harawira, 2020). The conflict between te ao Māori and te ao Pākehā (the worldview of non-indigenous people of New Zealand) has resulted in entirely different governance forms (Fisher & Parsons, 2020; Parsons et al., 2019; Salmond et al., 2019). The health of awa is considered taonga (treasure) and the mauri of the iwi (Fisher & Parsons, 2020). To retain their role as kaitiaki of water Māori have sought political and legal action, disputing assumptions in the government of private property, resource management, and ecosystem services that involve 'dominion' over the natural environment (Salmond et al., 2019; Tipa, 2010).

A new era of management

Through this, new collaborative management frameworks for freshwater management have emerged. These are important initiatives that seek to incorporate Māori traditional knowledge, values, and ethics, often in situations where stakeholders' competing goals exist (Stewart-Harawira, 2020).

The Waikato River, the longest in Aotearoa, is considered by the Waikato-Tainui iwi as an ancestor and became the first river in New Zealand to be a legally recognised living ancestor with its own life force (Salmond et al., 2019). Te Mana o Te Awa (the mana of the river) recognises the river as tūpuna (ancestor), which has mana and represents that of the iwi also.

Under the Waikato River Settlement Act, the Waikato River Authority, which represents Waikato Iwi and Waikato Regional Council equally, is responsible for providing recommendations for improving the health of the Waikato River that meet an agreed vision and strategy (Salmond et al., 2019; Stewart-Harawira, 2020). This strategy gives tribes the authority to "exercise control, access to and management of the Waikato River and its resources in accordance with tribunal values, ethics and norms of conduct" (Te Aho, 2010, pp. 290).

The Whanganui River, or Te Awa Tupua, in the Manawatū-Whanganui region is another example of co-governance in Aotearoa (Te Aho, 2019). In Tribunal hearings the Whanganui Iwi have shown their ongoing relationship with the river demonstrating the entanglement of their lives and wellbeing with that of their awa, "ko au te awa, ko te awa au" (I am the river, the river is me) (Salmond et al., 2019; Stewart-Harawira, 2020). Following the ongoing struggle over the ownership of water, Te Awa Tupua Act 2017 was developed (Salmond, 2017; Stewart-Harawira, 2020). The Act acknowledges the river as an ancestor and an "indivisible and living whole", which comprises the Whanganui River from the mountains to the sea. Section 14 of the Act declares that the Whanganui River, Te Awa Tupua, is "a legal person and has all the rights, powers, duties and liabilities of a legal person." The action of granting legal personhood to the river emphasizes the profound relationship between the awa and its people (Te Aho, 2019). Two guardians are appointed, one by the Whanganui Iwi and the other by the Crown who will "act on behalf of the river and protect its status and health". While providing promising steps towards a collaborative future of freshwater management, tensions still exist within these Acts. Despite the consideration of the "whole of the river" within Te Awa Tupua Act, water is not recognised as an intrinsic part of the river, instead, it is excluded to protect property rights (Stewart-Harawira, 2020).

Impelled by the continued degradation of the country's rivers and the failure of the government's freshwater reforms to address these adequately, the Te Awaroa project has been developed (Hikuroa, 2017). The project uses a Māori ontology to reframe the critical state of the nation's rivers from the perspective of the river's themselves and includes its geology, geomorphology and ecology (Brierley et al., 2015; Stewart-Harawira, 2020). It aims to see 1000 of New Zealand's rivers restored to wellbeing by 2050 and create a national movement for the restoration and conservation of water bodies by transforming the relationships between people and rivers. By bringing together mātauranga (Māori knowledge), local knowledge, and scientific knowledge, Te Awaroa believes that rivers will return to ora when stakeholders develop a sense

of care and have the relevant tools they can use. When working with a river, there is an importance in listening to it and what it needs; this is reflected in the whakataukī (proverb) (Brierley, 2020):

> Kauaka e kōrero mō te awa, engari kōrero ki te awa.
> Don't merely talk about the river, rather speak and commune with the river.
> - Te Tira Hoe Waka o Whanganui

The project hopes to articulate and empower the voice of the river to restore the health and mauri of the river and all of its species (Hikuroa, 2017; Salmond et al., 2014; Salmond et al., 2019). The recognition of rivers as living beings with legal personhood rights can be considered a transformative landmark in the management of freshwater bodies in New Zealand in the face of their declining state (Ruru, 2018; Stewart-Harawira, 2020). It marks a crucial step towards "learning to live with" rather than just "managing" rivers (Brierley et al., 2019).

Blue spaces such as rivers hold significance to those that interact with them, by shaping perceptions of landscape and the physical and mental benefits they provide to human wellbeing. Literature shows the complexity of social relations to rivers and the factors that may shape these relationships. The recognition and understanding of relations to rivers are important to their restoration and management. Studies are needed to help provide a basis for understanding the connections local residents share with their environment and their perceptions of it to inform effective restoration practice.

3 Methodology

3.1 Introduction

This chapter describes the approach taken in answering the central research question 'how do residents relate to the Waimatā River and how do these relations shape their perceptions of restoration?'. An explanation is given as to why the mixed-methods approach has been chosen and how it contributes to the findings of this research. The rationale behind participation selection, questionnaire design, distribution, and analysis is explained in section 3.3, and section 3.4 explains the interview participant selection, design, and analysis. Consideration for ethical research practice is also highlighted.

3.2 Methodology

A mixed-methods approach has been used to conduct this research on relations to the Waimatā River. This methodological approach consisted of online questionnaires and semi-structured interviews with residents from across the catchment to provide a comprehensive picture of relationality from a range of individuals that included experiences, attitudes, behaviours, and perceptions.

Social research to date has commonly focused on singular quantitative or qualitative approaches (Johnson & Onwuegbuzie, 2004). This has created two isolated research types, each with its own lists of strengths and weaknesses that separate different pieces of research into two very distinctive categories. By employing a singular approach, valuable information is lost in the process that could complement and present different messages. By 'mixing' quantitative and qualitative data within a single investigation, a mixed-methods approach moves past the paradigm wars between qualitative and quantitative data offering a practical solution that arguably benefits research outcomes (Almeida, 2018; de Waal, 2001; Johnson & Onwuegbuzie, 2004).

A mixed-methods approach can reduce some of the problems associated with singular quantitative and qualitative methods. While both methods have strong benefits, each singular method presents a different picture of data (Almeida, 2018; Johnson & Onwuegbuzie, 2004). While quantitative methods are quick in collection and analysis of data and provide a generalized picture for a large group of respondents, knowledge can be too general for direct application to specific local situations, contexts, and individuals. Data may miss out on phenomena occurring because of the focus on hypothesis testing rather than theory generation (Krosnick & Presser, 2010).

Qualitative methods also provide in-depth information on a limited number of cases (Newcomer et al., 2015). Phenomena are described in rich detail as it is situated in local contexts, and research conduct is flexible in its approach and allows for clarification on complex themes or answers. However, knowledge produced from these methods may not be generalized to other people or settings, and it is difficult to make quantitative predictions from or test hypotheses. Compared to quantitative approaches, results from qualitative methods are more easily influenced by the researcher's personal biases (Johnson & Onwuegbuzie, 2004).

This research reached a larger sample size and geographical area by employing questionnaires, providing a higher number of responses from residents and river users across the catchment (102 responses) and offered both quantitative and brief qualitative data (Kazi & Khalid, 2012; Krosnick & Presser, 2010). To complement this data, semi-structured interviews with residents and river users from across the catchment provided more in-depth qualitative data into the perceptions and insight that questionnaires did not expand on (Newcomer et al., 2015). Interviews allowed for direct contact with the participant and clarification and follow-up questions that were not possible using questionnaires (Kazi & Khalid, 2012). By employing quantitative and qualitative methods, different forms of data analysis and presentation were also possible (Johnson & Onwuegbuzie, 2004).

Prior to designing this research project and its methodological approaches, the coordinators of the Waimatā Catchment Restoration Project were consulted with to set up the research. Advice was given on the best ways to reach the whole catchment with the questionnaires, potential groups to approach and how to divide the catchment into different areas. The basic premise of the research was presented to residents at a restoration community meeting for the upper catchment in July 2020 to introduce the research and what it covered. Research methods were

designed to meet human ethics guidelines and were approved by the University of Auckland Human Participants Ethics Committee before commencing research (Reference number 2577).

Participants

Participants in both questionnaires and interviews were either residents that lived within the Waimatā Catchment (from the upper catchment down to and including Gisborne City) or river users that interact with the Waimatā, however live outside of the catchment. The catchment was divided into three areas: Area 1/the upper catchment (upstream of Waimatā Valley Road), Area 2/the mid catchment (upstream of Riverside Road), and Area 3/the lower catchment (downstream of Riverside Road and Gisborne City) (fig. 3.1). These areas were delineated based on the geographical boundaries within the catchment and changes in population density and land use. Area 1 consists of sparsely populated steep hill country predominantly used for agriculture and forestry. This area is geographically isolated from the rest of the catchment by forestry, only accessible from Waimatā Valley Road. Area 2 begins downstream of Area 1 and ends at the Waimatā Cheese Factory, where Riverside Road becomes an urban road. This area also consists of farming and forestry land in the upper part of the area, with lifestyle blocks of land in the lower reaches marking the transition to urban Gisborne. Area 3 or the lower catchment is the urban part of the catchment. For this study, the lower catchment covers the whole Gisborne city (including Kaitī, Whataupoko, and Te Hapara) from Waimatā Cheese Factory downstream to the mouth of the Tūranganui River. Outer parts of Gisborne (e.g., Wainui) and any respondents from outside of the Gisborne region are classed as Area 4/outside of the catchment. This distinction of the different areas of the catchment allowed for spatial comparisons and comparison between rural and urban respondents to provide insight into the factors influencing responses.

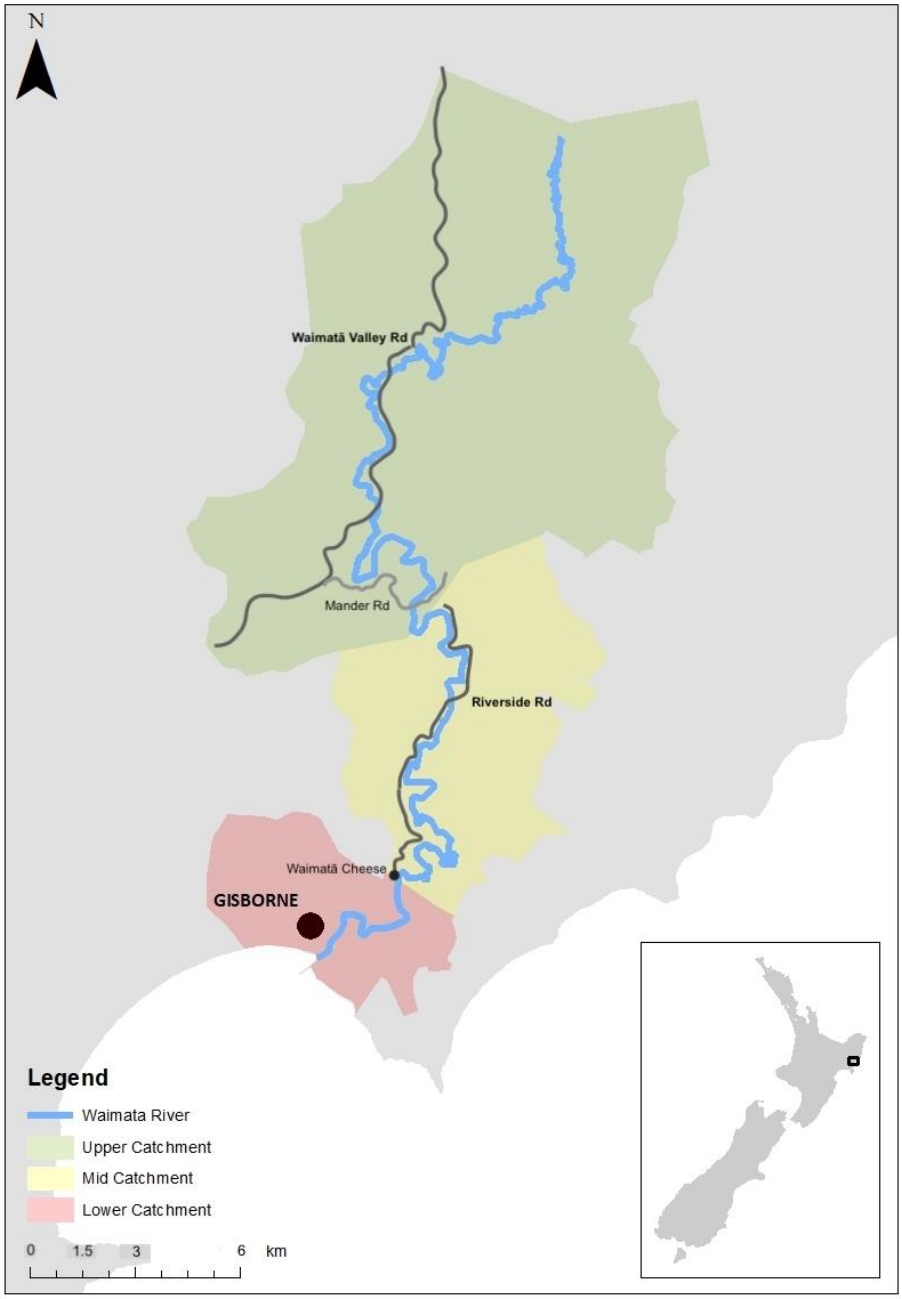


Figure 3.1: Delineation of the different catchment areas within the Waimatā Catchment referred to in this study.

3.3 Questionnaires

Participant Selection

Questionnaires were used in order to gain insight into relations across the whole Waimatā catchment. To ensure that everyone across the catchment had the opportunity to participate in the research should they wish, various distribution methods were used. Sports, recreation, and residential groups with an interest in the catchment were approached, and information sheets

were distributed in letterboxes across the catchment. As mentioned earlier, the basic premise of the research was also presented at the upper catchment community meeting in July 2020.

Questionnaire information and invitations were sent to the leaders of groups within the catchment that use or interact with the river (Appendix I & II). Participant information sheets outlined the study's purpose and information and contained the questionnaire link and QR code. These groups included three waka ama clubs, the Tramping and Canoeing Club, the Rowing Club, and the Residents of the Waimatā Catchment group (associated with the restoration project). Potential participants were then contacted by their group leader (e.g., the chairperson of waka ama club, team leader of the Tramping Club, project leader of the Catchment Project), who introduced the research to the group members, and sent on the participant information sheet and questionnaire link. Someone known to the participant needed to make initial contact to establish trust and allow distance between the researcher and participant initially. This distance allowed participants to feel comfortable declining the invitation to participate and prevented privacy breaches of participants' contact details and addresses (Krosnick & Presser, 2010).

The inclusion of water user groups ensured that the questionnaire was distributed to those who may not have lived within the catchment however still interacted with the river in their lives. This allowed for those for whom the river played an active part in their lives and were likely connected to the Waimatā to respond and participate within the research. This approach meant that the questionnaire's reach was limited to those groups whose leaders distributed the questionnaire information and links. Accordingly, it is assumed that leaders who did not respond to the invite did not disseminate the questionnaire. It is unknown how many people the questionnaire reached. As suggested by Dillman (2011), all residents needed to be offered the opportunity to participate; therefore, for residents that may not have been included in any groups contacted, information sheets were distributed across letterboxes within the catchment within proximity to the river.

In total, 102 responses were received, exceeding the minimum target number of 80 responses. Respondents ranged across all age groups, locations within the catchment, and lengths of residence in the catchment. Respondents under 45 years were less common and 16 – 24-year olds were particularly underrepresented (2% of respondents). Only 6% of respondents resided

in the upper catchment (Area 1); this number reflects the low population density in the upper catchment compared to the urban catchment (Area 3).

Questionnaire Design

The online survey platform *Qualtrics* was used to design and administer the questionnaire, which consisted of 22 questions and five main categories (Appendix III). Categories consisted of demographics, river interaction, river health, values and emotional connection, and river restoration and aspirations. Each category asked a series of questions regarding the particular topic and perceived changes in that topic over time. Demographic questions included age, gender, location within the catchment, and residence length to situate responses and make comparisons across these. For ethical purposes, participants had to be 16 years and over, which was confirmed in the demographic section of the questionnaire. The remaining questions were broadly categorized into four categories (excluding demographics): River interaction, health, values and connection, and restoration/aspirations for the Waimatā. These categories broadly covered the various aspects of relationality and restoration that the research sought to explore. As Krosnick and Presser (2010) reported, survey results may be affected by not only the question wording, but the context in which the questions are asked. Items need to flow coherently, requiring questions on related topic to be grouped together to aid respondents' cognitive processing.

Questions regarding river health were concerned with biophysical aspects of river health. This was consciously separated from sociocultural aspects to differentiate perceptions of health clearly. Space was given for participants to add other indicators of health if they wished, which could include sociocultural indicators.

Questions were predominantly closed and limited in number (22) for better response and engagement by participants and ease of analysis (Krosnick & Presser, 2010); although specific questions and responses required a short explanation to justify their choice (if they selected "other" as their response or questions that needed justification) (Kazi & Khalid, 2012). Questions consisted of a mixture of tick boxes (yes/no or item lists), 10-point Likert scales, and open questions. Diversity in questions and their format keeps the attention of respondents (Krosnick & Presser, 2010). Likert scales offer more information than simple yes or no answers while being easily coded and comparable against responses (Kazi & Khalid, 2012). To ensure respondents

were not led to the 'preferred' response, care was taken to avoid leading questions (Converse & Presser, 1986). Similar studies and personal understanding of the Waimatā Catchment were used to develop common responses that participants may offer to questions regarding interactions with and relations to the river. Participants were also given a space at the end of the questionnaire to add any additional comments they felt were relevant to the study or the experiences with the river.

Questionnaires were anonymous. Offering anonymity further reduces social pressure and therefore, may reduce social desirability bias in questionnaires (Krosnick & Presser, 2010; Paulhus, 1984). No identifiable information was collected from participants to preserve anonymity; however, participants were warned on the participant information sheet that their answers may make them identifiable to those who know them.

Upon distribution, all participants were given three weeks to complete the questionnaire before it was closed. To allow for participants who may not have reliable internet access, the option of receiving a printed version of the questionnaire by mail was offered. A pre-paid addressed envelope was included to allow for ease of response. Upon return, responses were added to the existing online data set without identifying information to preserve anonymity.

Participants were asked after the questionnaire whether they were interested in participating in an interview on the topic following the questionnaire. Those interested were directed to a separate questionnaire where contact details were taken to preserve questionnaire anonymity.

Questionnaire Analysis

Qualtrics is widely used in academic research. The software generates spreadsheets of all respondents and offers tools to generate data summaries and data visualization. Data visualization tools in *Qualtrics* were used to identify any patterns amongst responses and give a broad understanding of the data set. Questionnaire responses were downloaded from *Qualtrics* as a Microsoft Office Excel spreadsheet, and descriptive and inferential statistics were calculated using Excel. Descriptive statistics were used to determine the medians, frequencies, percentages, standard deviation, central tendency, and variability of the responses (Ruffing, 2010). Other software types can also be used for the analysis of quantitative data. SPSS (Statistical Package for Social Sciences) is a commonly used powerful package for analysing

complex survey data. It offers built-in functions that Excel does not (Ruffing, 2010; Zou et al., 2020), however for this research, only simple analysis methods in Excel were sufficient.

Due to a very small number of respondents identifying with Area 4 (outside of the catchment), Area 4 was excluded from area-specific analyses, however all responses from this area have been included in whole-catchment analyses.

3.4 Interviews

Participant Selection

Participants for interviews were selected by two methods, selection from each catchment area of those who expressed interest and selection of participants from river-related organisations. Of those that expressed interest in an interview in their questionnaire response, six participants were selected, two from each of the three catchment locations (Area 1/Upper, Area 2/Mid and Area 3/Lower). A lack of interest in interview participation from respondents in Area 4 (outside of catchment) meant that interviews did not involve anyone outside the catchment/Gisborne City (table 3.1). Despite recording their interest in participating in an interview on questionnaires, many participants did not respond to personal invitations to participate in interviews. This was likely due to the change from in-person interviews to remote interviews with the COVID-19 pandemic.

To ensure that interviews were representative of the different groups and interactions with the river and spatially, four other participants from within the catchment were selected based on their involvement in river-related organisations. These participants were heavily involved in waka ama on the river, Māori relations, the Catchment Restoration Project, farming in the upper catchment, and other environmental and restoration work on the Waimatā. These participants were previously aware of the research due to their roles in river management, restoration and waka ama groups. They were contacted by email with an information sheet regarding participation in interviews.

Table 3.1: Demographics of interview participants from within the Waimatā Catchment

Participant #	Gender	Age (years)	Location within Catchment	Length of Residence (years)
1	Male	65+	Area 2 / Mid	20 +
2	Female	45-54	Area 2 / Mid	1-5
3	Male	65+	Area 3 / Lower	10-20
4	Female	25-34	Area 1 / Upper	20+
5	Female	65+	Area 2 / Mid	20+
6	Male	45-54	Area 1 / Upper	20+
7	Female	45-54	Area 3 / Lower	10-20
8	Male	55-64	Area 3 / Lower	20+
9	Female	25-34	Area 1 / Upper	20+
10	Male	35-44	Area 3 / Lower	-

Interview Procedure and Design

Interviews are often influenced by the spatial context in which they are conducted (Sin, 2003). This results from the participant's level of comfort in the space and the interviewer/interviewee power dynamics. Interviews were intended to be held in person in Gisborne. Three of the ten interviews were conducted in person. Participants were encouraged to choose the location for their interview (this was at their place of work or public space), so they felt comfortable in the familiar location, allowing empowerment and open conversation (Flowerdew & Martin, 2005). Due to difficulties with the COVID-19 pandemic, the remaining seven interviews were held over *Zoom* (video conferencing software) or the phone, depending on the participant's preference.

Interviews were confidential. Only the interviewer was aware of the identities of the interviewees, and no names or identifying information are recorded in this thesis. Each interviewee was assigned a participant number (table 3.1) that they would be referred to as in this thesis to ensure confidentiality. Interviewees were given the participant information sheet and consent form before the interview to ensure they were adequately informed on the purpose of the research and made aware of their role and choices (Appendix IV & V). This ensured they knew the outcomes of their involvement and allowed choosing how the information they gave was recorded in this thesis. Interviews lasted between half an hour to an hour and a half, dependent on the participant. All participants agreed to be recorded and most allowed quotes given to be included. Upon request, transcripts were sent to participants following the interview to be reviewed.

As suggested by Flowerdew and Martin (2005), a flexible, semi-structured interview guide was used. Semi-structured interviews are useful for exploring individuals' personal thoughts, feelings and beliefs and moving with the participant's responses, providing more flexibility than a structured interview (Newcomer et al., 2015). The guide was divided into different themes, and various potential questions surrounding each theme were written for flexibility in the conversation. As with the questionnaires, these themes included interaction and experiences, values and connection to the river, river health, responsibility, restoration, and public wellbeing (Appendix VI). Interview questions were also reassessed to include questions surrounding themes that had arisen in questionnaire responses and required development. The use of the guide ensured that interviews covered all the main themes needed while maintaining a steady flow and allowing questions to be tailored to each interviewee (Guthrie, 2010). Given the differing nature of participants and their backgrounds and interactions with the river, questions could not remain the same across participants, and flexibility was necessary. Interviewees that had lived within the catchment for longer periods were asked questions based on changes they had experienced with the river and in connections and interactions. In contrast, the same could not necessarily be asked of those that were recently established within the area. Interviewees that offered more information covering the themes and provided more in-depth answers were asked fewer questions than those that provided shorter answers and required clarification.

Interview Analysis

Computer-aided qualitative data analysis software (CAQDAS) was used to aid the interview analysis process. Such software provides a method to assist analysis through creating, applying, and refining categories in data. Such software can be used to trace linkages between concepts and make comparisons between cases. It offers a more efficient and enhanced method of analysis than manual analysis (Schutt, 2018). Amongst many options available, including *HyperRESEARCH* and *ATLAS.ti., NVivo* was selected for this study (Schutt, 2018). *NVivo* offers many benefits, one of its strengths being in organising and managing large data sets. As all interviews in this study were between 30 mins to 90 minutes, it was well suited to this project (King, 2004). Its flexibility in approach and being readily available made it a suitable software for this research.

With the emergence of concerns that computer analysis tools may distance researchers from their data, causing coding to become a mechanistic task, reflection also took place away from *NVivo* (van Hoven, 2003). All interview recordings were transcribed and read through before importing and coding in NVivo. During this process each interview transcript was revised for key themes that emerged and the main themes of the interview (e.g., the emerging theme of governance and responsibility) and any similarities and differences observed across the interviews were noted. Transcripts were then coded using *NVivo* to observe themes and linkages. Participant numbers have been listed next to each quote in Chapter Six.

Using the questionnaire and interview responses, relations between residents and river users and the Waimatā River have been explored. Questionnaires and interviews have been analysed separately to give both a broad overarching view of local relations and a detailed picture of experiences and connections to the river. Although participants for both questionnaires and interviews represented a broad range of residents from different parts of the catchment, results cannot claim to represent the whole catchment population and their aspirations for the Waimatā. As interviews were restricted to only ten residents and river users, this picture does not accurately represent every story within the catchment. Instead, it describes in-depth the perceptions of some.

4 Regional Setting

4.1 Introduction

The Waimatā River is a place of recreational and cultural significance to the Tairāwhiti (Gisborne) region. While used for transport, industrial, and agricultural purposes over time, its use as a recreational hive of activity has remained constant throughout Gisborne's history.

The river begins in the steep hill country north of Gisborne City. It flows 20 kilometres south through rural and residential Gisborne to the town centre where it meets the Taruheru River to form the Tūranganui River (fig. 1.1). The presence of these three rivers, coastal setting, and mild climate made the Tairāwhiti area a suitable location for settlement for early Māori and European settlers. The convergence of these rivers in the town has led to Gisborne being labelled the 'City of Rivers' and the 'City of Bridges' (fig. 4.1) (Cullum et al., 2017; Reeve, 2015; Soutar, 2012a). The Waimatā River has always been a central part of Gisborne, physically and figuratively, however, a decline in the overall health of the river has caused changes to the river's role and the ways people interact with it. Restorative action is in its early stages to return the physical and emotional health of the river and its people.

Figure 4.1: Convergence of the Taruheru (top left) and Waimatā (top right) rivers to form the Tūranganui in a) 1909 (Crawford, 1909a) and b) 2020 (Tairāwhiti Gisborne, 2021).

For this research, the Waimatā Catchment is described as the watershed of the Waimatā River from its beginnings in the upper hinterlands of Gisborne to where the Tūranganui River meets the Poverty Bay coastline (fig. 3.1). All of the Gisborne city area has been considered the "lower catchment." The Waimatā River in this study refers to the trunk stream of the river. As the Tūranganui flows from the waters of the Waimatā River, it has been considered part of the river of interest. Although the Taruheru River flows within the catchment for this study, this river is not included in this research.

This chapter introduces the Waimatā River and its biophysical and sociocultural attributes. The geological setting of the catchment is explained as well as the river's history and current state. Current management techniques and the Waimatā Catchment Restoration project are explained to set the scene for this research.

4.2 Geological Setting

The character and behaviour of the Waimatā is largely influenced by the geology, climate, landscape history and position within the catchment (Cullum et al., 2017). The warm temperate maritime regional climate produces warm, moist summers and cool, wet winters, with high rainfall all year round (Marden, 2011). The area is subject to frequent intense rainstorms caused by tropical cyclones from March to May (e.g., Cyclone Bola in 1988), contributing to high rates of hillslope erosion and damage to infrastructure in the area (Marden, 2011).

The catchment sits adjacent to the major tectonic boundary at the Hikurangi subduction margin; therefore, faults and earthquakes are frequent and uplift rates are high. The combination of tectonic activity and weak lithology (predominantly mudstone) results in the East Cape region having some of the highest sediment yield per unit globally (Cullum et al., 2017).

The river shows a typical concave upwards longitudinal profile, with stream slope and stream power decreasing systematically downstream. While land cover on hillsides is forested, sediment inputs are relatively small. However, when combined with forest removal, weak lithology, steep slopes from tectonic uplift, high rainfall, and storms make the catchment particularly prone to erosion contributing large quantities of sediment into the system (Cullum et al., 2017; Marden, 2011). The steep headwaters of the river are confined by bedrock and steep

valley sides, meaning there is little space to store sediments locally and large sediment loads are conveyed downstream quickly with little to no effect on the local geomorphology of the river (Cullum et al., 2017) (fig. 4.2).

Confinement reduces downstream, with the unconfined tidal and urban reaches at the lower end of the catchment (fig. 4.2). Presently, the lower Waimatā is highly modified with stop banks to contain high waters and restrict lateral migration of the river across the coastal plains. Despite flood defence schemes, the river often causes extensive flooding in low lying parts of Gisborne City in heavy rainfall events. Sediment loads from the upper catchment are deposited here in low energy reaches, and sediment from tidal bank reworking line the channel (Cullum et al., 2017).

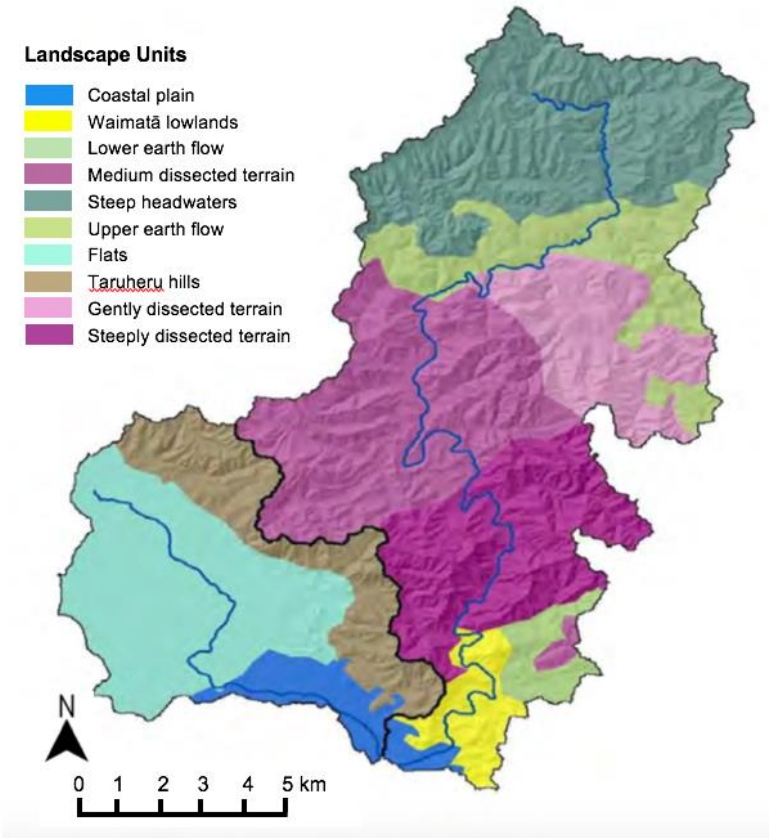


Figure 4.2: Landscape types in the Waimatā and Taruheru Catchments (Cullum et al., 2017)

4.3 Early History

The Waimatā, named by early Māori for its obsidian waters and dark nature, is also a river steeped in history, a history significant to Aotearoa (GDC, 2013b). The foreshore of the Tūranganui River, a river created by the confluence of the Waimatā and the Taruheru rivers – and the shortest river in New Zealand - is one of the world's greatest voyaging sites (Salmond, 1992). Here marks the landing place of the *Horouta* and *Tākitimu* waka (voyaging canoes), travelling from Polynesia in the 1300s. It is also the landing place of Captain James Cook and his crew in 1769, representing a meeting place of cultures; Captain Cook and a local man greeted each other with a Hongi (Māori greeting) – the first greeting between Māori and Europeans (Reeve, 2015; Spedding, 2006).

Upon the arrival of Māori to Tairāwhiti, each of the three rivers, the Taruheru, Waimatā and Tūranganui, became boundaries for the iwi that settled within the area. Fishing villages were established along the coastline, pā (a Māori village or fortified settlement) were created on the nearby hills, and unfortified Māori settlements were constructed in the surrounding area (Reeve, 2015; Spedding, 2006; Tombleson, 1997). Māori tribes in the region included Ngāi Tāmanuhiri, Ngāti Porou, Ngāti Rakai, Rongowhakaata, Te Aitanga-ā-Māhaki and Tūranganui-ā-Kiwa (Spedding, 2006).

Long-distance transport was only possible by waka; therefore, rivers became extensively used as transport routes by iwi. The river also offered a self-sustaining water and kai (food) source, including tuna (eel), mullet, īnanga, freshwater shellfish, berries and birds (GDC, 2013b; Gundry, 2015, Reeve, 2015). Although some bush was felled for construction purposes or to clear land for crops, the position of awa as taonga to Māori ensured damage to rivers was minimal (Reeve, 2015; Salmond et al., 2019).

The arrival of Europeans in the Gisborne area following Captain Cook's landing in 1769 led to the establishment of trading and whaling stations in Poverty Bay 1831. These were constructed on the Tūranganui River, where a port was created. The Tūranga settlement (now Gisborne) was decided by the government to be an ideal location for establishing a town and in 1868, 300 hectares of land was purchased for this (Soutar, 2012a). Under the ethos of 'progress' and 'improvement', the largescale clearance of native vegetation and the drainage of wetlands made way to introduce large grassland areas for agriculture (Gundry, 2015; Salmond et al., 2019). Furthermore, throughout the 1870s, Gisborne was rapidly adjusting to the growing population.

European-style houses were constructed in the town overlooking the Waimatā and Taruheru Rivers. Roads continued to be paved, sourcing construction materials from the Waimatā River by blasting hard rock with gelignite (Reeve, 2015; Tombleson, 1997).

With the increase in Gisborne's population and activity came the increase in the port's productivity. Located in the vicinity of the present-day Gisborne Port, at the Tūranganui River mouth, the sacred rock, Te Toka-ā-Taiau, marked a significant landmark for the local Māori. This rock was, by account, a mooring place for waka, a popular fishing port and site of mauri of the fisheries in the area and reputedly the tribal boundary marker (Spedding, 2006). It was also the location wherein 1769, Captain James Cook and an unnamed Māori man greeted each other with a hongi. In the words of Dame Anne Salmond, it was "a powerful place for the first formal greeting between a Māori and European" (Salmond, 1992, pp. 127). As part of the harbour development to create what is now known as the Gisborne Port, in 1877, the Marine Department blasted Te Toka-ā-Taiau amongst other rocks in the Tūranganui for shipping accessibility, despite fierce opposition from Rongowhakaata iwi (Perrottet, 2019; Reeve, 2015). While there is no visibility of the rock today, the rock is believed to still exist by local iwi, the dwelling place of the kaitiaki (guardians) of the river (Spedding, 2006).

4.4 The Modern Waimatā

In the present day, the Waimatā Catchment is a catchment divided by distinct land uses (fig. 4.3 & 4.4). The steep terrain of the upper catchment primarily consists of pine plantation forestry and agricultural land for sheep and cattle farming, where many farmers have resided across generations (Gundry, 2015; Reeve, 2015). Where Mander Road joins Waimatā Valley Road and Riverside Road together, forestry closes the road to the public, distinctly separating the upper and upper-mid catchments (fig. 3.1). Consequently, the upper catchment (Waimatā Valley Road) is accessed by Back Ormond Road on the plains and the mid catchment (Riverside Road) by the lower end of the city. Riverside Road is primarily agricultural, and forestry land in the upper end and transitions to lifestyle blocks and residential property in the lower reaches closer to the city. The lower Waimatā Catchment consists of urban and industrial land use, with the Waimatā Cheese Factory in the transitional zone between rural and urban along Riverside Road and the Gisborne Port located in the lower reaches of the catchment.

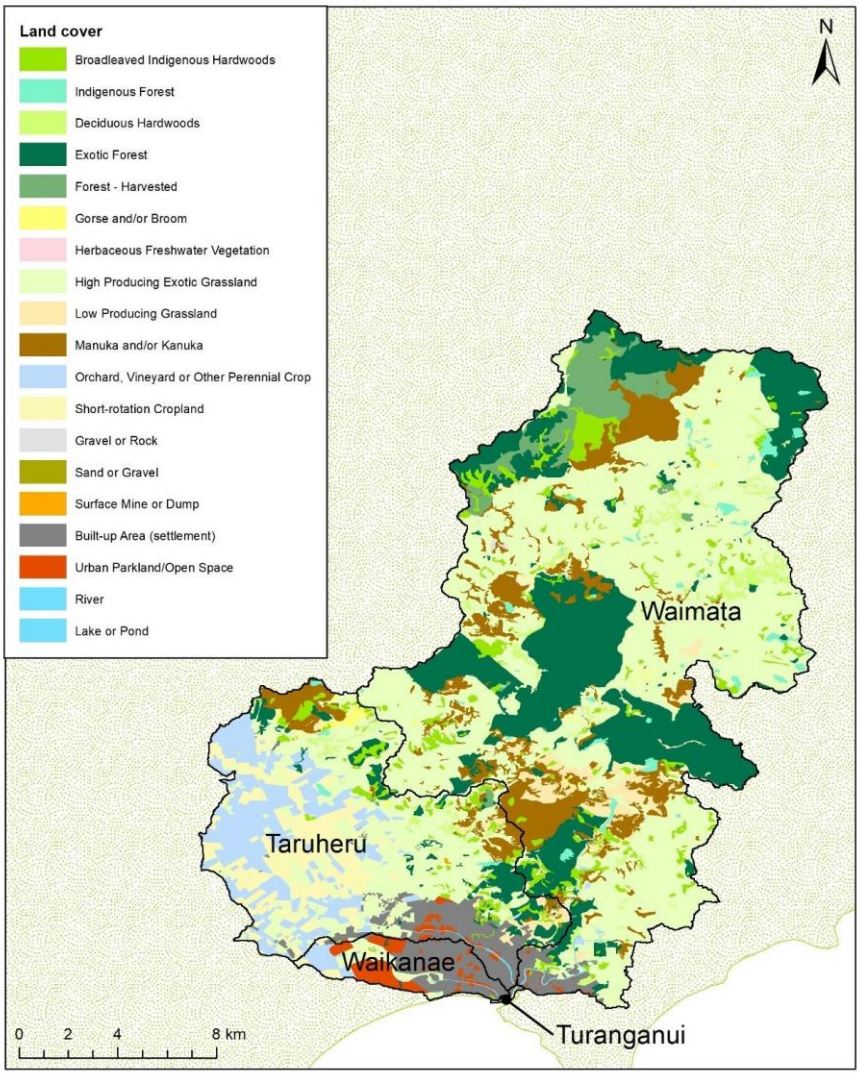


Figure 4.3: Current land cover in the Waimatā and surrounding catchments (Taruheru & Tūranganui) (GDC, 2020a)

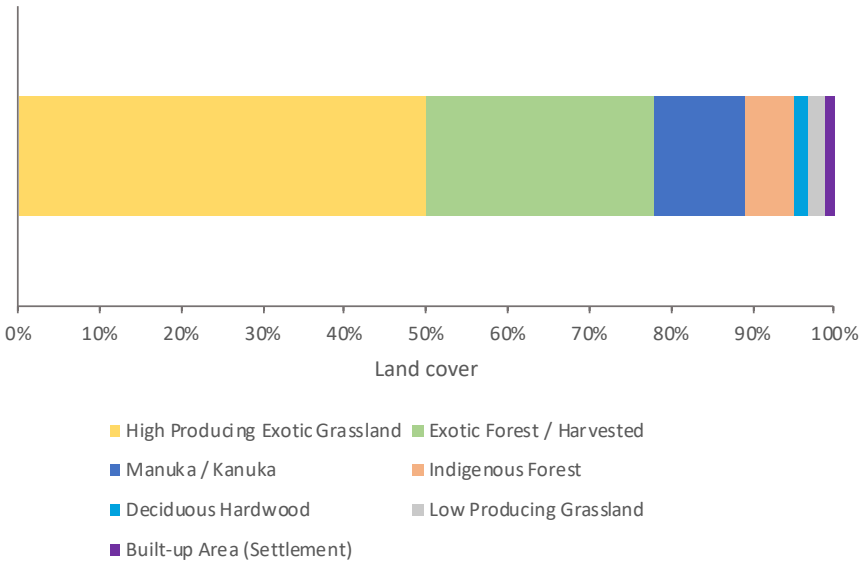


Figure 4.4: Percentage cover of different land classes in the Waimatā Catchment currently

Following the settlement of the area in the 1880s, the catchment has faced a continued history of degradation and land clearance. Large-scale removal of the catchment's native forest cover occurred over the late 19th to early 20th centuries to create space for agriculture. The fertile alluvial soils in the catchment and high external stock prices made income easy and available (Gundry, 2015; Reeve, 2015). Since then, continued utilitarian, forestry, and agricultural land use of the catchment have resulted in high erosion and sedimentation rates, ecological and water quality declines, reduced biodiversity, and increased pest species within the catchment (Cullum et al., 2017; WCEMP, 2019).

Forestry

In the headwaters of the Waimatā River lies part of one of the largest sectors in the Gisborne economy – the forestry industry. Forestry covers 28% of the Waimatā catchment (fig. 4.4), and in 2011/12, the direct value of the forest production in the Gisborne area (excluding processing) was $225 million (Eastland Wood Council, 2013; WCEMP, 2019). The sector has seen considerable growth over the last two decades (NZTE, 2016).

In response to fragile soils and increased susceptibility to landslides following large-scale forest clearance in the headwaters of the Waimatā in the early 1900s, pine plantations were established to promote stability. From the 1960s, pine plantations became widespread around the Tairāwhiti area as a government-subsidised soil conservation initiative (Cullum et al., 2017; Marden et al., 2012). Following Cyclone Bola in 1988, pine plantations in the Waimatā became the primary soil conservation and cyclone repair method. These plantations are now primarily commercial forestry businesses, many having been sold to overseas owners. Harvest of the plantations is now occurring, promoting large-scale erosion and increased sediment loads in the Waimatā (Cullum et al., 2017).

Despite job production and economic gain for the Gisborne region provided by plantation forestry, its detrimental impacts on the natural environment have been argued to outweigh the benefits. In addition to its contribution to widespread erosion and increasing sediment loads, in heavy rainfall, slash (debris) is washed downstream where it damages infrastructure (fig. 4.5), blocks up the main bridges (Gladstone and William Pettie bridges) (fig.4.6), and is deposited on popular Gisborne beaches (fig. 1.3). Confinement and steep slopes in the upper catchment cause the river to act as a sediment chute, depositing sediment at the port and requiring regular dredging (Cullum et al., 2017; Gundry, 2015). Forestry personnel appears to have ignored

regulations set by the Forest Stewardship Council or failed to acknowledge the river's presence. Restrictions on forestry activities are not as strict as those for other industries such as agriculture, and it is the only industry not legally required to pay taxes (Gundry, 2015; WCEMP, 2019).

Figure 4.5: Damage to infrastructure and private land in the upper Waimatā catchment caused by forestry slash and logs during a storm event (Hall, 2015)

Figure 4.6: Forestry slash blocking Gladstone Bridge on the Tūranganui River following flooding (Gisborne Herald, 2015)

Farming

The other dominant land use of the upper catchment, farming, also impacts the state of the Waimatā. Currently, high producing grassland makes up 50% of the catchment, the largest land cover type, and is one of the highest producing industries in the Tairāwhiti Region (fig. 4.4)

(Reeve, 2015; WCEMP, 2019). The steep hill country of the catchment makes it suitable for sheep and beef farming.

The introduction of agriculture in 1880 resulted in the clearing of native forests, the introduction of farm animals (sheep and cattle), and the construction of woolsheds on flat land close to the river and its tributaries (Tombleson, 1997). Sheep dip was historically released directly into the river on some farms, with observable impacts on aquatic ecology, before being discontinued in the late 1900s, improving water quality from this aspect (Gundry, 2015). On many farms, stock have access to the river and its tributaries, and pastoral land is very prone to landsliding and erosion further promoting sedimentation (fig. 4.7). High nutrient concentrations observed in the Waimatā River and its tributaries are also attributed to agricultural practices (GDC, 2020b; Reeve, 2015). The environmental impacts of intensive agriculture are now being recognised, with external pressures changing to reflect the demand for sustainably produced goods that follow high environmental standards. Beef and Lamb NZ strongly recommend fencing waterways on farms; however, uptake is slow, and this is in its early stages in the catchment (Reeve, 2015; Waikereru Ecosanctuary, 2020).

Figure 4.7: Landsliding of unstable land into the Waimatā River caused by agricultural land use (Harvey, 2020)

Utilitarian Uses

Rivers are commonly exploited for their vast services, spanning transport, food, water supply, recreational uses, and drainage. Following the port's construction and expansion and the use of the river for building materials, the Waimatā River continued to be used for utilitarian purposes.

With intensifying agriculture and native forest removal in the catchment, several freezing works were built within the Taruheru and Waimatā catchments to process animals and supply meat (fig. 4.8). The continued increase in production over the late 19th and early 20th centuries gave Gisborne the best export values per capita in New Zealand in 1914 (Spedding, 2006; Soutar, 2012b; Reeve, 2015).

Figure 4.8: Kaiti Freezing Works on the Tūranganui River 1909 (Crawford, 1909b)

The use of the Waimatā as a transport route for vessels soon became unviable in an era post-deforestation with significant levels of aggradation modifying bank morphology and reducing the depth and width of the channel (Cullum et al., 2017; Reeve, 2015). The river is now unnavigable by vessels past the confluence of the Taruheru and Waimatā and since 1916 the Port has been regularly dredged to allow for vessels in the harbour (Gundry, 2015; Tombleson, 1997).

The Waimatā has regularly been investigated as a water supply for Gisborne. This began in 1882, with the proposition of a weir in the lower reaches to develop a storage reservoir. This was eventually dismissed due to potential problems with siltation, scouring, and separating of freshwater and saltwater (Townley, 1882). The river as a water source was again investigated in 1902 for the suburbs of Kaiti and Whataupoko and 65 years later as a full water source for the surrounding suburbs and a complementary water source for Gisborne City, however, neither investigation amounted to action (Gundry, 2015; Poverty Bay Herald, 1903).

Today the Waimatā water is still seen as a common resource, primarily used for irrigation on agricultural and horticultural crops and drawn from bores and aquifers for residential and

commercial purposes. Excessive consumption and depletion of aquifers in private use have caused disagreement, and dry summers have led to water conservation campaigns within Gisborne (Reeve, 2015).

Considerable controversy exists amongst the local community surrounding the release of untreated human sewage and wastewater into the Waimatā River. Sewage overflows were granted consents before the mid 1980's, provided that overflows did not occur more than once a year (Reeve, 2015; Coombes, 2000). Yet, these events have occurred regularly for decades, totaling at least 13 overflows recorded in July 1990. Pumping stations in the region failed in 1987, resulting from a power cut, releasing more than two million litres of sewage into the waterways. Gisborne District Council (GDC) has been questioned as to whether they should be granted consent for such overflows**.** At present, overflows are still released in at least eight locations along 3.2 km of channel near the mouth of the Waimatā (Gundry, 2015; Reeve, 2015). In one storm event in 2014, an estimated volume of 48, 159 m^3 was released from 11 overflow points in the city's rivers. GDC has stated this to be the last-resort option due to pipe problems (e.g., blockages, broken pipes) within the wastewater network and prevents the spilling of sewage into private properties (GDC, 2020a). GDC state that such overflows following heavy rain in the area are safe due to the dilution of contaminants by heavy flows (Gisborne Herald, 2014a, 2014b; Reeve, 2015). Despite this, following rain and sewage releases swimming and temporary shellfish collection warnings are issued within the three rivers and local beaches.

Amenity Values

The Waimatā River has always been valued for its aesthetic appeal, drawing people and development to the area. After 1890, the government divided the large blocks of the lower land of the Waimatā Catchment into smaller 1000-acre land blocks for riverside properties. With the growth of the Gisborne population, it is likely scenic sections sold for higher prices and rapidly (Tombleson, 1997; Gundry, 2015).

Amenity values of the river have since decreased over the settlement history of the area. The disappointment was felt by property owners who upon moving into their idyllic river front properties were faced by erosion of the riverbanks (Tombleson, 2002; Reeve, 2015). A storm on the 18th-19th June 1894 caused significant destruction to the area that had never been observed before. During this event and subsequent storms, houses flooded, road accesses were blocked by landslides, driftwood, and logs while bridges were swept away. These issues became more

frequently documented and saw an increase in sedimentation, aggradation, and an increase in the volume and size of wood coming down the river (Gundry, 2015). These issues are still common today and lowered the amenity value of the river held by locals. Social disconnection has been reported due to the river's unhealthy state and apparent reduced recreational use of it. However, riverfront property is still popular despite its challenges (Reeve, 2015).

Recreation & Community Events

The Waimatā River has always been a space of recreation for the Gisborne community. Water sports remain popular on the river. Waka ama, rowing, canoeing, and kayaking are Gisborne's most competitive and popular water sports today and have a long history on the river, giving the Gisborne region great success nationally and internationally (Reeve, 2015; Gundry, 2015). The Gisborne Girls Rowing Club was established in 1874, and since then, rowers continue to train and compete on the river (Gisborne Rowing Club, 2020; Reeve, 2015). The Poverty Bay Kayak Club was established in 1978 with just single kayaks available. Since then, it has become a popular sport on the river, with competitive and recreational kayakers enjoying the water daily, despite the difficult conditions the river can present, including poor water quality and forestry debris in the channel (Reeve, 2015).

In the mid-1980s, waka ama was introduced as a sport on the Waimatā. The voyage of the waka *Hawaikinui* from Tahiti to New Zealand in 1985 created an increase in interest in waka ama. That same year one of the creators of the *Hawaikinui* established the first waka ama club in Gisborne, Mareikura Canoe Club. The club remains on the banks of Waimatā at Anzac Park today in addition to three more clubs: Te Uranga O Te Ra, Tūranga Waka Ama, and Horouta Waka Hoe located at Marina Park, at the Waimatā and Taruheru confluence. Its popularity holds no age restrictions with paddlers as young as five years to 75 years of age (Reeve, 2015; W. Walker, personal communication, November 26, 2020). Waka ama has huge significance to the region, being more than just a recreational activity (fig. 4.9). To the people of Tūranganui-ā-Kiwa, waka reflects their cultural and historical heritage as their first people arrived in New Zealand on the waka *Horouta* and *Tākitimu* (Spedding, 2006).

Figure 4.9: Waka ama competition on the river (Gisborne Herald, 2019)

In addition to kayaking, rowing, and waka ama, the Waimatā is enjoyed by many other activities, including rafting, swimming, and motorboats. Events are commonly held here and have been over time, including the Great Raft Race in 1964, swimming races (Poverty Bay Herald, 1892). and in recent times, multisport events (fig. 4.10) (Sport Gisborne Tairāwhiti, 2012; Reeve, 2015). In summer, children are seen jumping from bridges and swimming in the river.

Figure 4.10: Gisborne Swimming Race held on the river in 1961 (Gisborne Photo News, 1961)

Biodiversity

Terrestrial

Today, the Waimatā Catchment is dominated by high producing grassland and exotic forest; the majority of native vegetation is regenerating mānuka and kānuka (fig 4.3 & fig. 4.4).

Excluding mānuka/kānuka, tawa forest is the most common type of indigenous forest remaining, often growing with kānuka, kohekohe, tītoki, and kahikatea on the flats (WCEMP, 2019). Much of the remaining indigenous forest in the catchment has been recognised as Protected Management Areas by GDC. Due to favourable natural factors in the area, understory regeneration tends to be rapid when fenced off (Salmond, 2018a).

The primary threat to Gisborne's remaining biodiversity is introduced pest animals and plants. Animals do the most damage to native forests and their ecosystems; these include browsing herbivores, goats, deer, possum, and wandering stock. The presence of pest species can result in almost complete removal of forest understory and its seed source, which in turn drastically reduces bird, bat, and invertebrate abundance and diversity and impacts the health of the whole system (GDC, 2020c; Salmond, 2018a).

Freshwater

Many reaches in the headwaters of the Waimatā are in poor condition due to overloading by fine-grained sediments from forest harvesting and erosion. Large sediment loads smother habitat and decrease food resources for aquatic creatures, reducing local biodiversity of fish and macroinvertebrates and impact downstream reaches (Cullum et al., 2017; Salmond, 2018a).

Stream ecology monitoring by GDC shows all four monitored sites within the catchment have lower %EPT (sensitive species diversity) and MCI (macroinvertebrate community index) values than the reference site at Waihirere Stream elsewhere in the region (GDC, 2020c; LAWA, 2020). MCI scores are in the "Fair – Poor" range, and a decrease in both MCI and %EPT values over time has impacted local fish populations as macroinvertebrates provide their food source. There are currently 12 known freshwater fish species in the Waimatā, including 'At-Risk - Declining' longfin eel, kōaro, torrentfish, and īnanga. Kākahi (freshwater mussels) have also been found in the catchment, showing positive representations of health. In contrast to the main stem, some tributaries in the catchment are in good condition, particularly those with indigenous forest surroundings (GDC, 2020c).

Governance and Management Initiatives

As a regional function, GDC are responsible for monitoring and managing the region's rivers (GDC, 2020c). As outlined in the Resource Management Act 1991 (RMA), GDC is to achieve the purpose of the Act to promote sustainable management of natural and physical resources. Their

responsibility in regards to rivers includes preserving and protecting the natural character of rivers and from inappropriate subdivision use, and development; protecting areas of significant vegetation and habitats of indigenous fauna; maintaining and enhancing public access to and along rivers; respecting the relationship of Māori and their cultural traditions with their ancestral lands, water, and taonga; protecting protected customary rights; and managing significant risks from natural hazards (GDC, 2020c).

GDC currently conducts water quality testing at four sites along the Waimatā (and its tributaries) and two sites along the Tūranganui River (GDC, 2020c; LAWA, 2020). In 2018, anger was expressed by the community over the classing of the Waimatā River as 'low priority' by GDC. According to local residents and restoration coordinators, the Waimatā should be one of the region's highest priority rivers. The river acts as a sediment and slash 'chute' during high rainfall events, which are increasing in frequency and severity in the wake of climate change, and when coupled with the ongoing plantation forestry harvesting, its densely inhabited lower catchment, the vulnerability of the town's infrastructure along and on the river increases (Waikereru Ecosanctuary, 2020).

Waikereru Ecosanctuary, located in the mid-catchment, plays an active role in a community-based management and restoration of the Waimatā River. Within Waikereru Ecosanctuary, Longbush Reserve, a previous pastoral farm with a strip of remaining lowland bush under severe ecological threat was placed under a QEII Covenant following the purchase of the land (fig. 4.11). Intensive weed and pest control and native plantings were undertaken, and today, the forest has been colonized by many native species, with wildlife corridors planted between the reserve and regenerating bush in the catchment. Diverse native birds and animals have increased significantly also. Longbush is now the only area in the Tūranga Ecological District with such high remaining levels of biodiversity. The Ecosanctuary has become a site for educational programs in the area and programs for local kids have been developed to inspire young people in the area, help them understand anthropogenic change and participate in restoring the environment to a state of ora in an immersive experience. A 10-year strategic plan has been developed by the Ecosanctuary with objectives including pest and weed control, wetland and pond restoration, the reintroduction of kiwi, and the establishment of the Waimatā Catchment Restoration Project (Waikereru Ecosanctuary, 2020).

Figure 4.11: Longbush Reserve (left) bordering the Waimatā River and QEII Covenant land opposite (right) (Salmond, 2018a)

4.5 Waimatā Catchment Restoration Project

The long history of degradation of the Waimatā River and the connection between the river and its people has led to the formation of the Waimatā Catchment Restoration Project. The project was developed following the detailed research project *Te Awaroa: Voice of the River* undertaken by the University of Auckland and Ngā Pae o te Māramatanga Centre for Research Excellence. The research included land history, settler history, communal relations, biodiversity, and geomorphology of the Waimatā River and its catchment. Community report backs from this project were held in the community in November 2018 and attended by large numbers of residents from both the rural and urban communities. Discussion in the meetings enforced the need to create a project to improve water quality, biodiversity, and land stability in the catchment (Gisborne Herald, 2020; Waimatā Catchment Restoration Project [WCRP], 2020; WCEMP, 2019).

The collaborative project was formally created in 2020 and designed as a multi-year project in separate phases. The project has received $500,000 funding from the Ministry of Primary Industries to do conservation work in the catchment. The work follows the idea of the mountains-to-the-sea approach, beginning in the upper reaches with the source and working downstream over time. This first stage involves working in the upper catchment with rural landowners to develop farm environment plans.

The project's main aims include (WCEMP, 2019; WCRP, 2020):

- Restoring water quality in the Waimatā River and its tributaries
- Improving biodiversity in the wider catchment – particularly focusing on diversity and abundance in native bird species as well as other native fauna such as bats and herpetofauna
- Controlling predators of native birds and fauna, developing a Predator Free initiative
- Improving the health and diversity of existing native bush by reducing browsers, controlling weeds, planting buffers, and improving native bush connectivity
- Increasing community awareness of diversity issues and generating active landowner engagement in management
- Restoring local and cultural connections to the Waimatā
- Connecting with other ecological initiatives in the area and supporting sustainable land management and economic uses in the Waimatā catchment.

The catchment group currently includes 70-80% of the landowners in the upper and mid catchment, intending to eventually involve all landowners from the farming community. Currently, engagement includes catchment meetings and field days with landowners discussing farm environment plans, biodiversity, and pest management with guest speakers such as the Department of Conservation, LandCare, and QEII to educate farmers on restoring their land (fig. 4.12) (Gisborne Herald, 2020; WCRP, 2020).

Figure 4.12: Community plantings (Gisborne Herald, 2018)

Across the project and Waikereru Ecosanctuary, it is hoped that this can achieve a 'healthy' Waimatā that is restored to a state of ora. When discussing river health, social, cultural, physical, and biological processes in a river system are inseparable and cannot be isolated (Lave, 2015; Blue, 2018). Restoration of the Waimatā therefore, should be focused on working towards

the ‘best attainable condition’ that seeks to meet the biophysical aspirations and sociocultural aspirations of residents, scientists, and the river itself (Blue, 2018). For this to happen, perceptions of restoration and aspirations for it need to be understood. This research seeks to explore these perceptions and understand how residents relate to the Waimatā River.

5 Quantitative Results / Relations to the Waimatā

5.1 Introduction

The results of this research have been divided into two separate chapters to reflect the difference in approach to data collection, in which interviews build and expand on the themes expressed in questionnaires to present slightly different pictures of relations to the Waimatā River. Quantitative data has been presented in this chapter by analysing questionnaire responses, organised by the four main categories that the questionnaire was structured by: interactions, values and connections, river health, and aspirations. Further analysis of demographics and how these influence each variable are discussed. Additional thoughts some respondents gave at the end of their response have been analysed also.

5.2 Interactions

Interactions with the Waimatā River were broad, and many individuals interacted with the river in numerous ways (fig. 5.1). For the majority of respondents, their interactions with the Waimatā were purely recreational. Only 4% of respondents stated that they interacted with the river for work purposes, for most farming and for one respondent, beekeeping (considered as "other"). The most common interaction with the river was walking, with 66% of those that answered selecting this. Paddling on the river was particularly common; 43% of respondents used the river for kayaking, 9% for waka ama, and 8% for rowing. 9% of respondents used the river for stand-up paddleboarding. Just over half of respondents (52%) claimed to interact with the river in "other" ways; these included 'adventures' with grandchildren, birdwatching, and picnics. 14% listed residing on the river and watching it as their interaction and 5% interacted with the river and its banks through gardening, planting, and restoration works. Less common interactions

across the whole catchment listed included firework displays, cycling, abseiling, orienteering and boating. Interactions involved both being in or on the river itself as well as outside of it.

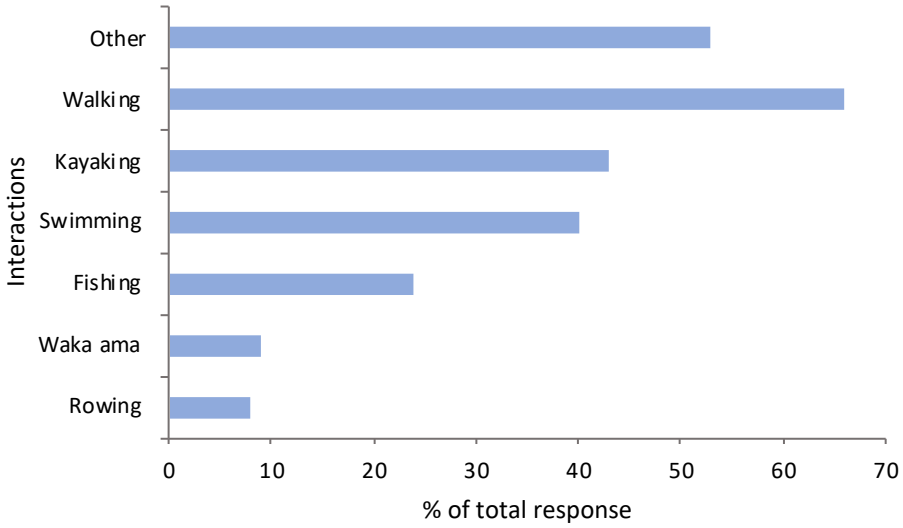


Figure 5.1: Ways in which residents and river users interact with the Waimatā River

Note: Percentage total does not add up to 100 as multiple answers were allowed

Recreational sports and activities such as walking, swimming, and paddling sports were more common in the lower and mid catchment than the upper catchment (fig. 5.2). In particular, rowing and kayaking (10% and 49% respectively) were most common in the lower catchment, where water-sport clubs are located. Fishing was most common in respondents from the mid catchment (Area 2) (33%). In the upper catchment (Area 1), interactions with the river were more related to work purposes, with 50% of upper catchment respondents interacting with the river for farming practices. Recreational interactions in this area were only walking and swimming.

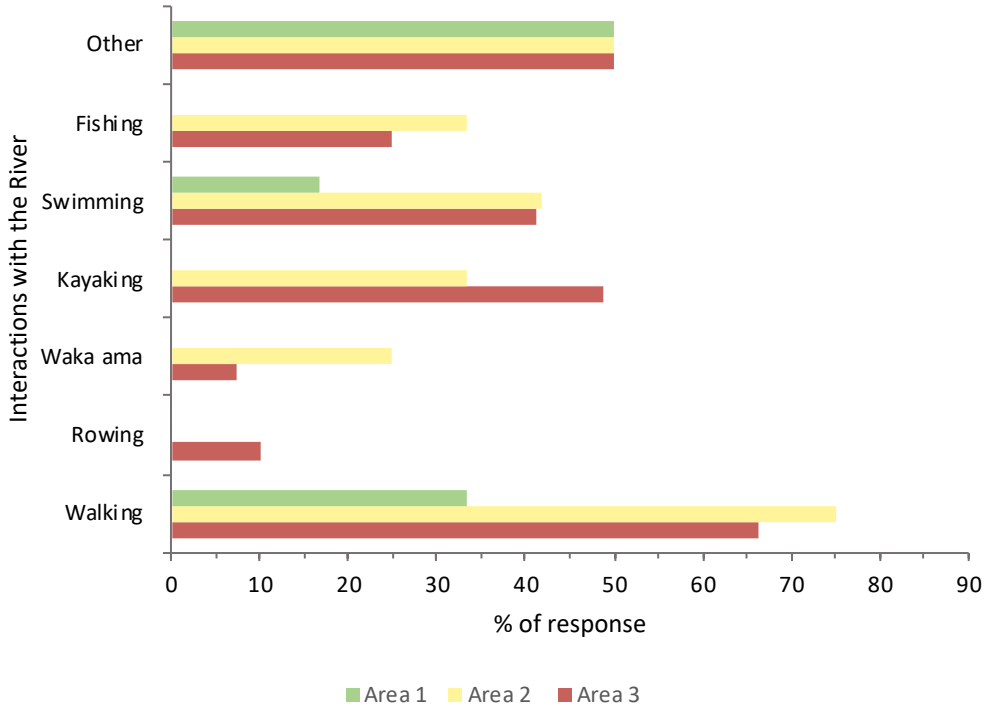


Figure 5.2: Ways in which residents and river users interact with the Waimatā River across the catchment

Note: Percentage total does not add up to 100 as multiple answers were allowed

Nearly three-quarters of respondents (71%) believed that river use and interactions had changed over time, but how people believed they had differed (fig. 5.3). Explanations given for perceived changes in river interactions attributed to environmental, recreational, industrial, and social changes of use. Respondents who lived in the catchment for periods greater than 50 years observed a decline in industrial use over time with the removal of factories on the riverbanks such as *Watties*. Some respondents believed the river had become more popular for recreational purposes and water sports. In contrast, others thought that recreational uses (such as swimming) had declined over time due to the degraded environmental state of the river. Of those that believed interactions had changed over time, respondents with a greater length of residence in the catchment appeared to be more likely to believe that interactions had changed over time (residency length of greater than 20 years compared to less than five years). However, those who lived in the catchment 11-20 years had low perceptions of change over time.

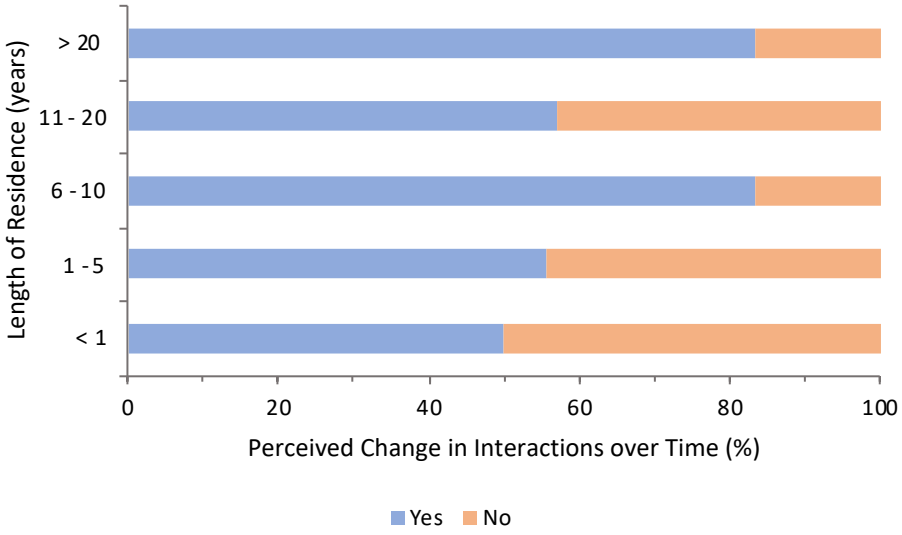


Figure 5.3: Perceived change in interactions with the Waimatā River across respondents of different residence lengths in the catchment

5.3 Value and Connection

The Waimatā River is valued for many things, with the average respondent indicating six different values (fig. 5.4). Recreational opportunities were the most common value of the river (92%), closely followed by scenic attributes (89%); respondents valued the river for its attractive scenery, sights, and sounds. The economic value was the lowest selected value of the listed options (19%). Of those who selected this value, only 5% were from the upper catchment, despite many in this area interacting with the river for farming (work) related purposes.

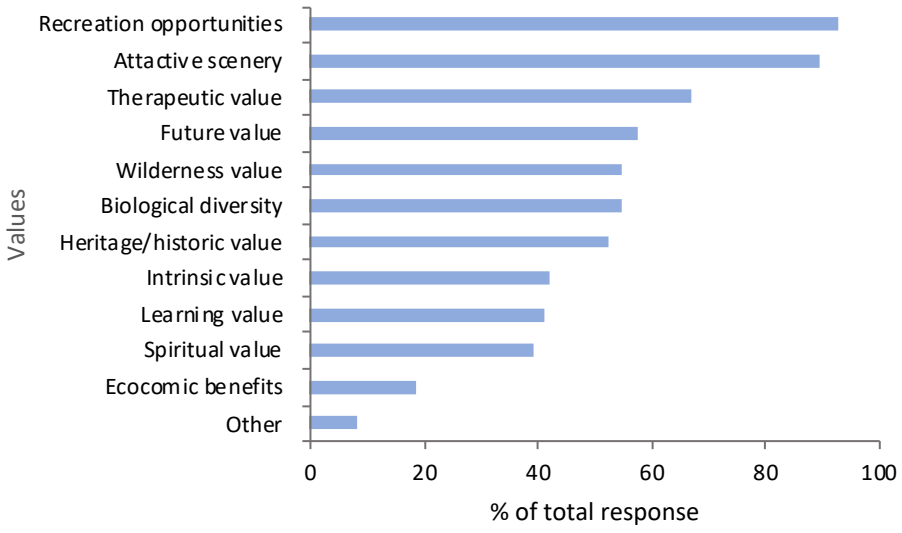


Figure 5.4: Ways in which residents and river users value the Waimatā River

Note: Percentage total does not add up to 100 as multiple answers were allowed

Therapeutic value, future value, biological diversity, and wilderness value were all commonly valued (67%, 58%, 55%, and 55% respectively). The river's spiritual value and its educational or learning value were less common (39% and 41% respectively). 8% of respondents held 'other' values of the river. These included availability of the river (free for use and sharing), cultural significance (their tīpuna (ancestors) lived there and used it), the notion that water is life, and the sporting value of the river – acknowledging the many world champions that have come from the river.

When asked if the way they valued the river had changed over the time they had interacted with it and in what way, respondents' answers were split. 44% of respondents believed that the value of the river had changed, whereas 50% believed it had not. Of those that had experienced a change in values, many were focused on education. Many individuals had become more aware of the environmental and ecological damage to the river and valued the river more as its condition declined. Future values were important, as for individuals who had children, they were more concerned with the river's ability to provide for their children.

Slight differences in changes in values were associated with residence time (fig. 5.5). It was expected that those with greater residency lengths would be more likely to have experienced a change in values over time compared to those that had had limited experiences with the river, however, those with a residency length of less than one year showed the greatest change in values (75%).

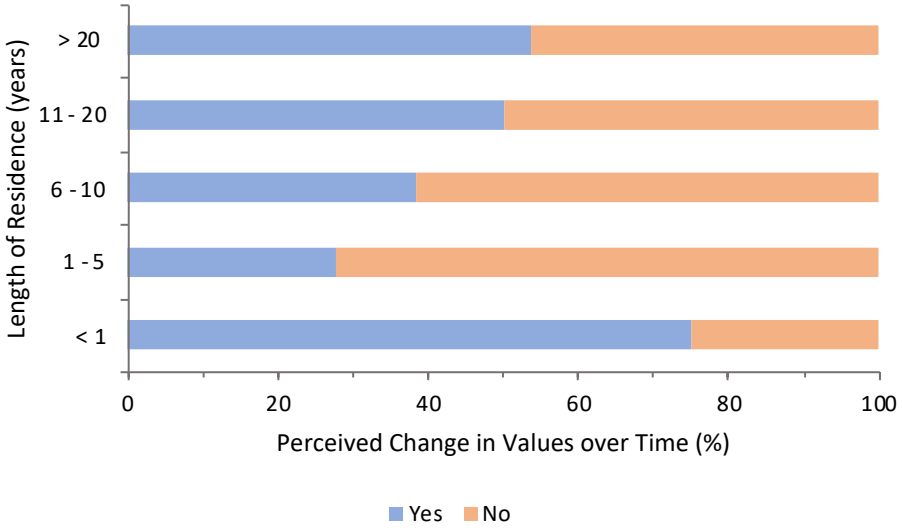


Figure 5.5: Perceived change in values over time across respondents of different residence lengths within the catchment

Spatial patterns were observed in how respondents valued the river, which can also be linked to how respondents interact with the river (fig. 5.6). Attractive scenery was valued the most across all catchment areas. In addition to the river's aesthetic value, the upper catchment valued the river for its wilderness, whereas the mid and lower catchment commonly valued it for its recreational opportunities. The mid catchment also commonly valued the river for its learning and educational attributes, and biodiversity.

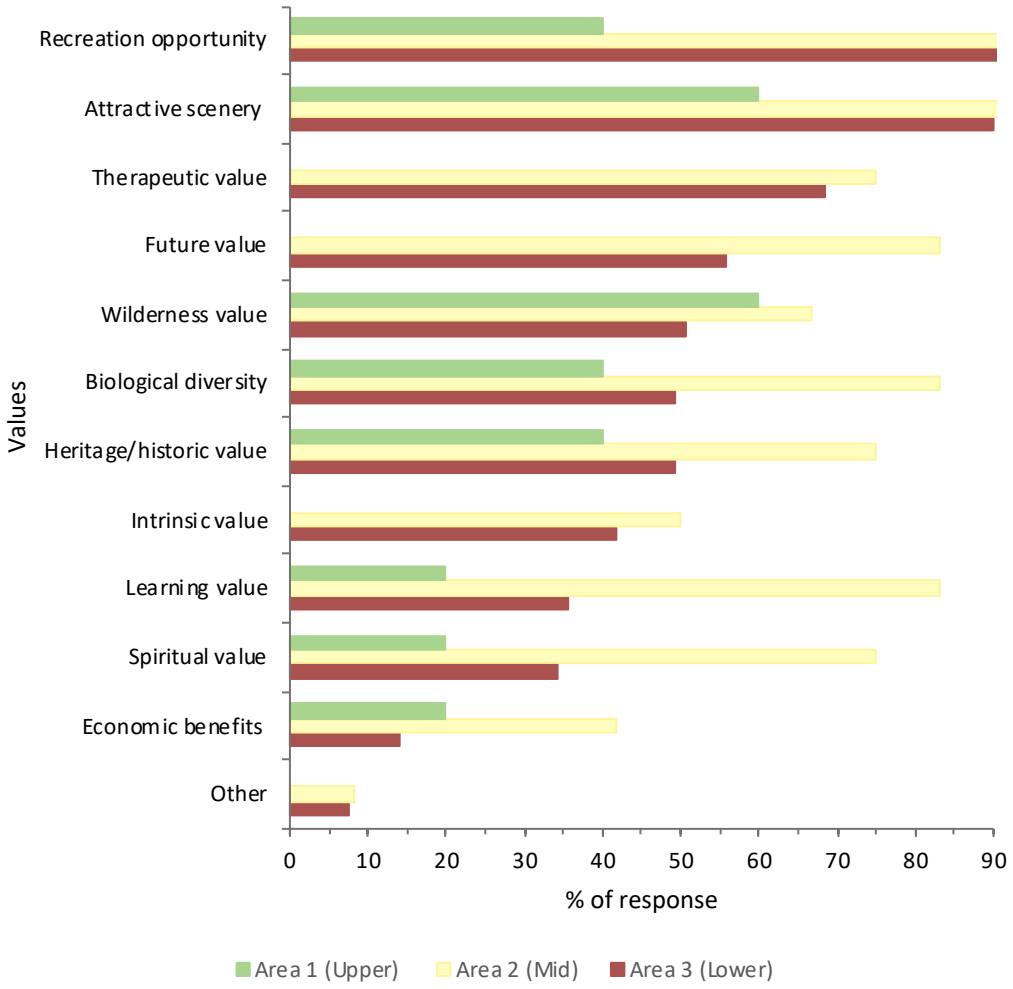


Figure 5.6: Ways in which residents and river value the Waimatā River across the catchment

Note: Percentage total does not add up to 100 as multiple answers were allowed

While all respondents valued the river for at least one reason, a sense of emotional connection to the river varied. Of the respondents, 29% did not feel an emotional connection to the river, but 71% did. Words such as "home", "calming", "part of the family", "deep appreciation", "affection", "part of my life", "therapeutic" and "heritage" were commonly used to describe the connection. Emotional connections stemmed from cultural connections. One respondent called

the river their "tūrangawaewae" (foundation, place to stand). Others described themselves as "kaitiaki" – in terms of their role in protecting the awa (river) from further degradation and considered it to be their responsibility.

> "Through whakapapa [genealogy and identity] Māori people are connected to water. It is in our DNA to have a connection to the water."

The Māori proverb "Ko au te awa, ko te awa ko au", meaning "I am the river, the river is me" was referred to numerous times, reflecting the deep connection many felt to the Waimatā.

Of those that felt they had an emotional connection to the river, 72% felt the connection had strengthened over time, 6% thought the connection had weakened, and 22% felt there had been no change. Those that had lived in the catchment for the longest periods (>10 years) showed higher emotional connections with the Waimatā than those that had lived there for shorter periods (1-5 years) (fig. 5.7).

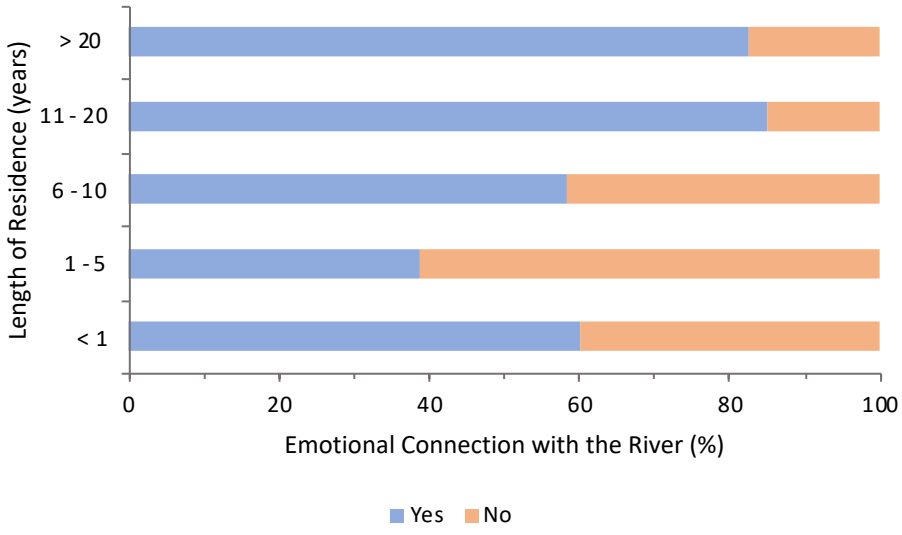


Figure 5.7: Residents' and river users' personal connection with the Waimatā River across respondents of different residence lengths within the catchment

The majority of respondents reported a connection between river health and societal wellbeing (81%) (fig. 5.8), particularly experienced personally, with negative impacts on their mental wellbeing when the river was in a degraded state and the opposite when the river was perceived to be in a good state. Respondents reflected on the connection between people and nature.

"How can my soul feel good when the river is often filthy with lots of debris!!!"

"We are all connected. Healthy water, healthy people"

"It makes me happy to see fish in the river, birds nesting nearby, swimming in it on days when the water is clear and warm is amazing and paddling to town is the best adventure one can have."

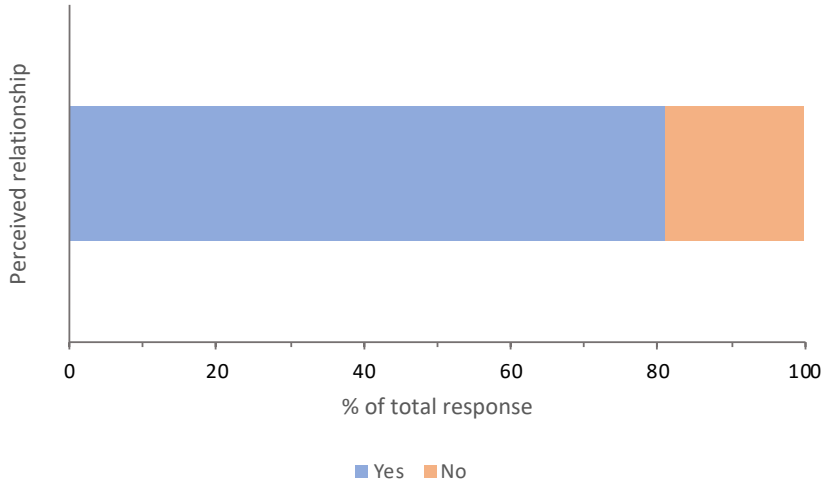


Figure 5.8: Residents' and river users' belief of the existence of a connection between the health of the Waimatā and societal wellbeing

5.4 River Health

When asked how satisfied respondents were with the current state of the Waimatā on a scale of 1 to 10 (one being very unsatisfied, ten being very satisfied), the median response was 5 – neither satisfied nor unsatisfied (fig. 5.9). Although overall results tended to be slightly skewed towards lower satisfaction, the most common response was 3 out of 10 (26%) and least common 9 and 10 (1% each). 4% of respondents considered their satisfaction to be 0.

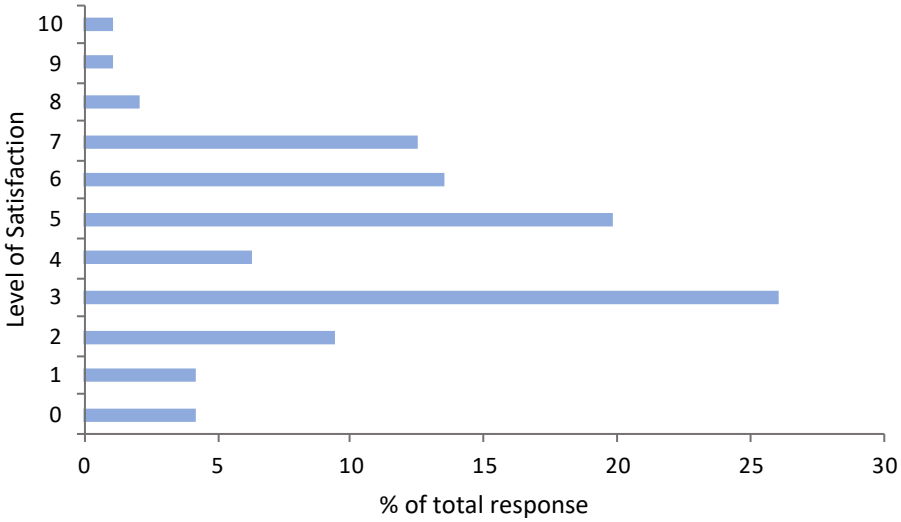


Figure 5.9: Residents and river users' perceived level of satisfaction with the Waimatā River, where 1 = very unsatisfied – 10 = very satisfied

When asked how healthy they considered the river to be on a scale of 1 to 10 (one being very unhealthy, ten being in perfect health), the mean and median response was 4 (fig. 5.10). Answers ranged between 0 to 10, with the most frequent response being 3, indicating lower perceptions of health. Only 3% of respondents responded with 8 or above, and 21% were neutral (5 out of 10).

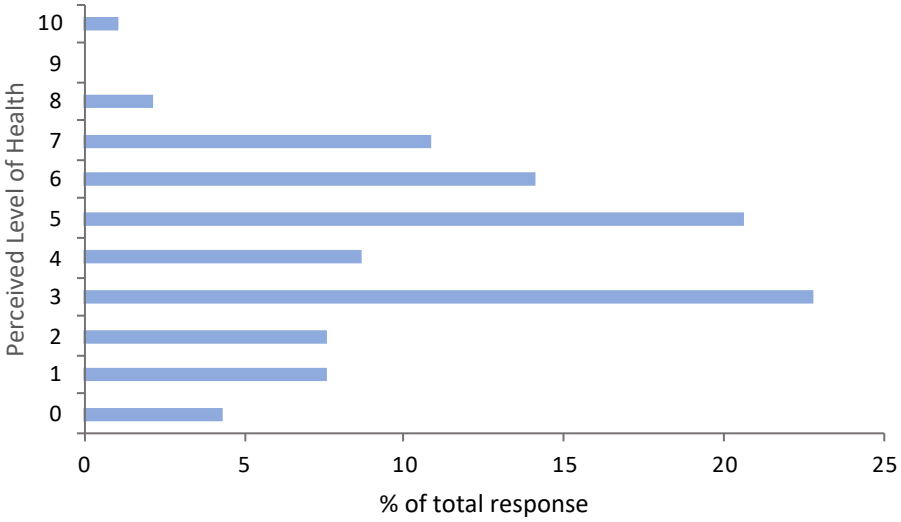


Figure 5.10: Residents and river users' perceived level of the health of the Waimatā River, where 1 = very healthy – 10 = very healthy

No observable differences were observed across the catchment in respondents' median level of satisfaction with the river (fig. 5.11). Perceived level of health was slightly higher in the upper catchment than in the mid and lower catchment (fig. 5.12).

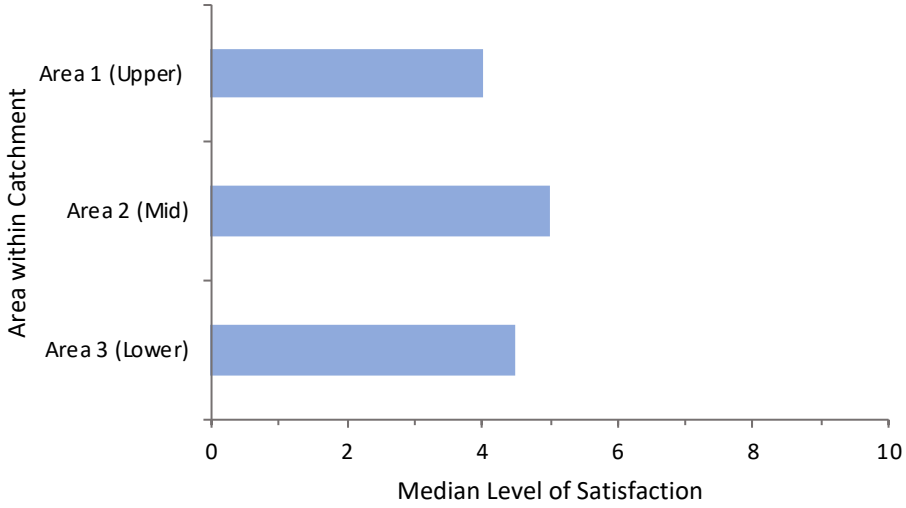


Figure 5.11: Median level of satisfaction with the state of the Waimatā River across the catchment

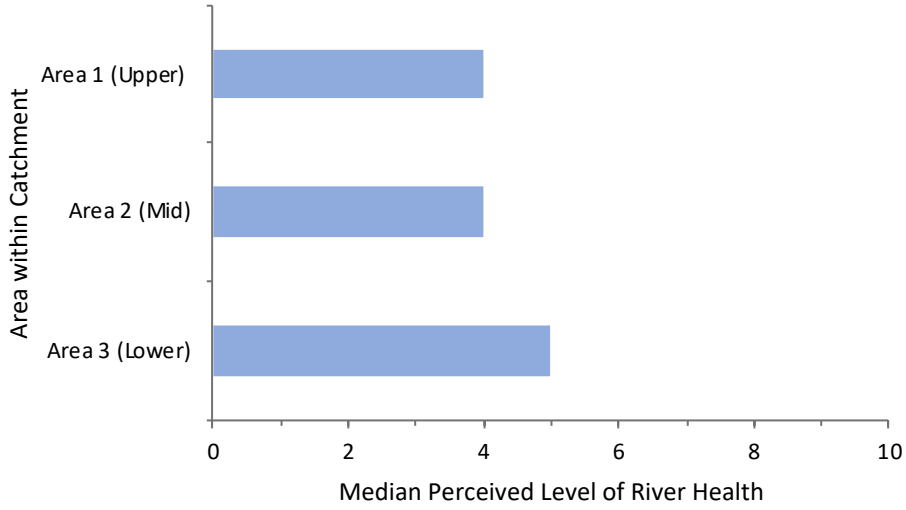


Figure 5.12: Median perceived level of health of the Waimatā River across the catchment

Residents and river users expressed consistent concerns for the health of the Waimatā, based on the options presented (fig. 5.13). The majority of respondents had more than one concern for the river and its health. Water quality was the greatest concern, with 86% of respondents selecting this as one of their concerns. Erosion, water clarity, and flooding were common

concerns across respondents, with selection being 65%, 64%, and 58%, respectively. Invasive species (terrestrial and aquatic) were the lowest concern (29%).

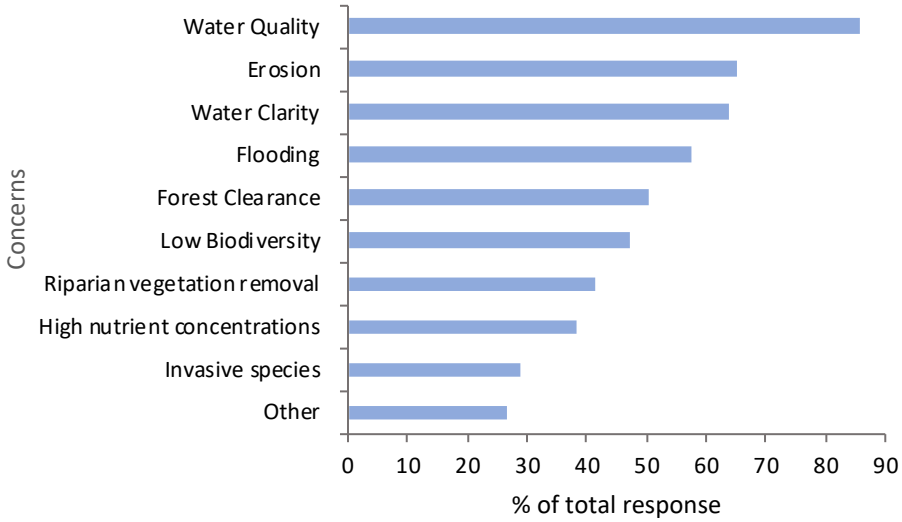


Figure 5.13: Residents and river users' concerns for the health of the Waimatā River

Note: Percentage total does not add up to 100 as multiple answers were allowed

"Other" concerns identified by 27% of respondents included the release of sewage into the river via stormwater overflow during heavy rainfall events (30% of those that selected "other"). Pollution – in particular industrial pollution at the port was also mentioned as a key concern. Forestry slash that jammed bridges and accumulated on downstream beaches and in the sea was identified due to the danger it presented to boaters and surfers. Also brought up was the lack of a clear role of mana whenua (indigenous people with rights over land) in conversations around the Waimatā and its restoration and the effects of rising sea levels. Only one respondent felt they had no concerns for the health of the Waimatā River. Despite having concerns such as erosion, some believed the quality of the river water was okay.

> "I think erosion could be remedied... I see a lot of birdlife and people fishing that makes me feel the water is alright. Youth enjoy jumping into it from bridges, a delight to watch."

Concerns were fairly consistent across the different parts of the catchment and related to how respondents from each area valued the river (fig. 5.14). All parts of the catchment were strongly

concerned about water quality, ranked as the two most common concerns for the river. In the upper catchment, forest clearance was also a primary concern, while in the mid catchment erosion was a greater concern. In addition to water quality, water clarity was a main concern to the lower catchment.

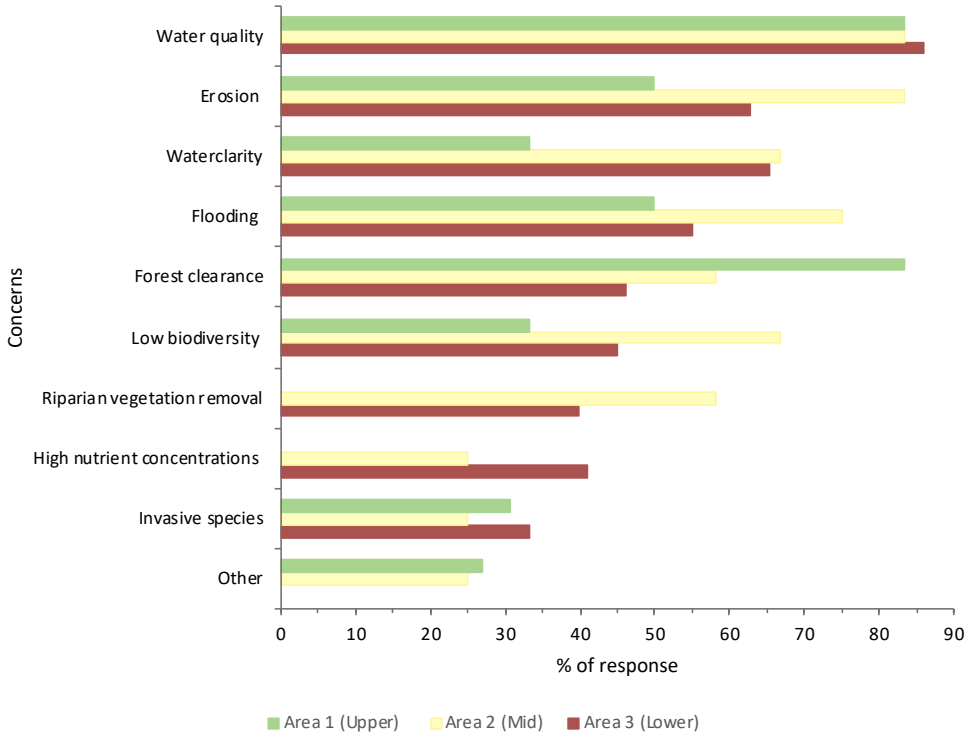


Figure 5.14: Residents' and river users' key concerns for the Waimatā River across the catchment

Note: Percentage total does not add up to 100 as multiple answers were allowed

Changes in river health overtime were identified by 77% of respondents (fig. 5.15). Of this group, 89% believed that river health had declined, while only 11% had observed an improvement over time. Two individuals wrote that the river had improved and declined in health over the time they had interacted with it (over 50 years) due to changes in river use and industrial processes over time.

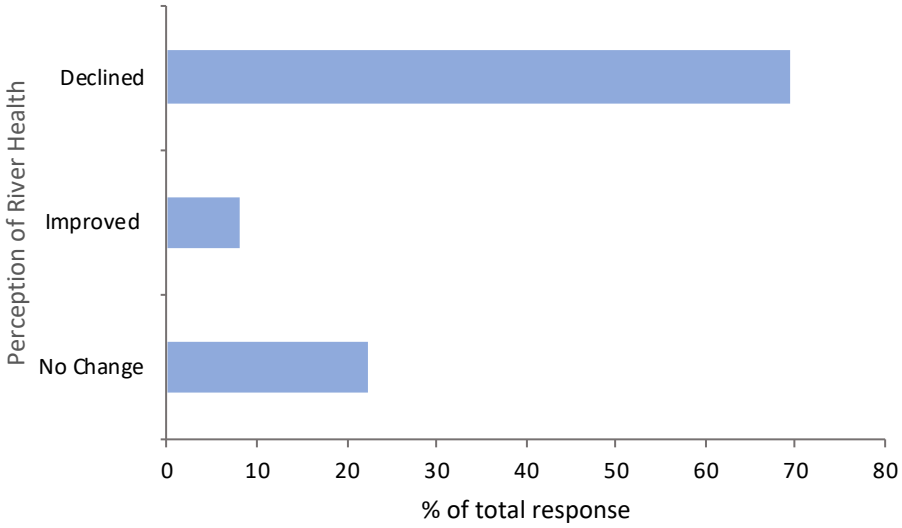


Figure 5.15: Residents and river users' perceived changes in health of the Waimatā River over their length of interaction

When asked what they believed to be pressures on the Waimatā river and its health, respondents' most common answer was forest clearance and agricultural runoff (each 64%) (fig. 5.16). Vegetation removal and urban development were both selected as pressures by 50% of respondents. The least common pressure selected was industrial processes, with 19% of respondents believing this to put pressure on the river. A third of respondents believed there to be other pressures other than the five options listed. These included pressures associated with agriculture, such as livestock in the riparian strip and dead animals in the river. Recreational and residential pressures were also raised, including boat wakes and riverside residents dumping waste and green waste on the riverbanks for removal by incoming tides and floods. Sewage released into the river during overflow events was listed by 53% of those that identified "other" pressures. Climate change, port activities, cheese factory runoff, and lack of active protection, and long-term planning by GDC and its predecessors were also listed. One respondent referred to the lack of a clear role of mana whenua in any conversations regarding the Waimatā and its restoration.

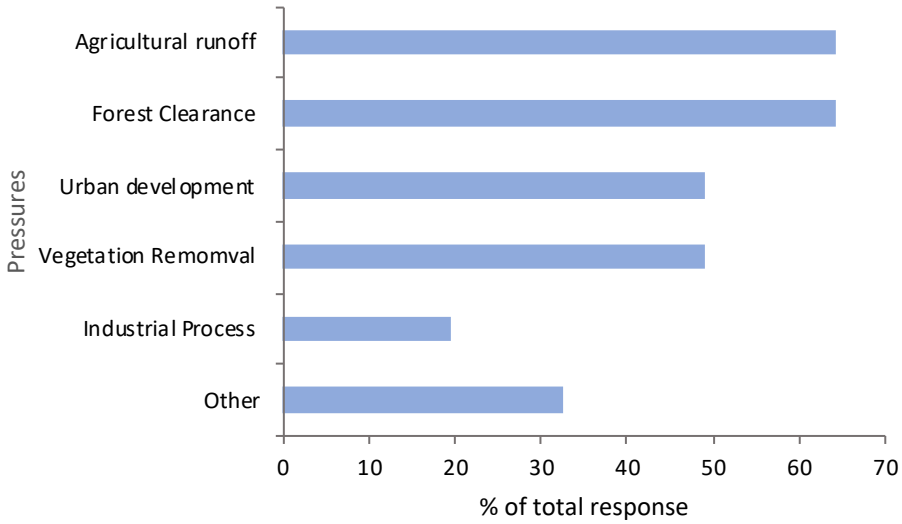


Figure 5.16: Residents and river users' perceived pressures on the health of the Waimatā River

Note: Percentage total does not add up to 100 as multiple answers were allowed

The perceived greatest pressures on the river of each catchment area were consistent with that area's concerns for the river (fig. 5.17). 83% of the upper catchment listed forest clearance as one of the greatest pressures on the river, while 83% of the mid catchment believed agricultural runoff was. Respondents in the mid catchment also selected more pressures than those in the upper and mid, suggesting greater concern. In the lower catchment, agricultural runoff and forest clearance were believed to be the greatest pressures (63% and 60%, respectively).

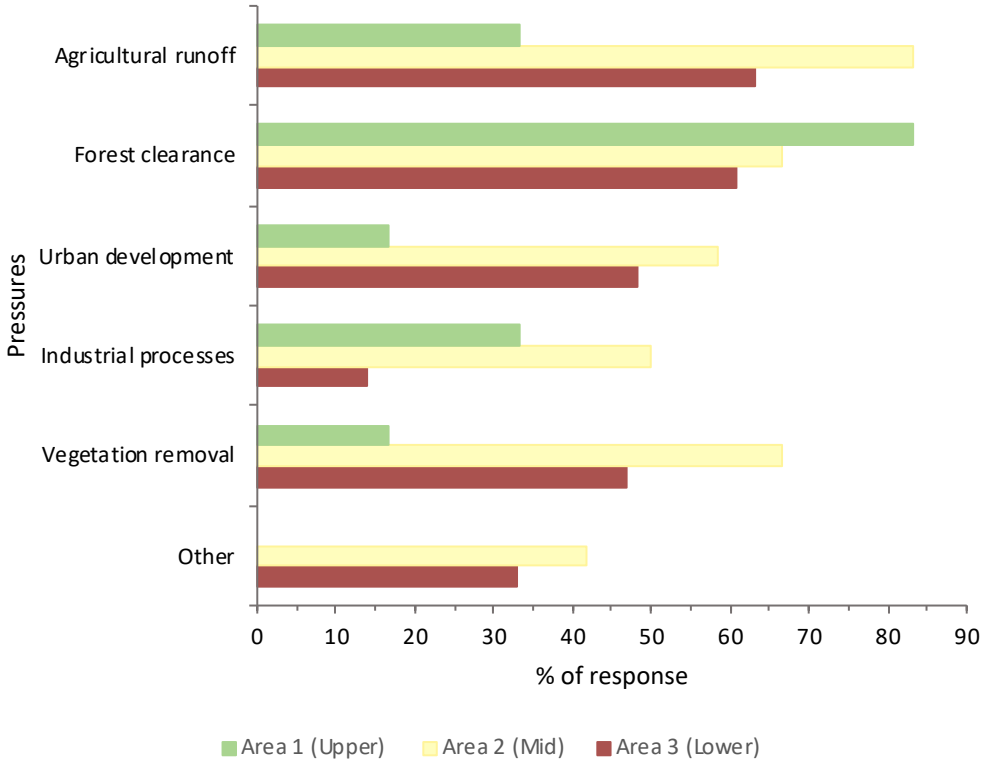


Figure 5.17: Residents' and river users' perceived pressures on the Waimatā River across the catchment

Note: Percentage total does not add up to 100 as multiple answers were allowed

5.5 Aspirations

Overall, residents and river users felt restoration of the Waimatā is necessary, yet views of what restoration means were likely different across individuals and related to their concerns and aspirations. When asked how necessary restoration of the river is on a scale of 1 to 10 (one being very unnecessary and ten being very necessary), the average response from participants was 8 and a median of 9 (fig. 5.18). Only 3% believed that restoration was not necessary at all (selected 0), 96% of respondents selected 5 or above, and 71% of respondents selected 8 or higher. The most common response was 10 out of 10 (36%).

More than active restorative action, one respondent believed that respect for waterways was crucial.

"Natural streams and rivers all need respect and often restoration to regain their natural values."

The perceived need for restoration differed across the catchment (fig. 5.18), as it was on average higher in the mid catchment (median: 10) than the upper or lower (median: 7 and 8 respectively). This corresponds with higher perceptions of greater pressures on the Waimatā by residents in the mid catchment and potential higher environmental concern.

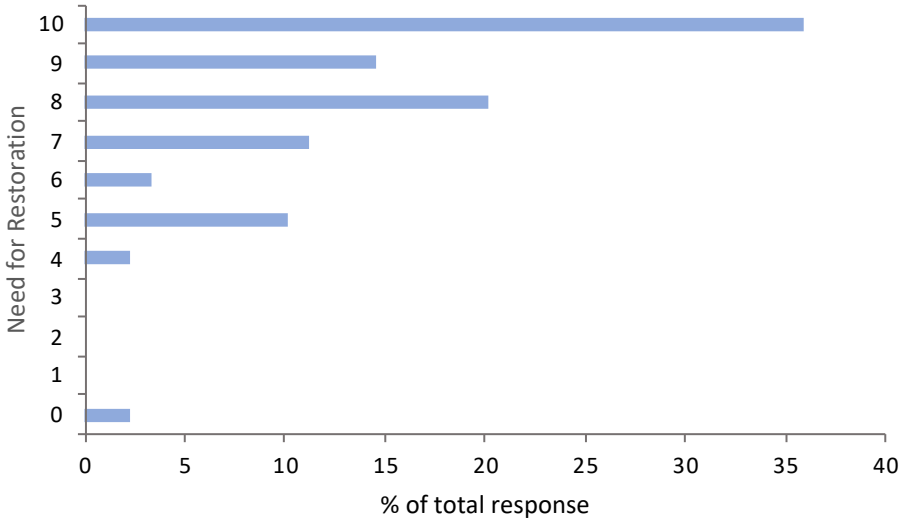


Figure 5.18: Residents and river users' perceived need for restoration of the Waimatā River

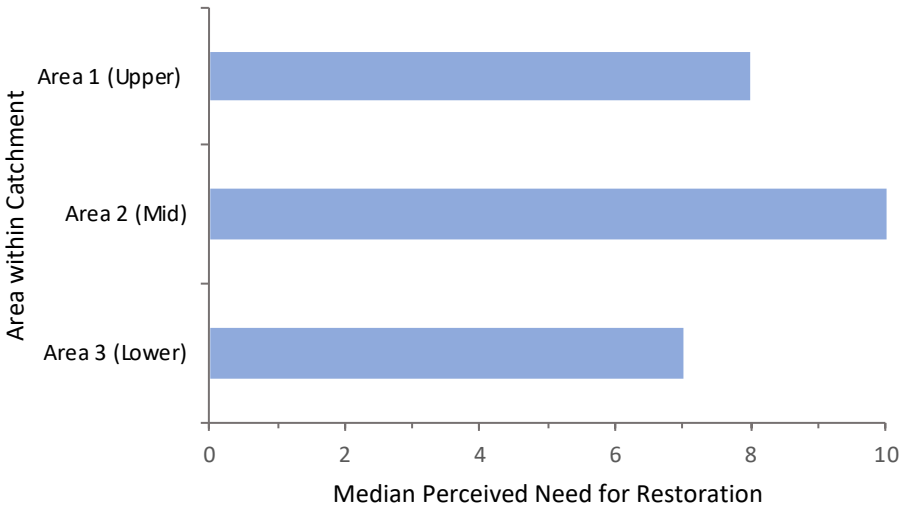


Figure 5.19: Residents and river users' perceived need for restoration of the Waimatā River across the catchment

Awareness of the existing Waimatā Catchment Restoration Project was split with 45% aware of the project and 55% unaware. This differed across the catchment. All respondents in the upper catchment were aware of the project, where the project is currently being established, whereas awareness was lower down the catchment. Only one-third of participants from the mid catchment were aware, and 42% of those in the lower catchment were aware (fig. 5.20).

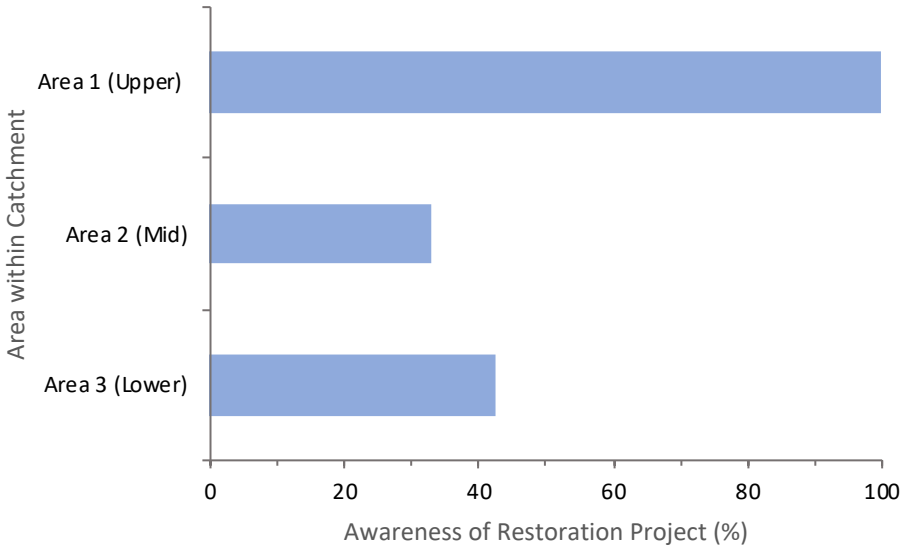


Figure 5.20: Residents and river users' awareness of the restoration project across the catchment

All respondents wanted to see changes in the Waimatā River moving forwards with restoration work, selecting all or most of the options given in the list of aspirations (fig. 5.21). Aspirations for the river were mainly biophysical, particularly water quality (97%) and aspirations associated with water quality. Swimmability of the river, water that was safe and pleasant enough for swimming and recreational use, was highly significant, selected by 94% of respondents. Increased public awareness around river protection, increased scenic beauty, minimized erosion, and increased aquatic life were all common responses (80%, 78%, 77%, and 75% respectively). Out of the options given, increased forest cover and increased potential for community spaces were the least selected aspirations (55% and 57% respectively) yet were still wanted by over half of the respondents.

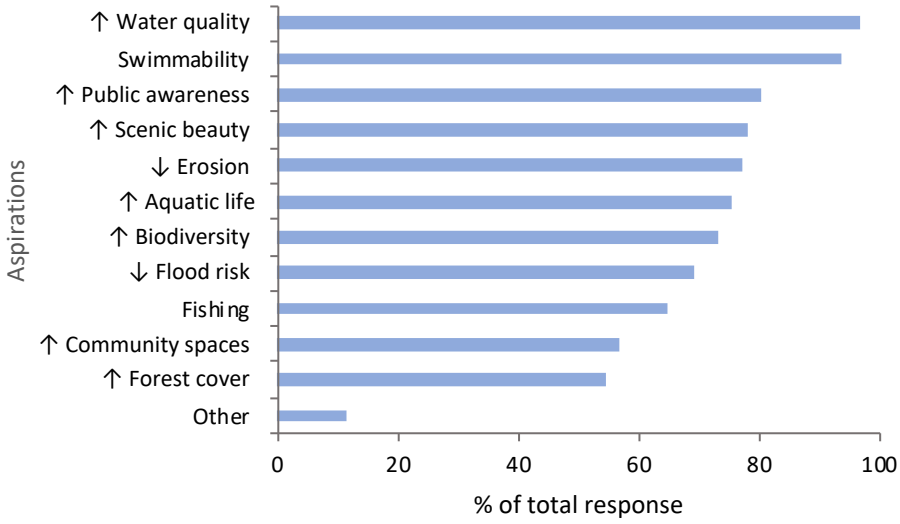


Figure 5.21: Residents and river users' aspirations for the Waimatā River

Note: Percentage total does not add up to 100 as multiple answers were allowed

'Other' aspirations identified by 11% of respondents included both biophysical and sociocultural aspirations for health. These included increased birdlife (in particular native species), rules for the river addressing boating, waka ama/paddling and swimming, an increase in respect for the waterway, and the increased role of mana whenua in the river's management. Aspirations surrounding forestry were common. One respondent agreed with the need for increased forest/vegetation cover, however, they did not wish to include plantation forestry in this. Another wanted the minimization and prevention of forestry slash in the river system. A hub for water sports and culture at the marina was wanted to help educate the community and visitors. Other aspirations related to Māori culture and tradition and management, with one respondent wanting varieties of harakeke (flax) planted along the river to allow the continuation of Māori weaving. The increased role of mana whenua in future management was raised. Another respondent wanted to see the river returned to a functional state reflecting pre-colonisation, an aspiration that is argued to be unattainable (Brierley & Fryirs, 2005).

Aspirations across the catchment appeared to be influenced by interactions with the river (fig. 5.22). In all areas of the catchment, water quality and swimmability were the most common aspirations, linked to common issues of sedimentation and high nutrient levels across the river's length. In the upper catchment, decreased erosion was common, linked to concerns for loss of land in farming, whereas aquatic life and fishing were common in the mid catchment. Public awareness was the third most common aspiration in the lower catchment.

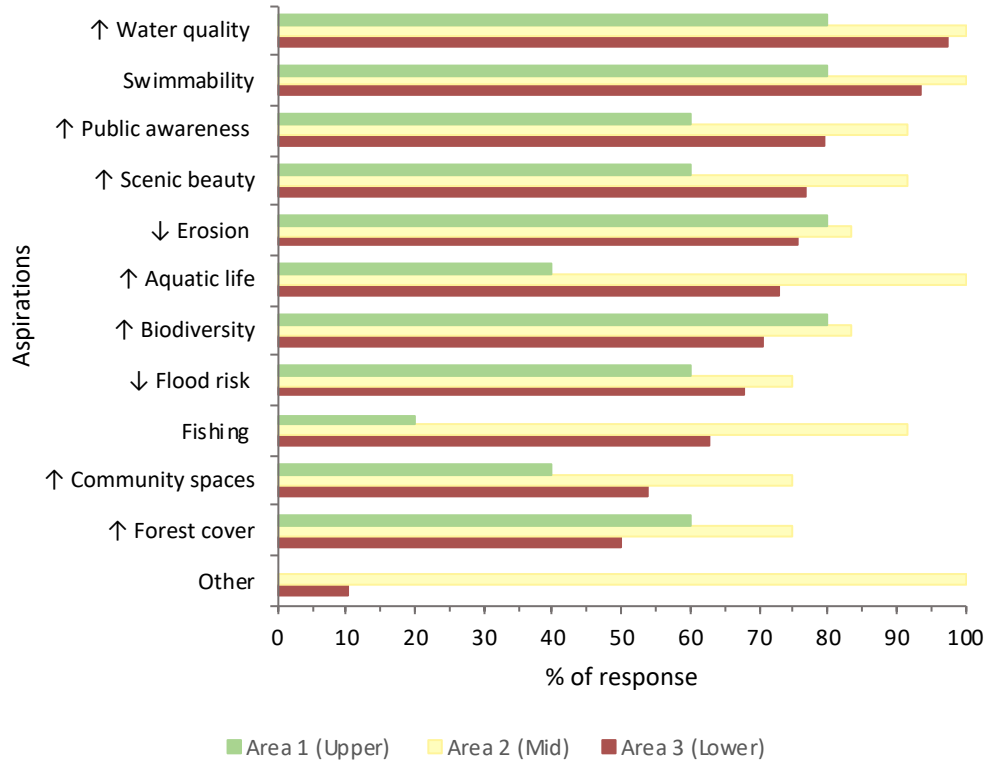


Figure 5.22: Residents' and river users' aspirations for the Waimatā River across the catchment

Note: Percentage total does not add up to 100 as multiple answers were allowed

5.6 Additional Thoughts

Participants were given space to reflect on their own perspectives and relations to the river. Here new themes emerged, and issues were raised that had not been considered or had been considered to be less common. Participants largely spoke about ownership and responsibility for the river, reflecting on concerns identified in the questionnaire and who was responsible for them. GDC and landowners were mentioned multiple times for their role in the health and wellbeing of the Waimatā. In particular, the Council was held responsible for the role in the releasing of sewage and wastewater into the river; something locals wanted to stop. As one respondent wrote:

> "Council does not have resource consent to pollute the river"

Respondents wanted Council to take an interest in the river, be open with their findings and data, and take responsibility for their contribution to the river's degradation. Other respondents had concerns about boats and their use in the river, and the impact on the riverbanks.

> "I would like to see most parts of the town rivers restricted to passive watercraft only"

> "Jet skis and other boats at times are trouble"

> "...even though the speed limit is 5 knots the boat wakes cause all of our erosion by undermining the riverbank and cause them to cave in"

Many residents felt that the river was the right of everybody in the country and a matter of respect.

> "The river should be owned and managed by the whole of New Zealand"

> "No one owns rainwater and that is the source of all rivers"

> "It is our responsibility to care for our rivers regardless"

The questionnaires provided insight into the perceptions and values held by residents and river users regarding the Waimatā and the differences in these across the catchment. Additional comments and expansion on answers given in questionnaires provided additional themes that were not included in the questionnaire and could be addressed in semi-structured interviews with residents to gain clarification and explore the topic further. Findings from quantitative data regarding interactions, values, and connections to the river and how these influence perceptions of river health and aspirations were used to design interview questions. These interviews expanded on the themes addressed and raised in questionnaires to provide detailed insight and personal stories of the Waimatā River in the lives of Gisborne residents.

6 Qualitative Results / The Story of the Waimatā

6.1 Introduction

Quantitative data from questionnaires explored in Chapter Five gave insight into the broad relations between local residents and the Waimatā River. Relations were shown to have changed over time for many, particularly in those residents who had lived within the catchment for longer periods. How people interacted with the river shaped the way that they valued the river, and their aspirations for it. The health of the river influenced how they interacted it, although concerns for its health were relative to where in the catchment respondents lived.

Findings and themes that emerged in questionnaire responses regarding interactions, connections, restoration, responsibility, and governance have been used to set up and guide the semi-structured interviews explored in this chapter. The interviews with ten residents in the catchment revealed the different roles the Waimatā plays in locals' lives, reflecting its significance in both the past and present and how this shapes perceptions for the future. Residents each have connections to the Waimatā, but what this connection means or looks like differs between individuals and groups and is influenced by differences in space and time.

This chapter explores the personal stories and experiences with the Waimatā told through the compilation of these interviews. Quotes by participants have been identified using the interviewee's assigned participant number. The chapter analyses each role identified in interviews starting with the river as a historical space its roles as a livelihood, a cultural, recreational and community space and a refuge, before exploring its degradation, conflict, governance and future.

6.2 The River as a Historical Space

The Waimatā was described by most (70%) as a historical landmark in their lives, ever-present and rich in history. It was identified as the river of their ancestors also, for both Māori and

pākehā. To these residents, the river has always been a part of their life and they have grown with the river and observed its changes over time.

> "I grew up in Gisborne. Then we shifted to Grant Road when I was in my early teens, from that time we lived right on the river." – 5

This sentiment is particularly true for those in the upper catchment from farming backgrounds. Here the land is a part of family history that has been passed on throughout the generations. All interviewees from the upper catchment were born and raised on the land where they are now raising their children and therefore were invested in the land and the river.

> "Well, I was born up here [in the upper catchment]. So, 50 years [I have lived here for]." – 6

> "I have grown up with the river in the valley, you know. I have enjoyed it as kids. And we've had the positives and the negatives with it of being trapped in through floods and things like that and everything that goes with it." – 6

> "I was born there, so our farm has been in the family for almost 100 years… I have been tied to it forever, for 30 years." – 9

> "I think [my connection to the river] is just my family history, but mainly it is as we said it has been almost 100 years. And every generation on our farm has done their bit to improve the farm. And this [the restoration project] is our opportunity to be able to do that… So each generation is just building on what the last one did." – 9

The history of the Waimatā is rich and spans generations for many residents in the catchment. Connections to the land are often generational, particularly in the upper catchment, giving a strong tie back to the river which influences perceptions of the river and land and creates a strong attachment to place. The history of the river is particularly significant for Māori in the area, telling the story of the connection between mana whenua and their awa.

6.3 The River as a Place of Cultural Significance

As is the Waimatā a historical space, it is also considered a place of cultural significance, with its foreshore marking the landing place of the *Horouta* waka. The river was traditionally used as a key transport route inland for local iwi, streams that fed into the river provided fish and floodplains provided space for gardens. For Rongowhakaata (an iwi), the river is a part of their history and culture, flowing from the ranges of the sacred maunga (mountain), Motukeo. Furthermore, the values of mana, mauri, whakapapa and tapu (sacred) define the relationship between Rongowhakaata and the river.

> "... places that have become alienated from them with landownership changes... There will be really strong benefits for the iwi to be able to reconnect with some of those places that they haven't been connected to for a couple of generations." – 7

For others, Māori culture and worldviews influence how they connect with the river and with nature, seeing them as part of a whole and not divisible.

> "... having spent so much time in Te Ao Māori, is that I see the people, the plants, the animals, the water, the land as one. They are all part of the ecosystem, the living landscape. The people are part of it, not separate, so this whole conservation ethos that you exclude people and lock it up is very alien to the way I sort of think about it." – 5

Māori depend on the river physically, emotionally, and spiritually in both the past and present day. Awa are often referred to as life, with the frequent use of the phrase "ko au te awa, ko te awa ko au" (I am the river, the river is me) emerging in questionnaires and interviews. "Ka mate te awa, ka mate tatou te Iwi" (if the river dies, we die) can be taken quite literally, with the life the river previously offered to sustain the local population.

6.4 The River as a Livelihood

For those in the upper catchment, the river serves as an important part of farmers' livelihoods. The constant water source provided by the Waimatā and its tributaries offers a valuable resource that still supports farms and their practices. Farmers in the upper catchment referred

to the river and its water as being "life". For those on farms, their income and livelihood are dependent on the river in a way those in the lower catchment are not.

> "... the river, well, it has been an essential stock water and stuff like that. As far as stock water goes, it is valuable." – 6

> "People in the world congregate around water... same with our farms, we know for our stock, water is life". - 4

The idea that water (and the river) is life holds true in many different ways. For the upper catchment, it allows landowners (farmers) to continue their businesses, their homes, and their livelihoods. Further down the river, the river offers a space of recreation, a place of enjoyment and physical activity, contributing to wellbeing and health.

6.5 The River as a Recreational Space

A key role the Waimatā River plays in resident's lives is its role as a place of recreation for locals. As one interviewee commented: "Well it's the most recreationally used river in the region" (7). As noted in the questionnaires, interviewees use and value the river for its recreational opportunities, namely swimming and paddling sports, whether part of a club or on their own. Often the river has been a space they have spent time on in their youth. Children have always used the river for swimming, playing, and fishing.

> "But we also spent a lot of time on the river, just playing. We would go down in boats and go to the island, with mullet jumping around there. So, we played in the river a lot." – 5

> "We would build slides and play in the river... We would catch a 40-gallon bucket of eels in a night... it was great fun, would drop them in a bucket and tip the drum over and let them all slide back into the river." – 1

Recreational uses of the river are vast. Along the length of the river there are spots popular with users.

> "We all used to grab our bikes and we'd head up the gravel road and then go swimming. There was a really good swimming hole." – 5

> "...there was a really cool dive spot, which had a thing in a tree, and we would swing off it." – 4

Paddling sports on the Waimatā play a prominent role in the lives of residents, often part of a sports club and participating competitively or recreationally through this.

> "We have got waka ama, singles, and 6's. Then you've got the rowing, so the singles, doubles, and fours. Then the kayaks. So that's basically the main. Oh yeah, and the odd stand-up paddleboard. Those are the good things." – 8

Waka ama, in particular, plays a significant role in Gisborne, providing opportunities to people of all ages to spend time on the river, make friendships and excel in sports.

> "It is called the river of gold, because so many people train on that river and have gotten gold medals in rowing and kayaking. It's our favourite playground. It's a massive part of Gisborne." – 5

> "...we [waka ama club] are just crazily expanding... We have paddlers from 5 [years] to 75 and there are racing provisions for every one of them. And they all compete at nationals." – 8

For other participants, this is in their own time using their equipment. Either way, exploring the Waimatā strengthens connections between residents and the river.

> "Well, we've got kayaks; we live on the river, so we fish in the river." – 3

> "I have spent a lot, a whole lot of my life paddling/kayaking since I was about 12 or 13. Kayaking has been up and down the river, so I know it pretty well." – 1

While some may not participate in the sports, they observe them and recognise the importance of the activity for children and residents of Gisborne.

> "You go down to the Taruheru and Waimatā here, there's lots of kids down there with their waka ama, they love it. It keeps them off the streets, keeps them fit, they love the competition, they love the energy they can get out of their boats. It's a huge part." – 1

The recreational space the river provides offers a wealth of benefits for the Gisborne locals. Whether through sports or personal use, being on and interacting with the Waimatā strengthens locals' connections to the river and others and also supports physical and mental wellbeing through doing so.

6.6 The River as a Place of Community

Aside from the recreational benefits, the Waimatā also serves as a space to connect people. The river serves as a communal space in which people come together to meet, play, participate in sports, and enjoy nature. This sentiment was expressed by '9', who observed that:
"It is a good meeting place for a lot of people. The waka ama, the rowing. It is just a shame that the health of the river isn't the best."

Spots along the river, particularly in its lower reaches, serve as meeting places for community members, young and old, historically and in the present. One interviewee spoke of the historic communal spot, the "Hole-in-the-Wall" along the Waimatā.

> "There used to be a swimming part called the Hole-in-the-Wall, they called it. And I had never been there, but it was fascinating, and all my mates talked about it, because it would be a congregating place for some of our mates and all that, people of our age etcetera, etcetera. But I never got up to the Hole-in-the-Wall." – 8

The river is a place of family. For interviewee 10, the river itself was considered whānau (family). For other participants, the river is a place where families connect. People who grew up on the river now bring their children and grandchildren to the river to participate in the same activities.

> "...it's great for our grandchildren because they have a wild time, and it's going to get better as they get older, and they've got their own kayaks and all those things." - 3

> "... and the grandkids all fish and catch little mullet and kahawai in the river and the other things you get, the odd snapper sometimes from them." - 3

> "... we live with our grandchildren... we would build slides and play in the river." – 1

The restoration project has been a way residents and community members have come together to work on the river. Those running the project speak about the experience and the love residents have for the river.

> "It was really nice to be working with people that are there because they wanted to and they care, and that's not to say that people in other catchments don't care. But they consciously said, 'actually we are worried about the river, we really care about it and want to work with it'". – 7

Consequently, the river is a place of connection. Residents and river users alike come together in many different forms, connecting sporting teams, families, friends, and residents in a common interest – the river. Restoration work on the catchment further strengthens connections, something that may only get stronger as work continues and the health of the river improves. The benefits in terms of community that the Waimatā offers also spans into the benefits on the individual and the space of refuge it provides.

6.7 The River as a Refuge

The Waimatā was often described residents as a place of refuge, an outlet of sorts. This is shown in various ways. For many recreational sports and paddling offers a refuge of a physical nature. However, for others, their emotional connection to the river offers a therapeutic benefit. The interplay between the physical landscape and the residents' emotional connection provides evidence of the mental benefits of blue space in the Waimatā Catchment.

> "It's really good, for looking at it. I don't know about you, but do you get up in the morning and look out at the sea or the river and just look at it? It's gorgeous. Look at the movement." – 1

> "Without a doubt, it has to have a huge emotional part, if it's in good condition. Because you want to be there. Even on a dirty day, they [locals, paddlers] want to be there." – 1

Interviewee 2 described the Waimatā as the perfect place they could sit for hours and simply enjoy the surroundings. They could spend time thinking and meditating surrounded by the peaceful environment of the riverbank. The effect of the river was described to be calming and rejuvenating on people.

A sense of home and belonging is created in the interface between people and the river. Connections between residents and the Waimatā appear to be closely linked to aesthetics and sensual experience. These connections have strong benefits for mental wellbeing, particularly when the river is in good condition. Degradation of the river, however, threatens this, instigating fear of losing the river itself and this connection.

6.8 The River as a Threatened Landscape

The river is increasingly becoming a threatened space and a river of poor health by those in Gisborne. The majority of interviewees believed the river was in poor health and need of improvement, particularly in times of heavy rainfall, although levels of concern varied. One interviewee (2) believed that although the river got very discoloured following periods of heavy rainfall, it often cleared quickly within two weeks of the event. They stated that the river did not give them any problems when swimming, however, they would not drink the water.

Across all other interviewees, there were multiple different concerns for the river and its health. The river was referred to as being in poor health and "pretty sick" (interviewee 7). Sewage releases, forestry impacts, and the effects of urban stormwater flows were common concerns of interviewees.

> "Yes [I consider sewage to be the biggest issue for the river] definitely, and the sediment in all the rivers in the region is the number one and it's a major problem. It's huge. But

the worst for me, tar seal is a hugely underrated problem, because there's nowhere for the water to go. It just travels along 'til it gets into the river. There's no filtering system before it gets in the river." – 3

"I think that its big problem is sediment. But its second big problem is E. coli bacteria, and probably its third big problem is kind of lack of quality riparian environment." – 7

"I'd say the sediment loads coming out of the forestry [is the greatest concern] … And because the whole upper catchment was pretty much planted in Bola, a lot of that has, we are sort of ahead of the rest of the country in the effects of forestry on the river systems." - 9

"People love it [the river], and a lot of people live on it, and if the river base aggrades and we also get sea level rise, Gisborne is not looking in a good way with water coming at it in both directions. It is really not a good idea to be sort of fostering a sort of market-led, let it all rip attitude to the rivers. It is just crazy." – 5

For some residents, there has been a shift in perception over time and increased awareness about the environmental state and impacts.

"I think that the rivers are terribly dirty now, I've grown up always having this silt in the river… So cloudy rivers never bothered me, I always just thought it was just part of the parcel of a healthy river. I never thought it was unhealthy… but yeah, my perception [now] is that our rivers are not clean". – 4

"…there are farmers that I never thought would be involved in the [restoration] project, involved in it. A couple that said right at the start that they didn't want anything to do with it, have come on board. And one of them bailed me up after a meeting the other day and said, "when's my farm environment plan getting done, I want to do this, this and this. When can I get the funding? I want to plant this and do that." People are just starting to think about it a bit different and also make the most of the funding being available." – 9

Poor river health and its degrading condition over time has led to concerns across the community. Concern for the river and collective responsibility for those who live along it has been translated into action for many across the catchment and an attitude of change-making. Concern has also translated into contestation, with differing management and responsibility views across various stakeholders and interest groups in the area.

6.9 The River as a Contested Space

Relations to the river are not without conflict. Throughout its history, the Waimatā has been prone to its fair share of controversy regarding its management and its uses by various stakeholders, beginning with the blasting of Te Toka-ā-Taiau by the Marine Department in 1877. The legacy effects of past arrangements of governance remain, influencing current perceptions and practice of management. As observed in questionnaire responses, most respondents are not happy with the state of the river and hold various stakeholder groups responsible for the condition of the Waimatā. Interviewees placed the responsibility on GDC for their responsibility in managing the river and their role in its declining health through sewage overflow releases.

> "...And yet, nobody in Council seems to think we should be doing a catchment plan or that you need to even understand what is going on the river. And they do absolutely nothing with it, except using it as a repository for wastewater and sewage when it rains too hard. And they just don't have a clue about this beautiful waterway that is right at the heart of their community." – 5

> "If you look at that, you'd say Gisborne District Council is really [responsible for the health of the river]" – 3

Residents also held the Council responsible for stormwater discharge and its effects on riverbank erosion on properties.

> "The Council don't care; they don't give a peruviol about [the erosion issues]. They have a responsibility; they'll jump up and down about the rate payers not paying their rates and the stormwater rates. But they are not taking responsibility and containing it and

> putting it in pipes and they don't want it, they don't care. It scours out the banks and it's not a problem to them. They have a lot to answer for." – 1

The effects of forestry and its role in damaging properties downstream has caused strained relationships between landowners and forestry companies. Forestry slash presents a danger to those in or on the river. It is perceived to have wiped out ecosystems in the river and tributaries, damaged and wiped-out properties and infrastructure, and caused visual and environmental issues for the river.

> "Everyone probably sounds like a broken record with the old forestry thing, but it has had a massive impact on our catchment." – 9

> "Forestry harvest has been particularly devastating". – 7

> "There is definitely tension there [between forestry and landowners]." – 9

The longstanding debate on farming versus forestry on the environment is a constant discussion in the Waimatā, with farmers (and non-farmers) defending agriculture and comparing its impacts to the forestry industry.

> "Farmers don't cause this [kind of damage] in the forests or even to their neighbouring farms. Everywhere floods, but it doesn't come with six big sawing logs crashing down through their properties." – 9

> "There was a huge divide between the farmers and the forestry, because farmers would have to clean up time and time again with these massive landslides and all the debris that would come down with it." – 9

Disappointment in regulations set by the government surrounding forestry and its implementation was common across respondents.

> "You can hold to account ratepayers because they are an easy target, but you try hold these companies like logging companies to account you'd be pushing it uphill. There's a

> simple fact of life. If you've got the money, you can get out of anything you don't want to do." – 1

While farmers, forestry companies and local government are held responsible for degradation to the river, respondents have recognised residents and landowners' contribution to the river's health. Although those involved in the restoration project have complimented residents' care for the river and their willingness to participate in improving it, other respondents believe that residents are responsible.

> "The residents themselves are their own worst enemy. They treat it is as a rubbish dump. It's sad, it's really sad." – 1

> "The people just don't think. That's the problem, people don't think. People have the power to make a difference, I think. But don't care. It's a bit of a catch 22." – 1

Despite their responses appearing to blame parties for the state of the river, when asked directly about who holds responsibility for the river and its health, over half of the interviewees answered that river health is everyone's responsibility, no matter how they relate to the river.

> "Everybody has a responsibility, but their little bit would help change it." – 1

> "Well, I think everybody is, well not just the landowners in the catchment, you know I think that we collectively as New Zealanders are responsible for the health of all our rivers, but also the biodiversity. So, I think that there is a part to play by the taxpayer and there is a part to play by the Council and by the rate payer." – 7

Respondents also held themselves and their specific parties responsible, mentioning farming too as having a role to play in restoring and keeping the river healthy.

> "I think everybody has a part to play in that. The sediment and stuff isn't just coming from the forestry, it is coming from the farming as well. So, everybody has to play their part in trying to reduce the erosion on the hillsides." – 9

Just as people believed the responsibility of the river was that of everyone; almost all interviewees believed that everybody benefited from a healthy river. Improved river health would benefit those that jump off the bridge and swim in the river, those that paddle on it, those that appreciate increased biodiversity and an improved catchment, those that farm on it, and the local iwi, who would be reconnected with the sacred places that they were alienated from with land ownership changes.

> "Everyone (profits from a healthy river), I mean everyone, it doesn't matter if you don't go swim and you don't have a boat, all those things. Your children might take up a water sport or your grandchildren. Everybody profits from a healthy river. Everyone suffers if it is not useable." – 3

The idea that the river can be separated from the community of Gisborne is something that one respondent feels is an outdated and unrealistic concept that serves to create more harm than good.

> "I think people don't just have a long run view, but also they think the river is something separate. They have this idea that somehow their life, they can just keep on pottering on and the river will keep pottering on and if it floods, well they have nothing to do with it." – 5

Varying attitudes and ideas of the river and how it should be managed further create conflict and slow steps toward progressing the health of the Waimatā. Outdated ideals of control and manipulation of river spaces in resource management policy and the separation between people and nature further contribute to its degradation. However, local knowledge and aspirations for the river provide valuable resources to take into management and restorative work.

6.10 The River as a (Future) Restored Environment

As the restoration project is being established within the catchment residents have shared their aspirations for the river. These aspirations were related to health, including mental and physical health of the residents themselves and sociocultural meanings of restoration and the health of the river itself, addressing the biophysical aspects of restoration.

> "I would love to see the river flowing again, so kids could have the fun we did." – 5

> "I want to see, for me, it is improved biodiversity. The catchment, we have had a few meetings and they [landowners in the upper catchment] have come up with their own biodiversity/farm management plans. They want to see kākāriki, pātiki, stuff like that." – 9

Some aspirations for the river extended to aspirations that would encourage further interaction between residents and the river. One interviewee wanted to see communal facilities built on the river.

> "Well, I would actually like to see, not so much the river, but for this [waka ama] club to have somewhere where they could have a clubhouse." – 10

> "Everyone else is going for their own slice of the pie in terms of facilities issues and getting bits and pieces for their sports. Well, why not us? We lobby on the grounds that we are the strongest waka ama centre in NZ. That we produce national champions galore and world champions, all coming out of a river that we are just having to improvise around. To deal with flooding, pollution, mud and weeds and logs and dead carcasses etc. And still despite all of that we can produce, because the world is greater than what might be happening on the river…. We have never had storage facilities, so both clubs have been pestering or lobbying to get storage facilities either side, if we could get something that would be a miracle because nothing is happening. Meanwhile our equipment, our waka, are just at the mercy of nature. Just during this winter, we had huge rains and our waka, which are just sitting out there, they get filled up with water, and it buckled them, the weight of the water." – 8

Each participant also had differing ideas on how to achieve the aspirations they had suggested.

> "We need to go back and look at the web of life… We need to look at living landscapes and people as part of ecosystems and we need to not think that mathematics has all the

answers… It's thinking in terms of whakapapa, as you do in Te Ao Māori, the whole world, everything is interconnected, it is all one."– 5

"…we just deal with the river, whatever state it is in. But boy, wouldn't it be great to get it cleaned up if it can be… You can clean the river up, but you are going to have to clean what feeds it in the upper reaches of the river. And it has to be a total combined, community effort. Landowners, farmers, etcetera, let alone neighbours along the river's edge as well." – 8

"One [suggestion for improvement] would be to take the permanent forest in the [Emissions Trading Scheme] and reserve that purely for native forests. The idea of permanent pine plantations is crazy… who needs them, they are just going to be an ecological problem. They are shallow rooting trees." – 5

One resident's solutions were based on work they themselves had achieved already on their land by the river.

"There was already some remnant bush around the creeks but as soon as we just let that rip and you get heavy rain, and you won't get sediment in the creeks like you see others, they just run clean, and that's only 10 years. So, you can do it. And people want it, I know the community wants it, and so if they can spend all that money subsidizing overseas owners of pine plantations and pay them heaps of money through the ETS [Emissions Trading Scheme], I have no idea why they don't actually make it possible for farmers in these catchments to line the riverbanks with bush, and their eroding gullies and slopes, and then let them have an income, a biodiversity credit that they can earn some money off because they are doing a good thing." – 5

Despite negative responses around forestry in the catchment and its obvious effects on the surrounding and downstream environment, the restoration project's leaders recognise the efforts being made by forestry companies to be involved in the restoration work.

"Forestry companies are completely different to what they were 5 or 6 years ago. Back then it was just like 'let's just get these trees out, who cares.' But now they are more environmentally focused, and I think they are looking at other ways to harvest and what

> they can do replanting wise to mitigate those effects next time… they have started coming along [to restoration meetings] and even the pest control workshop the other day." – 9
>
> "I think it has been good to see that the forestry companies are recognising that they are part of the community, and that in the Waimatā catchment they need to work more closely with landowners… So that has been good, and I just want to acknowledge that. Because I know I would be incredibly angry if I was one of the landowners who ended up having their streams wrecked and all of the things that happened as a result of forestry… They just come to meetings, so it's soft engagement. I want to see some action. But they are talking." – 7

Aspirations for the future of the Waimatā River are not only biophysical but are also sociocultural; these are driven by varying concerns for the river, many of which influence residents directly. While many aspirations are similar across residents, each individual had different opinions on how these would be implemented. Restoration work within the catchment provides a tangible approach to achieving these aspirations.

The Waimatā River plays many roles in the lives of residents in the catchment. In more ways than one, the river remains the 'life-blood' for those that live near and interact with it, whether this is in the functional role it provides for farmers or the refuge it provides for residents. Relations to the river span history, culture, and community and are shaped by how people interact with it. Discussion of relations between residents and the river draws attention to the relations between river health and societal and individual wellbeing. These connections and relations influence the concern residents have for the river and consequently shape their future aspirations.

These findings offer valuable information that shows a local perspective of relationality and its relation to restoration to inform river management. Chapter Seven will discuss and explain the relations to the Waimatā River outlined in Chapter Five and Six, and how these shape perceptions of restoration.

7 Discussion

7.1 Introduction

Research on the Waimatā demonstrates the importance of human relations to river systems and values ascribed to these places. Relational values influence how people interact with rivers and their aspirations for such systems, making them important considerations in river management and restoration (Tadaki et al., 2017). These values incorporate a sense of place, wellbeing, and identity, and vary in space and time; therefore, understanding these values and the influences on them are important considerations in restoration to ensure techniques reflect sociocultural relations (Mould et al., 2020). Chapters Five and Six analysed these values in relation to the Waimatā River using quantitative and qualitative data from residents and river users.

Questionnaire responses from residents and river users across the catchment revealed the influence of relations on perceptions of restoration and aspirations for the river. Relations were shown to have changed over time for many respondents, particularly in those who had lived within the catchment for longer periods. How people interacted with the river shaped the way that they valued the river, and their aspirations for it. The majority of the respondents were unsatisfied with the river's health, which was found to influence the ways they interacted with it. Concerns for its health and aspirations were relative to where in the catchment respondents lived.

When talking in-depth to residents and river users about their experiences and their relationship with the Waimatā River, key themes emerge that tell a story about the Waimatā River from the perspectives of the residents of today and the past. The Waimatā plays many roles within the lives of the people in Tairāwhiti, including as a historical figure, a cultural space, a means of livelihood, a place of recreation, a communal space, a place of refuge, a place of contestation, a threatened landscape and currently a restorative space for the future. No matter how or when people have interacted with the river, there are stories and shared experiences.

This chapter seeks to explore and develop upon the themes that have emerged from questionnaires and interviews with residents and river users to understand how and why people

relate to the Waimatā River in the way they do and how this influences their perceptions of health and aspirations for the future of both the river and society.

7.2 Relations to the River

When looking at connections to the Waimatā River and nature, the question arises, do people see themselves as part of nature or separate from it? Relational values, which incorporate a sense of place, wellbeing, and identity, offer a way of exploring the connection between people and the environment (Mould et al., 2020). The environmental identity is defined by Clayton (2003) as "a sense of connection to some part of the non-human natural environment, based on history, emotional attachment and similarity, that affects how we perceive and act toward the world" (pp. 45-46). Clayton argues that an environmental identity is similar to how people identify themselves, such as gender and ethnicity. The way people perceive their physical environment and the attachment people feel to it often greatly influences their experiences with it, behaviour, and responses to changes in the environment (Larson et al., 2013).

Such place attachment is influenced by several factors, including the length of residency or association with the place, and these bonds are commonly associated with increased quality of life and wellbeing (Lewicka, 2011; Scannell & Gifford, 2017). Stronger bonds between people and place can motivate individuals to protect it, encouraging active participation in restoration activities (Gifford & Nilsson, 2014; Song et al., 2019). Higher perceived needs for restoration of the Waimatā were associated with lower perceptions of river health, strong emotional connections to the river, and high value placed on it by residents; suggesting these people supported restoration activities and may express interest in becoming involved.

Historical Relations

Strong senses of history and legacy involved with the natural environment build and strengthen relationships between people and place. The generational ties between residents and the Waimatā, particularly those in the upper catchment, produce strong place attachment. Respondents from the upper catchment spoke of the river and the land with a sense of pride and familiarity, outlining their work to better the land, building upon what previous generations had established. These ties have been observed in many studies attempting to understand the contributing factors to place attachment. Kyle et al. (2004) found respondents with the

strongest sense of place held generational, cultural, and social ties to both the land and the community (Liu et al., 2021). Hay (1998) found generational connections to the land to develop a strong sense of place in both Māori and pākehā in New Zealand. In comparison, tourists or transients, those with limited residency or a superficial sense of place, were less likely to report strong emotional and spiritual ties to the land and were described by some researchers as having 'inauthentic' relations (Hay, 1998).

The presence of an emotional connection between residents and the river was attributed to their length of residence within the catchment. A residency period of over ten years showed the highest proportions of connections. The positive impacts of residency length on the strength of local place attachment are commonly reported in literature (Kleit & Manzo, 2006; Lewicka, 2011). Newcomers to an area, or those with shorter residence lengths, cannot develop a true attachment to a place or share values of the resident community as they have not contributed to its creation. Instead, they are consumers rather than creators in the place and may endanger the environment's true character by introducing foreign ways of life (Stedman, 2006). Relph (1976) and Hay (1998) believe that a true sense of place can only be developed by those who have been raised in that place or lived there for many generations, however, strong connections to the river were still reported by residents that had lived in the catchment for less than a year, suggesting that other factors were likely to influence connections to place.

Of respondents that grew up in the Waimatā catchment, many had left for periods of their lives and since returned as adults to raise families or retire. Deeply rooted connections to the land were still observable through care for the river landscape, concern for its health, and restoration involvement. Being raised in a place creates stronger ties to it than sheer length of residence, and time away from a place has not been found to weaken place attachment (Liu et al., 2021). Porteous (1976) observed that many people had more than one "home" and time away from a place often reinforced emotional bonds between people and the landscape of their 'real home' (Lewicka, 2011). The Waimatā River remains a place of 'home' to many, despite leaving as young adults. The strong connections residents feel with the environment remain unchanging over time and can bring them back as observed in this research. As one respondent noted: "I have been tied to it [the river and its land] forever", reinforcing the generational ties to the area some residents feel, which provide a deep sense of place and strengthens connections to the river.

Cultural Relations

Historical relations to rivers also overlap with cultural relations to the environment. Connections of local iwi to the Waimatā trace back to their arrival in Tairāwhiti in the 1300s and reflect the strong cultural ties that Māori share with the natural environment, unique to each iwi (Salmond et al., 2019). A common theme in the responses was the importance of the river to Māori identity, with several respondents citing the whakataukī: "Ko au te awa, ko te awa ko au. I am the river, the river is me", which originates from the people of the Whanganui River on the west coast of New Zealand and depicts the relationship between Māori and their awa. It speaks to the interconnectedness between the way Māori view the world and their rivers (Te Aho, 2010). Unlike Western scientific views, Māori ontologies observe people and the environment as indivisible wholes. In particular, the metaphysical and material characteristics of blue spaces such as rivers are interwoven and connected to the wellbeing of tāngata whenua. This definition of wellbeing differs from those of Western scientific origin depicting the separate physical and mental health of individuals; instead, it broadly focuses on the health of the self, whānau, hapū, and iwi in their connection with their rohe (territory) and their responsibility in maintaining the mauri of it (Parsons, 2019). In te ao Māori, the Māori worldview acknowledging the interconnectedness of all living and non-living things, freshwater bodies such as rivers and lakes are described as being the tears of Ranginui (the sky father) over his separation from Papatūānuku (the earth mother). These tears brought life to the land and people, the descendants of the pair (Harmsworth & Awatere, 2013; Salmond, 2014; Salmond et al., 2019). To Māori, rivers are often described as being the 'life-blood' of their people; the Waimatā provided a historic means of transport, an ever-flowing source of water for drinking, cooking, bathing, and ceremonial purposes, and a source of fish, eels, and freshwater shellfish for local iwi. They are also the home of taniwha (supernatural creatures) (Knight, 2019), *Pipitaiari* is a taniwha of special significance to local iwi, Rongowhakaata, who inhabited the Tūranganui River and was widely respected by hapū and iwi of the area. To Rongowhakaata, the values of mana, whakapapa, tapu, and mauri are central to their relationship with the river. The iwi consider themselves to be kaitiaki, responsible for protecting the mauri of the river, and these values remain important to them today (GDC, 2013a).

A 'place of home' to Māori is traditionally both physically and spiritually tied to the natural environment, such as rivers or mountains, awa were the source of physical and spiritual sustenance and identity (Knight, 2019; Le Grice & Braun, 2016). To certain iwi and hapū, rivers are recognised as ancestral beings (e.g., the Waikato River) (Fisher & Parsons, 2020; Salmond,

2014; Te Aho, 2010). Residents in the Waimatā referred to the river as being "part of the whānau" and their connection to the river was attributed to "whakapapa" and as being "in their DNA". Another described the river as "my tūrangawaewae", a powerful concept reflecting the places in where Māori feel empowered and connected and are a foundation or home. While these connections still hold strong, anthropogenic influences and poor management of such systems endanger the links between mana whenua and their land. As articulated in questionnaires, respondents believed that mana whenua were being excluded from discussions surrounding the Waimatā and its restoration, risking disconnection from their land and ancestry. Integrated management of the Waimatā that is informed by local knowledge and directly involves mana whenua can ensure that cultural relations remain intact (Salmond, 2014).

Recreational Relations

According to respondents, the Waimatā has always played a key role in recreational activities in the Tairāwhiti area and has continued to grow further in recent years. This was the most common value identified in the questionnaires and interviews (fig. 5.4). Waka ama, kayaking, rowing, paddle boarding, boating, swimming, walking, and cycling are among the activities people participate in, on and around the Waimatā, with many commenting on their popularity and the extensive use year-round. The popularity of such activities on the Waimatā highlights the role recreation plays in connecting people and the river.

Recreation such as sports and activities on rivers and in nature is commonly associated with benefits for mental and physical wellbeing and social connections (Foley, 2017; McDougall et al., 2020; Völker & Kistemann, 2011), something that waka ama paddlers commented on. While strengthening social relationships, time spent in nature through recreational activities has also been associated with strengthened place attachment (Williams & Patterson, 2008). Williams and Patterson (2008) found that experiences of a place (e.g., kayaking on a river) and the consequent relations to that place that were formed were central to the development of one's identity. Interview respondents consistently referred back to interactions and their experiences (such as kayaking, fishing, and swimming) on the Waimatā when answering questions on the river's health and restoration. This recreation, consequently, serves as an important tool for both building and maintaining relationships to place (Haggard & Williams, 1991).

Societal Relations

The Waimatā River has been described by those who use it as a communal space. The river serves as a gathering place for friends, family, and community through recreation, sporting, and simply gathering and has done so throughout its history. Respondents described the river as a "congregating place" for friends and a family space in which they passed on knowledge and shared experiences with their grandchildren. Rivers and water bodies have long been associated with social interaction between people (de Bell et al., 2017; Triguero-Mas et al., 2015). They are a source of cultural continuity in communities and provide both a material and symbolic means of communicating, interacting, and exchanging ideas, knowledge, and goods (Anderson et al., 2019; Montag et al., 2014). Interactions between people and rivers as observed on the Waimatā, offers a means to teach the young and work together whether it be through fishing, sports like waka ama or exploring the space and building shared values and beliefs across communities (Ortiz et al., 2008; Anderson et al., 2019).

Several respondents noted that the way they interacted with the Waimatā had changed over time, with many stating they were less likely to use it for water-based activities and exploring with family and friends due to the degraded state of the river (see Chapter 5). This was related to age - mostly reported by residents aged 65 and older, however it was not limited to this age group. Findings such as these reinforce the need for drastic improvements to health of the river, and community-based restoration work to see the Waimatā continue to be a communal space. Participating in restoration has been observed to strengthen ties to both community and place. Community-based and participatory restoration projects trigger positive feedback loops that serve to enhance rivers ecologically, and socially, contributing to shared values and greater interactions with the river (Boone et al., 2009; Johnson et al., 2018; Westling et al., 2014).

Public Wellbeing

Among their many roles, rivers are considered to be a place of refuge for residents and river users, as also observed within the Waimatā. Historically, water bodies have been associated with health, water was used for treatment and recovery, health maintenance, mental health and wellbeing, and within spiritual and religious practices (Foley et al., 2019). Today, it can be argued that rivers and blue space play a greater role in mental wellbeing. Residents referred to the river as "therapeutic"; one respondent explained how they would meditate watching the

river and its flow, labelling it “restorative”. Comments by residents about the meditative and restorative nature of the river on their daily lives reinforce recent research on the benefits of blue spaces, such as rivers, for wellbeing (Regan & Horn, 2005; McDougall et al., 2020; Völker & Kistemann, 2011).

Living close to blue spaces has shown an association with improved physical and mental health (Coleman & Kearns, 2015; Hooyberg et al., 2020; Wheeler et al., 2012) and views of blue space from one’s home have been linked to positive effects on mental wellbeing (Dempsey et al., 2018; McDougall et al., 2020). Waimatā residents reinforced this: “It’s really good, for looking at it. I don’t know about you, but do you get up in the morning and look out at the sea or the river and just look at it? It’s gorgeous. Look at the movement” (Interviewee 1, Chapter 6). Exposure to water bodies, whether on the water or beside it, has been found to reduce stress and provide cognitive restoration. Such environments are often described as relaxing and restorative spaces (Maund et al., 2019; Grassini et al., 2019; McDougall et al., 2020). Therapeutic benefits span from attributes such as soundscapes offered by rivers that buffer anthropogenic noise and provide pleasant sounds such as bird song and flowing water (Jeon et al., 2012; White et al., 2010). Ecosystem services provided can enhance thermal comfort by reducing the urban heat island effect contributing to the calming environment (Gunawardena et al., 2017; McDougall et al., 2020). De Bell et al. (2017) observe such psychological benefits as one of the most important benefits of nature interactions reported by residents.

While multiple studies discuss the psychological benefits of interactions with freshwater environments, the health of such systems may influence interactions (de Bell et al., 2017). The perceived quality of freshwater systems can impact how the space is used, and poor environmental quality can be a deterrent for children and adults (Akpinar, 2016; McCracken et al., 2016; McDougall et al., 2020). Some residents on the Waimatā noted that their interactions had changed over time, stating that they refused to swim in the water now due to its quality, however others still interacted with the river in its degraded state. Doi et al. (2013) confirmed this finding that people interacted with and valued blue spaces more when water quality was good. Water bodies of a poor quality were less frequently used for swimming, boating, and fishing and therefore less likely to positively impact mental and physical health (Lankia et al., 2019; Curtis et al., 2017; McDougall et al., 2020). One questionnaire respondent stated: “How can my soul feel good when the river is often filthy with lots of debris!!!”, emphasizing the role of river health on personal wellbeing. Contamination, erosion, and flooding events in the

Waimatā restrict its uses and serve to disconnect users with the river. The social importance of blue space and its condition in communities indicates the strong need for the protection and restoration of freshwater environments (de Bell et al., 2017).

7.3 Environmental Concern

Concern for the Waimatā appears to be widespread across the catchment based on the results of this study. As observed in figures 5.9 and 5.13, most individuals were not satisfied with the river's current state and had concerns for its health. When applying the Value-Belief-Norm Theory to findings from the Waimatā, attitudes of environmental concern can be identified as being rooted in a person's values system and based on the values they place upon themselves, other people, and other living things (plants and animals) (Milfont & Schultz, 2018; Stern & Dietz, 1994). It is these three clusters of values that provide a basis for environmental concern. People in the Waimatā Catchment could all express the same level of concern for the water quality of the river, however, for fundamentally different reasons. Some may be concerned about the impacts of the water on themselves (e.g., the risk the water presents to themselves while swimming), some may be concerned about the impacts the river has on the health of their children or neighbours that swim in the water. In contrast, others may worry about the impacts of the water quality on the ecology within the river. Concerns for the Waimatā were largely those that impacted the individual, with poor water quality, flooding, and erosion the most commonly selected concerns (fig. 5.13), suggesting that concern was heavily rooted in values placed upon themselves and other people.

Temporal Influence on Perception of Health

Perceptions of river health in the Waimatā appeared to be influenced by the length of residence in the catchment. Residents who had lived in the catchment for greater than 20 years, often now retired and having spent their whole lives there, had low perceptions of river health and described a decline in health over time. Consequently, their perceptions of current river health were constantly compared to a 'past state' of the river, often from their youth. Such personal baselines have been observed in other studies, reported by Mould et al. (2020) in a study of the Macdonald River Valley in which residents used a baseline of how the river appeared in their earliest experiences of it. The memory of this state became the desired condition to maintain or

restore the river to. In the case of the Waimatā, those that have spent little time in the catchment have no baseline to compare the river to and often have higher perceptions of river health or little perception of change to the river. Therefore, perceptions of river health must be considered in relation to the specific baseline it is being compared against. Aspirations for river health are likely also based on conditions observed over different time frames.

Spatial Influence on Perception of Health

Perceptions of river health along the Waimatā were seen to differ between different areas of the catchment. Lower perceptions of health observed in the lower urban catchment may result from a combination of factors. Overall, water quality is worse in the lower catchment than in the upper reaches (GDC, 2020; LAWA, 2020), and the effects of erosion, forestry harvests, and pollutants are often compounded in the lower reaches of the river. Individuals who observe greater environmental degradation are more likely to be concerned about it than those that do not (Mobley, 2016). Differences in perception also may be attributed to socio-demographic factors such as location, lifestyle, and occupation. Perceptions of health and the importance of ecological health of river systems have been found to differ between rural and non-rural environments (e.g. the upper catchment and the lower catchment). Perceptions of water quality were significantly different between farmers and non-farmers in studies, with water quality perceived to be better by farmers than by urban and non-farming respondents (Hu & Morton, 2011). As observed in the Waimatā catchment, Ryan (1998) also found water quality problems were felt more strongly by those who lived near the river and in the downstream urban centre of the River Raisin than in upstream rural areas.

Respondents in the lower catchment perceived agricultural sources to be the greatest pressure on the Waimatā river, while those in the upper catchment deemed pressures to be from forestry and urban development. This corresponds to other studies' findings (Arnberger & Eder, 2011; Hu, 2011). While there is awareness among agricultural residents of the impacts of their practices on water quality, they often place responsibility and criticism on urban and industrial groups' practices (Ranjan et al., 2019). Church et al. (2020) notes that farmers sometimes feel that they are stewards of the land yet are given a disproportionate percentage of the blame for poor water quality of waterbodies. This was the case for many farmers in the Waimatā, that felt that their impact on the river was minimal compared to that of forestry or the sewage releases by the Council in the lower catchment. These perspectives raised in the Waimatā highlight the

complex issues that arise when multiple groups are involved and interact with a natural feature. When approaching environmental issues, social relations need to be untangled across all groups with an interest in the environment. Perceptions of responsibility and blame influence how people interact with the Waimatā River and shape their concern and willingness to participate.

7.4 Contestations, Responsibility, and Governance

Concern for the Waimatā River introduces the key theme of responsibility when talking to residents about the state of the Waimatā River. Who should be responsible for the river, and how should this look? Many entities were mentioned by respondents, including forestry companies, farmers, residents, and most frequently, local government, Gisborne District Council. Obvious discord exists between the public and the government within the catchment surrounding their management decisions (or lack of) made historically and in recent decades. In literature, many authors note that perceptions around rivers are changing, and this can be observed in the management of rivers as they are seen less as 'self-cleansing', efficient drainage systems and something to be controlled and more as a threatened and valuable environment (Beattie & Morgan, 2017; Brierley, 2020; Knight, 2019). However, with the Waimatā River still being used as an overflow system for sewage and wastewater regularly – and far from the only river in the country used for this purpose – it raises the question, have perceptions of what a river is and how it should be used changed?

The perceived lack of attention paid to the river by Gisborne District Council and the continual release of overflow sewage and wastewater was consistently referred to by residents of the Waimatā Catchment in questionnaire responses and interviews alike. Responsibility was also placed on central and local government for their permittance of forestry practices and lack of regulations surrounding this. Such resistance to the government's responses to waterway degradation is commonly reported around New Zealand; Salmond et al. (2014) attributes this to the deployment of technologies of alienation. Examples of this include the removal of the concept of kaitiakitanga (stewardship) from the Resource Management Act 1991 as well as removing the four well-beings (cultural, social, environmental, and economic) from the Local Government Act 2002 in 2012 (reinstated in 2019), reducing the role of local councils to providing 'rates, roads and rubbish' rather than focusing on the wellbeing in the exchanges among people and the land (Tadaki et al., 2014).

Exclusion of mana whenua from discussions surrounding the Waimatā River and its future was another of the concerns respondents had for river management. Gisborne District Council has statutory acknowledgements (formal recognition by the Crown of the mana of tāngata whenua over a specified area – particularly the cultural, spiritual, historical, and traditional associations with that area) that include the Waimatā River. The Statutory Areas for the Waimatā River and Tūranganui River are recognised as an interest of Ngāti Porou and Rongowhakaata. Therefore, Gisborne District Council has a legal requirement to consider these acknowledgements in resource consent decision-making and include them in relevant regional plans and policy statements (GDC, 2013a). These concerns in the Waimatā are common across New Zealand and globally as Māori and other indigenous people are left out of important decision-making concerning their environments. Degradation of culturally significant waterways and the exclusion of Māori from the management of such systems further isolates people and weakens connections (Harmsworth & Awatere, 2013; Salmond, 2018b; Te Aho, 2010). Co-management of environmental resources, which seeks to recognise indigenous interests in the environment and the differences in world views and involves the negotiated agreements between identifiable Māori groups and Crown agencies, is becoming recognised as a new approach to freshwater management (Fisher & Parsons, 2020; Te Aho, 2010). Such strategy is being implemented within New Zealand, observed in the Waikato and Whanganui Rivers (Salmond et al., 2019; Te Aho, 2019). The inclusion of the Waimatā in Hikuroa's (2017) *Te Awaroa* project seeks to transform traditional management of the river and the separation of the public from this by bringing together mātauranga, local knowledge, and scientific knowledge (Brierley et al., 2015).

Interviews with residents of the Waimatā identified another common response that the Waimatā was not only the responsibility of local government and those with an economic interest in the river and its catchment but of everybody (Chapter 6). Although present, this was not common in questionnaire responses, with most respondents placing responsibility (and blame) for the state of the Waimatā on local government and contributing industries (forestry and agriculture). Only when explicitly asked about responsibility in interviews did public responsibility emerge. As stated by interviewee 7:

> "Well, I think everybody is, well not just the landowners in the catchment, you know I think that we collectively as New Zealanders are responsible for the health of all our

> rivers, but also the biodiversity. So, I think that there is a part to play by the taxpayer, and there is a part to play by the Council, and by the rate payer."

Historically, there has been a globally shared fundamental understanding of people's public responsibility to work for the common good, including that of the natural environment. Morgan (2018) argues that through the misuse of liberal ideals, as liberalism was emerging simultaneously with colonization and countries were encouraging efficient extraction of value from their colonies, it became publicly accepted that people had no duties and responsibilities. In New Zealand, it appears when British common law was applied following the signing of the Treaty of Waitangi, the common requirement that water users should respect other's interests was lost in translation, and responsibility was shifted off the individual (Salmond, 2018b). Although there are movements towards a sense of public duty and responsibility for the natural environment, resistance still exists within communities. In the case of the Waimatā, the public refer to the failure of regulatory agencies to fulfil their mandates as the cause of degradation of the Waimatā. Salmond et al. (2014) suggest that there are different ways of framing the environmental problems New Zealand faces. By encouraging a collective responsibility or duty of care approach to river systems, residents are more likely to engage in river management projects and present pro-environmental behaviour toward the Waimatā River (Mould et al., 2020).

7.5 Restoration and Aspirations

Today, we are moving into what Brierley (2020) describes as an era of 'river repair', where the impacts of our actions are becoming recognised and changes are being made to the traditional 'command and control' management of waterways. River restoration is becoming more pronounced globally, and scientific literature details such projects. Despite residents and river users making up the vast majority of those involved with or affected by restorative work on rivers, their aspirations and knowledge are not often sought out in restoration projects. However, as observed in the results of this study, residents have many aspirations for their river and opinions on how these are to be achieved that prove valuable to river work – including improved water quality, swimmability, increased public awareness around river protection and environmental knowledge, and increased scenic beauty.

Aspirations of residents commonly differ from those of scientists in river restoration. What a restoration scientist may view as necessary for restorative projects in biophysical terms may not be the same as those that a community may value (Eden & Tunstall, 2006; Wohl et al., 2015). While scientific goals are mainly ecological and include the introduction of previously lost sensitive taxa and an increase in species diversity, local aspirations are more likely to be concerned with aesthetic values of the ecosystem, their liveability, safety, and control (Eden & Tunstall, 2006; Junker & Buchecker, 2007). Although aspirations across restoration workers and residents in the Waimatā were both interested in 'improved water quality' for the river, the perceptions of water quality differ and come from different motives. From a scientific perspective, improved water quality is derived from its impact on ecology; improved quality is associated with the reintroduction of sensitive taxa and increased species diversity in river systems, improving ecological habitat and minimising the loading effects of contaminants on downstream environments (Wohl et al., 2015). Whereas water quality as an aspiration of residents often comes from aesthetically driven motives. Improved water quality results in clearer water which is linked to attractive visual appearance, more desirable conditions to swim in, and lower public health risk from contamination (Gobster et al., 2007; Junker & Buchecker, 2007). Overall the river's aesthetic and scenic beauty was stated as the second most common value attached to the Waimatā, proving the high worth of the river's visual appearance (see fig. 5.4). Therefore, it is not surprising such underlying values would drive aspirations for the river. Just as with environmental concern, residents' aspirations are likely to be associated with the impacts on the self (Eden & Tunstall, 2006; Gobster et al., 2007; Tunstall et al., 2000).

Waimatā residents were likely to select aspirations that influenced them directly. Aesthetic preferences and aspirations for restoration are often affected by the extent to which a landscape is perceived to satisfy human needs (Junker & Buchecker, 2008; Tunstall et al., 2000). This can be observed in differences in aspirations across different geographical areas of the catchment. Although all areas wanted improved water quality, in the lower catchment, an area of higher population density, increased public awareness around river protection and environmental knowledge was wanted. In the mid catchment, where fishing as an activity on the river was higher than any other part of the catchment, increased aquatic life was a common aspiration for the river. In the upper catchment, residents were most interested in the reduction in erosion rates. This can likely be attributed to the loss of productive farmland in the upper catchment through erosion, both hillside and riverbank, particularly its location within the impact zone of forestry effects.

Aspirations did not always align with each other. While residents across the catchment wanted to see lowered erosion rates and improved water quality, increased forest cover had the lowest response as an aspiration for the catchment. This contradicts respondents' comments on their desire to see the Waimatā return to its "functional pre-colonisation state". Plantings and tree cover are associated with reduced hillside and riverbank erosion, increased uptake of nutrients, and improved water quality of river systems (Larned et al., 2004). Yet for those who live on riverside properties, increased forest cover could relate to the loss of riverscape views and perceived reduction in aesthetic quality (Eden et al., 2000; Petts, 2007). Negative connotations of 'forest cover' with 'active forestry' undertaken in the catchment could also deter the want for forest cover in restoration works. This could also be attributed to general unawareness surrounding the benefits of forest cover in river catchments.

Studies have also shown public aspirations for restoration projects to be associated with a perceived level of 'naturalness', a term commonly linked to aesthetics (Junker & Buchecker, 2008; McCormick et al., 2015; Nassauer, 1992). This was also apparent in Waimatā; although residents did not want increased forest cover (likely due to connotations with forestry), a large proportion of residents wanted 'increased scenic beauty' in the catchment tied to comments of naturalness and aesthetics. Comments regarding the want for native species appeared to be related to aesthetics and perceived connotations of naturalness (Weber & Stewart, 2009). While these findings are common across literature, what is perceived by locals to be "natural" does not always align with the true "natural" elements of a landscape (McCormick et al., 2015). In Birmingham, a shared vision of 'ruralising' urban rivers did not mean restoring the wild nature of rivers as suggested, instead, residents wanted an environment with a sense of control, one that responded to urban living but was not spoiled by it. More trees were wanted along the riverbank to produce shading associated with a 'rural' river, but not enough that the area became 'dark and foreboding' (Eden et al., 2000; Petts, 2007).

As observed within the Waimatā, residents' perceptions of naturalness are not always aligned with scientific depictions of naturalness and health. McCormick et al. (2015) found respondents were unable to distinguish the difference between unhealthy and healthy river systems. Consequently, scientific interventions are not always met with support (Wohl et al., 2015). Instead, people enjoy what appears natural to them and often only to a lesser extent what 'experts' assess to be the most valuable in scientific and ecological terms (Junker & Buchecker,

2008). Therefore, careful communication strategies are needed to emphasise the associated biodiversity values with aspects of naturalness, aesthetic appeal, and place (Fryirs & Brierley, 2009).

While there can be a disconnect between local perceptions of health and scientific ones, local aspirations and knowledge are incredibly important in the implementation of restoration projects and their success. Involvement of residents and river users and their perspectives in restoration work has led to increased support for restoration and consequently the prolonged maintenance of river systems, but also social benefits in the form of enhanced quality of place and wellbeing (Buijs, 2009; Tunstall et al., 2000; Wohl et al., 2015). Co-production sees public involvement incorporated in negotiation from before objectives are set right through to the project's implementation (Wohl et al., 2015). The involvement of landowners and community members in the restoration work on the Waimatā River shows promise for the project's results and continued connections to the landscape.

7.6 Personal Perspectives on the Waimatā

As the health of rivers and communities are intrinsically linked, it places importance upon restoration of river systems. While there are varying definitions and perceptions of what a 'healthy river is' (see Chapter 2), the health of the Waimatā is connected to both biophysical and sociocultural attributes. Table 7.1 discusses the current biophysical and sociocultural issues on the Waimatā River, why these compromise the health of the system and how they might be addressed through management strategies to contribute to the whole system's health. Issues and management actions to address them draw on residents' relations to the Waimatā River, aspirations, and perceptions of restoration (Chapters 5 – 7).

Table 7.1: Current biophysical and sociocultural issues on the Waimatā which need to be addressed by new management actions to achieve a healthy Waimatā River and Catchment

Issue	Reasoning	Implementation / Management Actions	Literature
Water quality - Sediment / Reduced Erosion	Erosion control needed, particularly in the upper catchment, the source of the sediment, to reduce the risk of flooding downstream, reduce topsoil loss in the upper catchment, prevent smothering of benthic habitat, improve water quaity and clarity and contribute to aesthetic appeal of the river.	Targeted at trapping sediment at source (forestry and agriculture). Riparian plantings throughout upper and mid catchment (more confined sections) of native species that encourage biodiversity and offer habitat. Plantings on unstable land of native species to stabilise hillside. Creation of wetlands on agricultural land. Implementation of more sustainable methods of harvesting in forestry that includes restriction of harvesting along wider riparian edges, reduced-impact logging techniques and slash prevention methods.	Daigneault et al. (2017) Cullum et al. (2017) Hughey et al. (2019)
Water quality - Nutrients & Agircultural E. coli	Improved water quality needed in terms of nutrient reduction for swimmability of the river and protection of human health (river users), aquatic biodiversity, protection of downstream environments and prevention of eutrophication.	Working with farmers in the upper catchment to manage nutrient use, riparian plantings of native species to provide buffer and uptake nutrients before entering waterways and fencing off all waterways for stock exclusion.	Daigneault et al. (2017) Hughey et al. (2019) Larned et al. (2016)
Water quality - Sewage / Wastewater	Need for reduction in discharges of wastewater and sewage overflows into the river. High E. coli and urban contaminants provide health issues for those using the river (waka ama paddlers, swimmers etc.) and organisms in the river. Effects on humans also through food sources (shellfish collecting restrictions) as well as aesthetic problems.	Community education surrounding water usage and waste disposal to take pressure off of wastewater system. Increased green space in the lower catchment to reduce stormwater quantities. Assessments of residential downpipes to prevent excess stormwater entering the wastewater network. Improvements made to the current wastewater system to prevent overflow and repair ageing or damaged infrastructure.	GDC (2020) Heikkinen et al. (2016)
Water quality - Industrial & urban pollutants	Reduction and prevention of discharge of industrial pollutants (Port, Cheese factory etc.) and urban pollutants (heavy metals, plastics etc.) due to impacts on downstream environment, harm to river users, ecological impacts.	Assessment and regulation of industrial processes. Increased community education surrounding waste and pollution. Increased green spaces in urban catchment to reduce metals in stormwater runoff.	Larned et al. (2016)
Biodiversity & pest management	Current poor ecological health overall (aquatic and terrestrial) in the catchment. Expected to continue to decline due to impacts of pest species and forestry and agriculture. Increasing biodiversity in of native species across the whole catchment including plants, animals, birds, fish, macroinvertebrates needed as well as pest management. This also contributes to aesthetic appeal of the river and catchment.	Riparian and catchment plantings of native trees and vegetation (particularly trees that encourage birds e.g. titoki). Wetland construction on agricultural land for biodiversity. Pest management by landowners, general public and Council on public and private land (trapping, spraying etc.).	Daigneault et al. (2017) WCEMP (2019)
Anthropogenic river confinement	Confinement of river provide constant flooding issues in the urban catchment and exacerbates erosion issues outside of these structures. Space needs to be given to the river to move in the lower catchment (unconfined) to reduce the risk of erosion, loss of property and flooding events.	Move to soft management strategies. Preventing further development close to the river. Removing hard structures that prevent the river's adjustment and increase erosion downstream. Relocating at-risk infrastructure.	Brierley et al. (2019) Cullum et al. (2017)

Management that focuses on the reach scale and treats symptoms not the 'cause'	Management in the catchment is focused on individual areas or reaches and views these as isolated from the rest of the system. Rivers are connected laterally, longitudinally, vertically and temporally and need to be managed with this in mind. Issues in the catchment are treated as symptoms and the cause is not addressed, allowing this to continue to happen (e.g. cleaning up slash from foresrty downstream without addressing forestry practices that cause the debris).	Management and restoration of the river that considers the whole system as one part from mountains to the sea, including the land surrounding the river. Acknowledgement that issues upstream cause and contribute to issues downstream and addressing of these issues. Forestry management plans to address erosion, slash (mentioned above), farm management plans (above), rather than simply cleaning up the impacts downstream.	Brierley (2020) Hikuroa (2017)
Exclusion of the Voice of the River	Scientific ideals placed upon the river through current management technqiues. Management of the river is needed that does not enforce scientific or stakeholder ideals on to it, but listens to the needs of the river. Need to live with rivers.	Continue to listen to the voice of the river to understand what it is saying, what it needs and what this looks like in order to work with the river not against it. Does not exclude local and scientific aspirations but looks to see how these align with the river needs and how this can be implemented. Looks at the river through a integrated catchment framing - viewing the river system as an interconnected whole from the mountains to the sea.	Brierley (2020) Salmond et al. (2019)
Public education and awareness around the river	Increasing awareness surrounding the river, who it is, how it is threatened and why is needed in order to prevent further degradation and separation from people.	Public workshops, educational programs such as offered at Waikereru Ecosanctuary for children and adults, engagement in discussions surrounding the river and its management.	Garcia et al. (2019) Petts (2007)
Separation of iwi / hapū with the river and land	Separation of iwi and hapū from their ancestral land (Waimatā and ancestral mountain) impacts ora. Need to allow tangata whenua to reconnect with their ancestral land and maintain traditions, practice and relations to maintain a state of ora.	Management of the river that involves iwi / hapū, integrates principles of te ao Māori and recognises people as part of the system. Restoration of the river that restores ora. Restoration and access to ancestral mountain.	Fisher & Parsons (2020) Salmond et al. (2019)
Public involvement in restoration and future management	Current management of the river does not include many interest groups - including residents, which creates dettachment from the river and feelings of exclusion. Management needs to include landowners, interest groups, stakeholders and general public in restoration and management to restore and strengthen connections to the river, encourage participation in environmental management and protection and encourage pro-environmental behaviours.	Public engagement in discussions surrounding the river and its management. Restoration initiatives that involve the public (planting days, clean ups, community-based science and monitoring). Incorporating local aspirations and knowledge alongside scientific ones in management. Forming and maintaing relationships between scientists and public. Providing landowners with the resources they need to complete restorative work on their properties.	Eden & Tunstall (2000) Petts (2007) Mould et al. (2018) Smith et al. (2016).
Communal / public spaces on the river	More areas along the river need to be included which encourage interaction with each other and the river to maintain human-human connections and human-nature connections.	Providing and maintaining spaces for engagement such as parks, swimming areas (e.g. like the historic Hole-in-the-rock) and facilities (e.g. the needed waka ama clubhouse and storage).	Alam (2011) de Bell et al. (2020)

These management strategies include and build on strategies addressed and employed by the Waimatā Catchment Restoration Project and Waikereru Ecosanctuary (WCEMP, 2019; Waikereru Ecosanctuary, 2020). Current restoration work on the Waimatā offers the potential to strengthen and restore not only the ecological health of the river and its terrestrial catchment, but social relations to the environment through public engagement. This complements the

work which Waikereru Ecosanctuary set out to achieve 21 years ago, but on a broader catchment scale, restoring native bush, regenerating local native plant and animal populations, and educating and reconnecting the Gisborne community with the area. Involvement of the community is likely to generate interest in the river that previously may not have existed, encourage greater interaction with the environment, and instigate further conservation work and pro-environmental behaviours (e.g., conscious water use, planting of waterway boundaries on private property, involvement in environmental groups).

These strategies, guided by relations to the river, can be applied broadly to the management of river systems. Just as the general principles of healthcare are tailored to the specific patient, the same exists for river care and implementation of each of these strategies need to be tailored to each river and the people that interact with it (Brierley, 2020).

Reflections on the conduct of this study

Methodological approaches to this study have shaped the outcomes of the research. Employing a mixed-methods approach offered a complementary approach to research that gave both broad findings of relationality and perceptions across the catchment and personal stories that revealed how relations to the Waimatā had been shaped.

Low numbers of respondents from the upper and mid catchments relative to the lower catchment are proportional to population density in the catchment, however, impacted the ability to make statistical claims of significance. Lower numbers of those in the 16 – 25-year age group also meant that findings were not necessarily reflective of younger residents in the catchment. Follow-up emails to group leaders to remind potential participants of the research would have helped generate greater numbers of respondents in questionnaires.

The COVID-19 pandemic presented issues to the conduct of interviews and delayed the research. Restrictions on travel and gatherings meant that in-person interviews were not possible for most of the interviews conducted. This resulted in lower response rates of potential interviewees after they had initially expressed interest in participating in an interview.

Future Research

The findings of this research provide a basis for further research into relationality and building interpersonal connections amongst stakeholders in restoration practices (Mould et al., 2018). Follow-up questionnaires and interviews with residents after catchment restoration work is completed would provide insight into changes in relations to the Waimatā River, adding to the knowledge on the dynamics of changing relationality to environmental systems following management interventions (Åberg & Tapsell, 2013). Research would be useful into the influence of factors such as age, socioeconomic status, employment type on relations to river, and perceptions for restoration in the catchment. As the field of blue space remains relatively new, further research is needed in blue space and the connections between river health and societal health and wellbeing (McDougall et al., 2020).

Socioeconomic indicators are rarely used to evaluate restoration outcomes, and studies including ecological and socioeconomic indicators are nearly absent in literature (Evju et al., 2020). Further research is necessary for strategic planning of restoration projects and measuring outcomes of these.

8 Reflections and Contributions

8.1 Introduction

This thesis has explored local relations to the Waimatā River and perceptions surrounding its restoration. A mixed-methods case study approach appraises relational values in order to understand the complex ties between people and place in the Waimatā catchment at Gisborne, seeking to answer the central research question:

> How do residents relate to the Waimatā River, and how do these relations shape their perceptions of restoration?

A geographic lens was employed to interpret quantitative and qualitative data provided from questionnaires and semi-structured interviews. This chapter summarizes the findings of the research, framing contributions in practical terms in the study catchment and broader academic terms.

8.2 Summary of Findings

Analysis of quantitative data from questionnaires in Chapter Five provides a broad picture of relational values in the catchment. Perspectives upon the river – in terms of a sense of connection, interactions, and values - were found to have changed over time for many residents, particularly those who had lived within the catchment for longer periods (more than 10 years). This was often related to river health. The majority of residents were unsatisfied with the current health of the Waimatā River. As river health declined over time, residents felt a stronger connection to the Waimatā yet interacted with it less for this reason. Concerns for river health were often associated with issues that influenced the individual directly. The area within the catchment where residents lived and how they interacted with the river, influenced these concerns and their consequent aspirations. In the upper catchment, this included concerns for the impacts of forestry operations upon erosion and water quality. Results from the mid and

lower catchment highlighted the importance of recreational activities and landscape aesthetics, and associated concerns for water quality, swimmability, aesthetic potential, and public awareness.

Personal stories of relations to the Waimatā were summarized for various residents across the catchment in Chapter Six. Qualitative data revealed the many roles of the Waimatā River in their lives, drawing on lived experiences, connections in past and present, and aspirations for the future. The river retains a strong historical presence through cultural and generational connections. This is expressed in many ways: a livelihood with many residents dependent on its resources for agricultural purposes; an important recreational and community space that helps to generate physical and mental (psychological, emotional) benefits through engagement with both the river and people; and a refuge for residents offering solace and restoration. In this light, although the river acts as a blue space that provides a source of wellbeing, concerns for river health threaten the ability of the river to provide these roles in residents' lives. Residents each had aspirations for the river's future, spanning biodiversity goals, communal facilities, and the return to its 'past' state. Management strategies suggested by residents included personal strategies already employed in the catchment, policy changes, and integration of te ao Māori. The theme of responsibility and governance emerged strongly. Residents felt that issues were the cause and responsibility of stakeholders in the catchment – namely forestry companies, GDC, and farmers/landowners – however, some also recognised the role of personal responsibility in addressing problems.

Relational values, developed through lived experiences with the river, tied to sociocultural factors such as length of residence and age, shape how people interact with rivers, how they perceive the system, and their views on restoration. These findings can support locally grounded approaches to the design and implementation of restoration initiatives (Mould et al., 2020).

8.3 Contributions

Local Contribution

The findings of this research contribute to the local management of the river system. Information regarding local relations to the Waimatā River and perceptions of and aspirations

for its restoration can be used by organisations with interest in the river such as GDC, the Waimatā Catchment Restoration Project, and Waikereru Ecosanctuary to support management practices that consider and integrate social knowledge and perspectives.

Information regarding how people relate to the river, their concerns for the river, and their aspirations for it can be incorporated into the aims and practices of the Waimatā Catchment Restoration Project, striving to ensure that applications are appropriately tailored to work with differing values and connections across the catchment (Mould et al., 2020). Differences in relations across the catchment in interactions, values, and connections with the river across this study reveal the complex nature of river systems. 'From the mountains to the sea' is quite literal in the case of the Waimatā River. Issues that arise in the lower catchment such as poor water quality, high sedimentation rates, slash from forestry, and flooding can mostly be attributed to actions in the upper catchment (forestry and agriculture) and the highly connected nature of the river. Therefore, it is necessary that management strategies view the catchment as a whole system, in which actions upstream influence the whole system and unique relations to the river exist. In the same way that the physical environment of the Waimatā differs across its catchment, so do the people that inhabit that space. Therefore, restoration projects require area-specific consideration of local perspectives and their involvement is required to effectively engage the public (Petts, 2007). Greater community engagement in the planning and implementation of restoration projects often results in more effective restorative work in the long-term, as residents feel a connection to the environment such that a sense of responsibility supports efforts to maintain it (Åberg & Tapsell, 2012). These feelings may extend to other environmental areas and further support additional conservation initiatives (Smith et al., 2016).

Feedback on residents' concerns and aspirations for the river can help GDC develop locally grounded management programmes in the future (although it is hard to envisage how integrated catchment management plans can be designed and conducted independently from such insights). Importantly, many residents hold GDC and other stakeholders in the catchment responsible for the perceived degradation of the Waimatā and efforts required to address these problems. Sociocultural uses and relations to the river are fundamental to prospects for sustained success in restoration efforts.

Academic Contribution

This work adds to current research on relations to the environment and the importance of relational values in environmental management. Findings from the Waimatā offer a New Zealand perspective on relations to blue space and river systems currently underrepresented in global literature of relationality (McDougall et al., 2020). On a broad scale, this work offers analysis into how people interact with river systems, connect with them, and their perceptions of health and restoration, and the factors that may influence these relations.

Limited research exists on rivers as blue space and the mental and physical benefits of interaction with these systems, and the connections between river health and societal health (de Bell et al., 2017). Findings of the therapeutic and recreational benefits of the river, and the negative impact of the degrading health on residents' wellbeing, and their willingness to interact with the river provide insight into rivers as blue spaces. These findings are important considerations in management and urban planning; the understanding of the wellbeing benefits associated with blue space can lead to a focus on incorporating and protecting blue space in urban areas. Harnessing the power of blue space may help to alleviate inequality by giving all people access to these systems (McDougall et al., 2020).

Restoration is not simply a scientific venture. As people are part of the system, not separate from it, management and restoration of river systems should seek to integrate sociocultural factors, knowledge, and aspirations, drawing on relational values and how people connect with their environment. By drawing on local perspectives and perceptions, it is hoped that connections to rivers that have spanned centuries may be strengthened, and people can live with their rivers in sustainable ways rather than simply managing them (Brierley et al., 2019).

Reference List

Åberg, E. U., & Tapsell, S. (2012). Rehabilitation of the River Skerne and the River Cole, England: A Long-Term Public Perspective. In P. J. Boon & P. J. Raven (Eds.), *River conservation and management* (pp. 249-259). https://doi.org/10.1002/9781119961819.ch20

Åberg, E. U., & Tapsell, S. (2013). Revisiting the River Skerne: The long-term social benefits of river rehabilitation. *Landscape and Urban Planning*, *113*, 94-103. https://doi.org/10.1016/j.landurbplan.2013.01.009

Akpinar, A. (2016). How is quality of urban green spaces associated with physical activity and health?. *Urban forestry & urban greening*, *16*, 76-83. https://doi.org/10.1016/j.ufug.2016.01.011

Alam, K. (2011). Public attitudes toward restoration of impaired river ecosystems: Does residents' attachment to place matter?. *Urban Ecosystems*, *14*(4), 635-653. https://doi.org/10.1007/s11252-011-0176-5

Albrecht, G. (2005). Solastalgia: A new concept in human health and identity. *PAN (Philosophy, Activism, Nature), 3,* 41-55.

Almeida, F. (2018). Strategies to perform a mixed methods study. *European Journal of Education Studies, 5*(1), 137-151.

Anderson, E. P., Jackson, S., Tharme, R. E., Douglas, M., Flotemersch, J. E., Zwarteveen, M., ... & Arthington, A. H. (2019). Understanding rivers and their social relations: a critical step to advance environmental water management. *Wiley Interdisciplinary Reviews: Water*, *6*(6), e1381.

Anderson, J. (2004). Talking whilst walking: a geographical archaeology of knowledge. *Area*, *36*(3), 254-261. https://doi.org/10.1002/wat2.1381

Arnberger, A., & Eder, R. (2011). Exploring the heterogeneity of rural landscape preferences: an image-based latent class approach. *Landscape Research*, *36*(1), 19-40. https://doi.org/10.1080/01426397.2010.536204

Ashmore, P. (2015). Towards a sociogeomorphology of rivers. *Geomorphology*, *251*, 149-156. https://doi.org/10.1016/j.geomorph.2015.02.020

Beattie, J., & Morgan, R. (2017). Engineering Edens on This' Rivered Earth'? A Review Article on Water Management and Hydro-Resilience in the British Empire, 1860-

1940s. *Environment and History*, *23*(1), 39-63. https://doi.org/10.3197/096734017X14809635325593

Blue, B. (2018). What's wrong with healthy rivers? Promise and practice in the search for a guiding ideal for freshwater management. *Progress in Physical Geography: Earth and Environment*, *42*(4), 462-477. https://doi.org/10.1177/0309133318783148

Boone, C. G., Buckley, G. L., Grove, J. M., & Sister, C. (2009). Parks and people: An environmental justice inquiry in Baltimore, Maryland. *Annals of the Association of American Geographers*, *99*(4), 767-787. https://doi.org/10.1080/00045600903102949

Booth, D. B. (2005). Challenges and prospects for restoring urban streams: a perspective from the Pacific Northwest of North America. *Journal of the North American Benthological Society*, *24*(3), 724-737.

Brierley, G. J. (2020). *Finding the Voice of the River: Beyond restoration and management*. https://doi.org/10.1007/978-3-030-27068-1

Brierley, G., Salmond, A., Cullum, C., Tadaki, M., & Fenemor, A. (2015). The Te Awaroa Project: Enhancing the ora of New Zealand rivers. http://www.graie.org/ISRivers/docs/papers/2A61-52424BRI.pdf

Brierley, G., Tadaki, M., Hikuroa, D., Blue, B., Šunde, C., Tunnicliffe, J., & Salmond, A. (2019). A geomorphic perspective on the rights of the river in Aotearoa New Zealand. *River Research and Applications, 35*(10), 1640–1651. https://doi.org/10.1002/rra.3343

Buijs, A. E. (2009). Public support for river restoration. A mixed-method study into local residents' support for and framing of river management and ecological restoration in the Dutch floodplains. *Journal of Environmental management*, *90*(8), 2680-2689. https://doi.org/10.1016/j.jenvman.2009.02.006

Buttel, F. H., & Flinn, W. L. (1974). The structure of support for the environmental movement, 1968-1970. *Rural Sociology*, *39*(1), 56.

Chan, K. M., Gould, R. K., & Pascual, U. (2018). Editorial overview: Relational values: what are they, and what's the fuss about?. *Current opinion in environmental sustainability, 35,* A1-A7. https://doi.org/10.1016/j.cosust.2018.11.003

Church, S. P., Floress, K. M., Ulrich-Schad, J. D., Wardropper, C. B., Ranjan, P., Eaton, W. M., ... & Rissman, A. (2020). How water quality improvement efforts influence urban–agricultural relationships. *Agriculture and Human Values*, *38,* 481-498. https://doi.org/10.1007/s10460-020-10177-8

Clapcott, J., Ataria, J., Hepburn, C., Hikuroa, D., Jackson, A. M., Kirikiri, R., & Williams, E. (2018). Mātauranga Māori: shaping marine and freshwater futures. *New Zealand journal*

of marine and freshwater research, 52(4), 457-466. https://doi.org/10.1080/00288330.2018.1539404

Clayton, S. (2003). Environmental identity: A conceptual and an operational definition. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 45-65). Massachusetts Institute of Technology.

Coleman, T., & Kearns, R. (2015). The role of blue spaces in experiencing place, aging and wellbeing: Insights from Waiheke Island, New Zealand. *Health & Place*, *35*, 206-217. https://doi.org/10.1016/j.healthplace.2014.09.016

Converse, J. M., & Presser, S. (1986). *Survey questions: Handcrafting the standardized questionnaire*. Sage.

Crawford, W. F. (1909a). *Gisborne from Kaiti Hill* [Photograph]. Tairāwhiti Museum. https://collection.tairawhitimuseum.org.nz/objects/28387/glass-plate-negative

Crawford, W. F. (1909b). *Kaiti Freezing Works early 1909* [Photograph]. Tairāwhiti Museum. https://collection.tairawhitimuseum.org.nz/objects/28387/glass-plate-negative

Cullum, C., Brierley, G., & Hikuroa, D. (2017). *Landscapes and rivers of the Waimatā and Taruheru.* (Report No. 1). Te Awaroa Project. https://www.waikereru.org/assets/documents/WaimataReport1.pdf

Curtis, J., Hynes, S., & Breen, B. (2017). Recreational boating site choice and the impact of water quality. *Heliyon*, *3*(10), 1-21. https://doi.org/10.1016/j.heliyon.2017.e00426

Dadvand, P., Bartoll, X., Basagaña, X., Dalmau-Bueno, A., Martinez, D., Ambros, A., ... & Nieuwenhuijsen, M. J. (2016). Green spaces and general health: roles of mental health status, social support, and physical activity. *Environment international*, *91*, 161-167. https://doi.org/10.1016/j.envint.2016.02.029

Dempsey, S., Devine, M. T., Gillespie, T., Lyons, S., & Nolan, A. (2018). Coastal blue space and depression in older adults. *Health & place*, *54*, 110-117. https://doi.org/10.1016.j.healthplace.2018.09/002

de Bell, S., Graham, H., Jarvis, S., & White, P. (2017). The importance of nature in mediating social and psychological benefits associated with visits to freshwater blue space. *Landscape and Urban Planning*, *167*, 118-127. https://dx.doi.org/10.1016/j.landurbplan.2017.006.003

de Blij, H. (2012). *Why geography matters: More than ever*. Oxford University Press.

de Groot, M., & de Groot, W. T. (2009). "Room for river" measures and public visions in the Netherlands: A survey on river perceptions among riverside residents. *Water Resources Research*, *45*(7), 1-11. https://doi.org/10.1029/2008WR007339

de Waal, C. (2001). *On Peirce*. Belmont, CA: Wadsworth.

Dillman, D. A. (2011). *Mail and Internet surveys: The tailored design method (2nd ed.)*. John Wiley & Sons.

Doi, H., Katano, I., Negishi, J., Anada, S., & Kayaba, Y. (2013). Effects of biodiversity, habitat structure, and water quality on recreational use of rivers. *Ecosphere, 4*(8), 1–11. https://doi.org/10.1890/ES12-00305.1

Eastland Wood Council. (2013). *Economic impact assessment of the forestry industry in the Gisborne-Tairāwhiti region.* https://rcaforum.org.nz/sites/public_files/images/East-Coast-Forest-Sector-Contribution-EWC-2013.pdf

Eden, S., & Tunstall, S. (2006). Ecological versus social restoration? How urban river restoration challenges but also fails to challenge the science–policy nexus in the United Kingdom. *Environment and Planning C: Government and Policy*, *24*(5), 661-680.

Eden, S., Tunstall, S. M., & Tapsell, S. M. (2000). Translating nature: river restoration as nature-culture. *Environment and Planning D: Society and Space*, *18*(2), 258-273. https://doi.org/10.1177/022637758000180010l

Evju, M., Hagen, D., Kyrkjeeide, M. O., & Köhler, B. (2020). Learning from scientific literature: Can indicators for measuring success be standardized in "on the ground" restoration?. *Restoration Ecology*, *28*(3), 519-531. https://doi.org/10.1111/rec.13149

Fisher, K., & Parsons, M. (2020). River Co-governance and Co-management in Aotearoa New Zealand: Enabling Indigenous Ways of Knowing and Being. *Transnational Environmental Law*, *9*(3), 455-480. https://doi.org/10.1017/S204710252000028X

Flowerdew, R., & Martin, D. (Eds.). (2005). *Methods in human geography: a guide for students doing a research project*. Pearson Education.

Foley, R. (2017). Swimming as an accretive practice in healthy blue space. *Emotion, Space and Society*, *22*, 43-51. https://doi.org/10.1016/j.emposa.2016.12.001

Friberg, N., Angelopoulos, N. V., Buijse, A. D., Cowx, I. G., Kail, J., Moe, T. F., ... & Wolter, C. (2016). Effective river restoration in the 21st century: from trial and error to novel evidence-based approaches. In A. J. Dumbrell, R. L. Kordas & G. Woodward (Eds.), *Advances in Ecological Research* (Vol. 55, pp. 535-611). Academic Press.

Fryirs, K., & Brierley, G. J. (2009). Naturalness and place in river rehabilitation. *Ecology and Society*, *14*(1). https://www.jstor.org/stable/26268049

Garcia, X., Benages-Albert, M., Buchecker, M., & Vall-Casas, P. (2019). River rehabilitation: preference factors and public participation implications. *Journal of Environmental Planning and Management*, 63(9), 1-22. https://doi-org.ezproxy.auckland.ac.nz/10.1080/09640568.2019.1680353

Gascon, M., Zijlema, W., Vert, C., White, M. P., & Nieuwenhuijsen, M. J. (2017). Outdoor blue spaces, human health and well-being: a systematic review of quantitative studies. *International journal of hygiene and environmental health*, *220*(8), 1207-1221. https://doi.org/10.1016/j.ijheh.2017.08.004

Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International journal of psychology*, *49*(3), 141-157. https://doi.org/10.1002/ijop.12034

Gisborne District Council. (2013a). Ngā whakaaetanga ā ture mō Te Tairāwhiti: statutory acknowledgements for the Gisborne District. Gisborne District Council. https://www.gdc.govt.nz/statutory-acknowledgements/

Gisborne District Council. (2013b). *Ten water permit renewals*. Gisborne District Council. http://www.gdc.govt.nz/10-water-permit-renewals/

Gisborne District Council. (2020a) . *Gisborne wastewater network – overflow discharges. Assessment of effects on the Environment.* http://gdc.govt.nz/notified-resource-consent-applications/detail/31/Gisborne%20District%20Council%20-%20Community%20Lifelines

Gisborne District Council. (2020b) . *Gisborne wastewater network – overflow discharges. Appendix I: River water quality monitoring report.* http://gdc.govt.nz/notified-resource-consent-applications/detail/31/Gisborne%20District%20Council%20-%20Community%20Lifelines

Gisborne District Council. (2020c). *State of our environment 2020: Te āhuatanga o te taiao.* https://www.gdc.govt.nz/state-of-our-environment/#:~:text=Gisborne%20District%20Council's%20State%20of,case%20studies%20of%20community%20initiatives.&text=Our%20biodiversity%20and%20biosecurity%20discusses,and%20enhancing%20our%20natural%20environment.

Gisborne Herald. (2014a, May 1). Sludge in sewer causes overflow. *Gisborne Herald.* http://www.gisborneherald.co.nz/article/?id=36834

Gisborne Herald. (2014b, August 4). Wastewater let go into city rivers this morning. *Gisborne Herald.* http://www.gisborneherald.co.nz/article/?id=38091

Gisborne Herald. (2015). *Workers remove logs from the Gladstone Rd bridge* [Photograph]. New Zealand Herald. https://www.nzherald.co.nz/nz/gisborne-residents-begin-clean-up-after-floods/LMFSFHFV37SHZGDXPLCSWO4HII/

Gisborne Herald. (2018). *Community planting* [Photograph]. Gisborne Herald. http://www.gisborneherald.co.nz/local-news/20180426/community-planting-for-the-waimata-project/

Gisborne Herald. (2019). *Waka ama race day* [Photograph]. Gisborne Herald. http://www.gisborneherald.co.nz/local-news/20190108/waka-ama-race-day-2/

Gisborne Herald. (2020, July 18). Checking out traps for Waimatā catchment. *Gisborne Herald. http://www.gisborneherald.co.nz/local-news/20200718/checking-out-traps-for-waimata-catchment/*

Gisborne Photo News. (1961). *Ready for the water* [Photograph]. Photo News. https://photonews.org.nz/gisborne/issue/GPN81_19610323/t1-body-d19.html

Gisborne Rowing Club. (2015). Gisborne Rowing Club. http://www.gisbornerowingclub.co.nz/

Gobster, P. H., Nassauer, J. I., Daniel, T. C., & Fry, G. (2007). The shared landscape: what does aesthetics have to do with ecology?. *Landscape ecology*, *22*(7), 959-972. https://doi.org/10.1007/s10980-007-9110-x

Gould, R. K., Klain, S. C., Ardoin, N. M., Satterfield, T., Woodside, U., Hannahs, N., ... & Chan, K. M. (2015). A protocol for eliciting nonmaterial values through a cultural ecosystem services frame. *Conservation Biology*, *29*(2), 575-586. https://doi.org/10.1111/cobi.12407

Grassini, S., Revonsuo, A., Castellotti, S., Petrizzo, I., Benedetti, V., & Koivisto, M. (2019). Processing of natural scenery is associated with lower attentional and cognitive load compared with urban ones. *Journal of Environmental Psychology*, *62*, 1-11. https://doi.org/10.1016/j.jenvp.2019.01.007

Gunawardena, K. R., Wells, M. J., & Kershaw, T. (2017). Utilising green and bluespace to mitigate urban heat island intensity. *Science of the Total Environment*, *584*, 1040-1055. https://doi.org/10.1016/j.scitotenv.2017.01.158

Gundry, S. (2012). *A Splendid Isolation: Gisborne, East Coast, 1950-2012*. H B Williams Memorial Library Book Trust, Gisborne.

Gundry, S. (2017) The Waimatā River: settler history post 1880, Te Awaroa Project Report 3, University of Auckland, https://www.waikereru.org/assets/documents/WaimataReport3.pdf

Guthrie, G. (2010). *Basic research methods: An entry to social science research*. SAGE Publications India.

Grunwell, R. (2015). *Start made* [photograph]. Gisborne Herald. http://www.gisborneherald.co.nz/local-news/20151022/waikanae-beach-clearing-underway/

Haggard, L. M., & Williams, D. W. (1991). Self-identity benefits of leisure. In B. L. Driver, P. J. Brown, & G. L. Peterson (Eds.), *Benefits of leisure* (pp. 103-120). State College, PA: Venture Press.

Hall, M. (2015). *Widespread damage* [Photograph]. Gisborne Herald. http://www.gisborneherald.co.nz/local-news/20150922/homes-inundated-by-rivers/

Harmsworth, G. R., & Awatere, S. (2013). Indigenous Māori knowledge and perspectives of ecosystems. In J. R. Dymond (ed.), *Ecosystem services in New Zealand—conditions and trends (pp. 274-286)*. Manaaki Whenua Press, Lincoln, New Zealand.

Harmsworth, G., Awatere, S., & Robb, M. (2016). Indigenous Māori values and perspectives to inform freshwater management in Aotearoa-New Zealand. *Ecology and Society*, *21*(4). http://www.ecologyandsociety.org/vol21/iss4/art9/

Harvey, K. (2020). [Photograph of landslide into the Waimatā River on agricultural land].

Hay, R. (1998). Sense of place in developmental context. *Journal of environmental psychology*, *18*(1), 5-29.

Hikuroa, D. (2017). Mātauranga Māori—the ūkaipō of knowledge in New Zealand. *Journal of the Royal Society of New Zealand*, *47*(1), 5-10. https://doi.org/10.1080/03036758.2016.1252407

Hikuroa, D., Brierley, G.J., Blue, B., Tadaki, M. and Salmond, A. (2021). Restoring sociocultural relationships with rivers: experiments in fluvial pluralism from Aotearoa New Zealand. In M. Cottet, B. Morandi & H. Piegay (Eds.), *River Restoration: Social and Policy Perspectives from Practice and Research*. Wiley, Chichester. In press.

Hooyberg, A., Roose, H., Grellier, J., Elliott, L. R., Lonneville, B., White, M. P., ... & Everaert, G. (2020). General health and residential proximity to the coast in Belgium: Results from a cross-sectional health survey. *Environmental Research*, *184*, 1-10. https://doi.org/10.1016/j.envres.2020.109225

Hu, Z. (2011). *Water quality perceptions in the US*. Proquest Dissertations Publishing.

Hu, Z., & Morton, L. W. (2011). US Midwestern residents perceptions of water quality. *Water*, *3*(1), 217-234. https://doi.org/10.3390/w3010217

Jeon, J. Y., Lee, P. J., You, J., & Kang, J. (2012). Acoustical characteristics of water sounds for soundscape enhancement in urban open spaces. *The Journal of the Acoustical Society of America*, *131*(3), 2101-2109. https://doi.org/10.1121/1.3681938

Johnson, E. S., Bell, K. P., & Leahy, J. E. (2018). Disamenity to amenity: Spatial and temporal patterns of social response to river restoration progress. *Landscape and Urban Planning*, *169*, 208-219. https://doi.org/10.1016/j.landurbplan.2017.09.008

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, *33*(7), 14-26. https://doi.org/10.3102/0013189X033007014

Junker, B., & Buchecker, M. (2008). Aesthetic preferences versus ecological objectives in river restorations. *Landscape and urban planning*, *85*(3-4), 141-154. https://doi.org/10.1016/j.landurbplan.2007.11.002

Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. CUP Archive.

Kazi, A. M., & Khalid, W. (2012). Questionnaire designing and validation. *Journal of the Pakistan Medical Association*, *62*(5), 514.

Kearns, R., & Moon, G. (2002). From medical to health geography: novelty, place and theory after a decade of change. *Progress in Human Geography*, *26*(5), 605-625. https://doi.org/10.1191/0309132502ph389oa

Kearns, R., O'Brien, G., Foley, R., & Regan, N. (2015). Four windows into geography and imagination (s). *New Zealand Geographer*, *71*(3), 159-176. https://doi.org/10.1111/nzg.12100

King, N. (2004). Using templates in the thematic analysis of texts. In C. Cassell & G. Symon (Eds.), *Essential guide to qualitative methods in organizational research* (pp. 256–270). Sage Publications.

Kleit, R. G., & Manzo, L. C. (2006). To move or not to move: Relationships to place and relocation choices in HOPE VI. *Housing Policy Debate*, *17*(2), 271-308. https://doi.org/10.1080/10511482.2006.9521571

Knight, C. (2019). The meaning of rivers in Aotearoa New Zealand—Past and future. *River Research and Applications*, *35*(10), 1622-1628. https://doi.org/10.1002/rra.3353

Krosnick, J. A., & Presser, S. (2010). Questionnaire design. In J. D. Wright & P. V. Marsden. (Eds.), *Handbook of survey research* (pp. 263-313).

Kyle, G., Graefe, A., Manning, R., & Bacon, J. (2004). Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *Journal of environmental psychology*, *24*(2), 213-225. https://doi.org/10.1016/j.jenvp.2003.12.006

Land Air Water Aotearoa. (2020). *Waimatā River*. LAWA. https://www.lawa.org.nz/explore-data/gisborne-region/river-quality/waimata-river/

Lankia, T., Neuvonen, M., & Pouta, E. (2019). Effects of water quality changes on the recreation benefits of swimming in Finland: Combined travel cost and contingent behavior model. *Water resources and economics*, *25*, 2-12. https://doi.org/10.1016/j.wre.2017.10.002

Larned, S. T., Scarsbrook, M. R., Snelder, T. H., Norton, N. J., & Biggs, B. J. (2004). Water quality in low-elevation streams and rivers of New Zealand: Recent state and trends in contrasting land-cover classes. *New Zealand journal of marine and freshwater research*, *38*(2), 347-366. https://doi.org/10.080/00288330.2004.9517243

Larson, K. L. (2004). Residents' attitudes toward water resource protection in metropolitan Portland, Oregon. Proquest Dissertations Publishing.

Larson, S., De Freitas, D. M., & Hicks, C. C. (2013). Sense of place as a determinant of people's attitudes towards the environment: Implications for natural resources management and planning in the Great Barrier Reef, Australia. *Journal of environmental management*, *117*, 226-234. https://doi.org/10.1016/j.jenvman.2012.11.035

Lave, R., Wilson, M. W., Barron, E. S., Biermann, C., Carey, M. A., Duvall, C. S., ... & Pain, R. (2014). Intervention: Critical physical geography. *The Canadian Geographer/Le Géographe canadien*, *58*(1), 1-10. https://doi.org/10.1111/cag.12061

Le Grice, J. S., & Braun, V. (2016). Mātauranga Māori and reproduction: Inscribing connections between the natural environment, kin and the body. *AlterNative: An International Journal of Indigenous Peoples*, *12*(2), 151-164. https://doi.org/10.20507/AlterNative.2016.12.2.4

Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years?. *Journal of environmental psychology*, *31*(3), 207-230. https://doi.org/10.1016/j.jenvp.2010.10.001

Liu, W. Y., Chen, J. S., & Li, D. R. (2021). Impacts of Environmental Change on Place Attachment in a Small-Island Destination. In J. S. Chen (Eds.), *Advances in Hospitality and Leisure* (pp. 99-113). Emerald Publishing Limited.

Marden, M. (2011). *Sedimentation History of Waipaoa Catchment*. Gisborne District Council, Gisborne.

Marden, M., Arnold, G., Seymour, A., & Hambling, R. (2012). History and distribution of steepland gullies in response to land use change, East Coast Region, North Island, New Zealand. *Geomorphology*, *153*, 81-90. https://doi.org/10.1016/j.geomorph.2012.02.011

Maund, P. R., Irvine, K. N., Reeves, J., Strong, E., Cromie, R., Dallimer, M., & Davies, Z. G. (2019). Wetlands for wellbeing: Piloting a nature-based health intervention for the management of anxiety and depression. *International journal of environmental research and public health*, *16*(22), 4413. https://doi.org/10.3390/ljerph16224413

McCormick, A., Fisher, K., & Brierley, G. (2015). Quantitative assessment of the relationships among ecological, morphological and aesthetic values in a river rehabilitation initiative. *Journal of environmental management*, *153*, 60-67. https://doi.org/10.1016/j.jenvman.2014.11.025

McCracken, D. S., Allen, D. A., & Gow, A. J. (2016). Associations between urban greenspace and health-related quality of life in children. *Preventive medicine reports*, *3*, 211-221. https://doi.org/10.1016/j.pmedr.2016.01.013

McDougall, C. W., Quilliam, R. S., Hanley, N., & Oliver, D. M. (2020). Freshwater blue space and population health: An emerging research agenda. *Science of the Total Environment, 737*. https://doi.org/10.1016/j.scitotenv.2020.140196

Milfont, T. L., & Schultz, P. W. (2018). The role of attitudes in environmental issues. In D. ALbarrac & B. T. Johnson (Eds.), *The Handbook of Attitudes: Applications* (pp. 337-364). New York: Routledge.

Mobley, C. (2016). What matters when explaining environmentalism at the watershed level: Who you are, where you live, what you see, or what you perceive?. *Environment and Behavior*, *48*(9), 1148-1174. https://doi.org/10.1177/0013916515586058

Montag, J. M., Swan, K., Jenni, K., Nieman, T., Hatten, J., Mesa, M., ... & Maule, A. (2014). Climate change and Yakama Nation tribal well-being. *Climatic Change*, *124*(1-2), 385-398.

Moore, H. E., Rutherfurd, I. D., & Peel, M. C. (2018). Excluding stock from riverbanks for environmental restoration: the influence of social norms, drought, and off-farm income on landholder behaviour. *Journal of Rural Studies*, *62*, 116-124. https://doi.org/10.1016/j.jrurstud.2018.07.012

Morgan, G. (2018). 'Public Responsibility. A Fundamental Concept Reflected Throughout the Ages. Where did we lose the plot?'. In B. Martin, L. Te Aho & M. Humphries (Eds.), *ResponsAbility* (pp. 183-192). Routledge.

Morris, J. D., & Ruru, J. (2010). Giving Voice to Rivers: Legal Personality as a Vehicle for Recognising Indigenous Peoples' Relationships to Water?. *Australian Indigenous Law Review*, *14*(2), 49.

Mould, S. A., Fryirs, K., & Howitt, R. (2018). Practicing Sociogeomorphology: Relationships and dialog in river research and management. *Society & Natural Resources*, *31*(1), 106-120. https://doi.org/10.1080/08941920.2017.1382627

Mould, S., Fryirs, K., & Howitt, R. (2020). The importance of relational values in river management: understanding enablers and barriers for effective participation. *Ecology and Society*, *25*(2). https://doi.org/10.5751/ES-11505250217

Murphy, A. B. (2006). Enhancing geography's role in public debate. *Annals of the Association of American geographers*, *96*(1), 1-13. https://doi.org/10.111/j.1467-8306.2006.00495.x

Nassauer, J. I. (1992). The appearance of ecological systems as a matter of policy. *Landscape Ecology*, *6*(4), 239-250.

Newcomer, K. E., Hatry, H. P., & Wholey, J. S. (2015). *Handbook of practical program evaluation* (4th ed.). John Wiley & Sons.

New Zealand Trade and Enterprise. (2016). *Gisborne Investment Profile.* https://www.forestenterprises.co.nz/wp-content/uploads/2016/03/Gisborne-investment-profile.pdf

Ortiz, E., Mendez, A., Zarzycki, A., & Alcorn, J. B. (2008). Fox Walker on the Parapeti River, Bolivia: The Origins of How We Guarani Live in Íví. In J. E. Staller (Ed.), *Pre-Columbian Landscapes of Creation and Origin* (pp. 161-202). Springer, New York, NY.

Parsons, M., Nalau, J., Fisher, K., & Brown, C. (2019). Disrupting path dependency: Making room for Indigenous knowledge in river management. *Global Environmental Change*, *56*, 95-113. https://doi.org/10.1016/j.gloenvcha.2019.03.008

Paterson-Shallard, H., Fisher, K., Parsons, M., & Makey, L. (2020). Holistic approaches to river restoration in Aotearoa New Zealand. *Environmental Science & Policy*, *106*, 250-259.

Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of personality and social psychology*, *46*(3), 598.

Perrottet, A. (Host). (2019, September 8). Awkward conversations about intertwined Gisborne histories – with Dr Jill Chrisp and Karen Johansen [Audio podcast episode]. In *Awkward conversations*. RNZ. https://www.rnz.co.nz/programmes/awkward-conversations/story/2018711757/awkward-conversations-about-intertwined-gisborne-histories-with-dr-jill-chrisp-and-karen-johansen

Petts, J. (2007). Learning about learning: lessons from public engagement and deliberation on urban river restoration. *Geographical journal*, *173*(4), 300-311. https://doi.org/10.1111/j.1475-4959.2007.00254.x

Pickup, M., Sayers, A., Knopff, R., & Archer, K. (2004). Social capital and civic community in Alberta. *Canadian Journal of Political Science/Revue canadienne de science politique*, *37*(3), 617-645.

Porteous, J. D. (1976). Home: The territorial core. *Geographical Review, 66*(4), 383-390. https://doi.org/10.2307/213649

Poverty Bay Herald. (1892, December 27). Swimming matches. *Poverty Bay Herald.* https://paperspast.natlib.govt.nz/newspapers/PBH18921227.2.18?items_per_page=10&query=waimata+swimming+race&snippet=true

Prokopy, L. S., Floress, K., Arbuckle, J. G., Church, S. P., Eanes, F. R., Gao, Y., ... & Singh, A. S. (2019). Adoption of agricultural conservation practices in the United States: Evidence from 35 years of quantitative literature. *Journal of Soil and Water Conservation*, *74*(5), 520-534.

Ranjan, P., Church, S. P., Floress, K., & Prokopy, L. S. (2019). Synthesizing conservation motivations and barriers: What have we learned from qualitative studies of farmers' behaviors in the United States?. *Society & Natural Resources*, *32*(11), 1171-1199.

Regan, C. L., & Horn, S. A. (2005). To nature or not to nature: Associations between environmental preferences, mood states and demographic factors. *Journal of Environmental Psychology*, *25*(1), 57-66.

Reeve. M. (2015). *A place belonging to the heart: Spatially and temporally changing social connections to the Waimatā River and its tributaries.* (Report No. 4). Te Awaroa Project. https://www.waikereru.org/assets/documents/WaimataAPlaceBelongingToTheHeart.pdf

Relph, E. (1976). *Place and placelessness* (Vol. 67). London: Pion.

Robb, M., Harmsworth, G., & Awatere, S. (2015). *Maori values and perspectives to inform collaborative processes and planning for freshwater management* (Landcare Research contract report LC2119). Manaaki Whenua: Landcare Research.

Ruffing, C. (2010). *A study of the roles of geomorphology and perception in the implementation of stream restoration projects* [Doctoral dissertation]. University of Missouri.

Ruru, J. (2018). Listening to Papatūānuku: a call to reform water law. *Journal of the Royal Society of New Zealand*, *48*(2-3), 215-224. https://doi.org/10.1080/03036758.2018.1442358

Ryan, R. L. (1998). Local perceptions and values for a midwestern river corridor. *Landscape and urban planning*, *42*(2-4), 225-237.

Ryan, R. L. (2005). Exploring the Effects of Environmental Experience on Attachment to Urban Natural Areas. *Environment and Behavior, 37*(1), 3–42. https://doi.org/10.1177/0013916504264147

Salmond, A. (1992). *Two worlds: First meetings between Maori and Europeans, 1642-1772*. University of Hawaii Press.

Salmond, A. (2017). *Tears of Rangi. Experiments across worlds.* Auckland University Press.

Salmond, A. (2018a). *Biodiversity in the Waimatā River Catchment, Gisborne.* (Report No. 4.). Te Awaroa Project. https://www.waikereru.org/assets/documents/BiodiversityInTheWaimataCatchmentReport.pdf

Salmond, D. A. (2018b). Rivers as ancestors and other realities: Governance of waterways In Aotearoa/New Zealand. In B. Martin, L. Te Aho & M. Humphries-Kil (Eds.), *ResponsAbility* (pp. 183-192). Routledge.

Salmond, A., Brierley, G., & Hikuroa, D. (2019). Let the rivers speak. *Policy Quarterly*, *15*(3), 45-54. https://doi.org/10.26686/pq.v15i3.5687

Salmond, A., Tadaki, M. and Gregory, T. (2014). Enacting new freshwater geographies: Te Awaroa and the transformative imagination. *New Zealand Geographer, 70*(10), 47–55. https://doi.org/10.1111/nzg.12039

Scannell, L., & Gifford, R. (2017). The experienced psychological benefits of place attachment. *Journal of Environmental Psychology*, *51*, 256-269. https://doi.org/10.1016/j.envp.2017.04.001

Schultz, P. W., & Tabanico, J. (2007). Self, identity, and the natural environment: exploring implicit connections with nature 1. *Journal of Applied Social Psychology*, *37*(6), 1219-1247. https://doi.org/10.1111/j.1559-1816.2007.00210.x

Schutt, R. K. (2018). *Investigating the social world: The process and practice of research*. Sage publications.

Sin, C. H. (2003). Interviewing in 'place': the socio-spatial construction of interview data. *Area*, *35*(3), 305-312. https://doi.org/10.1111/1475-4762.00179

Smith, R. F., Hawley, R. J., Neale, M. W., Vietz, G. J., Diaz-Pascacio, E., Herrmann, J., ... & Utz, R. M. (2016). Urban stream renovation: incorporating societal objectives to achieve ecological improvements. *Freshwater Science*, *35*(1), 364-379.

Soini, K., Vaarala, H. & Pouta, E. (2012). Residents' Sense of Place and Landscape Perceptions at the Rural-Urban Interface. *Landscape and Urban Planning, 104*(1), 124–134. https://doi.org/10.1016/j.landurbplan.2011.10.002

Song, Z., Daryanto, A., & Soopramanien, D. (2019). Place attachment, trust and mobility: Three-way interaction effect on urban residents' environmental citizenship behaviour. *Journal of Business Research*, *105*, 168-177. https://doi.org/10.1016/j.jbusres.2019.08.001

Soutar, M. (2012a). *East Coast places – Gisborne*. http://www.teara.govt.nz/en/east-coast-places/page-6,

Soutar, M. (2012b). *East Coast Region – Pākehā settlement, 1870 to 1940*. http://www.teara.govt.nz/en/east-coast-region/page-6

Spedding, M. (2006). *The Turanganui River: A brief history*. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/conservation/historic/by-region/echb/turanganui-river-history.pdf

Spink, A., Hillman, M., Fryirs, K., Brierley, G., & Lloyd, K. (2010). Has river rehabilitation begun? Social perspectives from the upper hunter catchment, New South Wales, Australia. *Geoforum*, *41*(3), 399-409. https://doi.org/10.1016/j.geoforum.2009.12.003

Sport Gisborne Tairāwhiti. (2012). *The Waimatā Traverse*. https://sportgisborne.org.nz/events/

Stedman, R. C. (2006). Understanding place attachment among second home owners. *American behavioral scientist*, *50*(2), 187-205. https://doi.org/10.1177/0002764202906333

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of social issues*, *50*(3), 65-84.

Stewart-Harawira, M. W. (2020). Troubled waters: Maori values and ethics for freshwater management and New Zealand's fresh water crisis. *Wiley Interdisciplinary Reviews: Water*, *7*(5), e1464. https://doi.org/10.1022/wat2.1464

Tadaki, M., Brierley, G., & Fuller, I. C. (2014). Making rivers governable: Ecological monitoring, power and scale. *New Zealand Geographer*, *70*(1), 7-21. https://doi.org/10.1111/nzg.12036

Tadaki, M., Sinner, J., & Chan, K. M. (2017). Making sense of environmental values: a typology of concepts. *Ecology and Society*, *22*(1). https://dx.doi.org/10.5751/ES-08999-220107

Tairāwhiti Gisborne (2021). *Kaiti Hill* [Photograph]. Tairāwhiti Gisborne. https://tairawhitigisborne.co.nz/listings/operator/1304/top-of-titirangi-kaiti-hill

Te Aho, L. (2010). Indigenous challenges to enhance freshwater governance and Management in Aotearoa New Zealand—The Waikato River settlement. J*ournal of Water Law, 20*, 285–288.

Te Aho, L. (2019). Te Mana o te Wai: An indigenous perspective on rivers and river management. *River Research and Applications, 35*(10), 1615–1621. https://doi.org/10.1002/rra.3365

Te Awa Tupua (Whanganui River Claims Settlement) Act (2017). Public Act 2017 No. 7. https://www.legislation.govt.nz/act/public/2017/0007/latest/whole.html

Tipa, G. (2010). In M. Mulholland (Ed.), *Cultural opportunity assessments: Introducing a framework for assessing the suitability of stream flow from a cultural perspective.* Wai Maori Aoraki Press.

Tombleson, J. (1997). *Waimatā Valley: The land, its people*. Gisborne.

Tombleson, J. (2002). *Whataupoko: The land, its people*. Gisborne.

Townley, J. (1882, May 25). Borough Council. *Poverty Bay Herald.* https://paperspast.natlib.govt.nz/newspapers/PBH18820525.2.21?end_date=31-12-1950&items_per_page=10&query=Report+on+Waimata+Scheme&snippet=true&start_date=01-01-1880

Tremblay, K. R., & Dunlap, R. E. (1978). Rural-urban residence and concern with environmental quality: A replication and extension. *Rural sociology*, *43*(3), 474-491.

Triguero-Mas, M., Dadvand, P., Cirach, M., Martínez, D., Medina, A., Mompart, A., ... & Nieuwenhuijsen, M. J. (2015). Natural outdoor environments and mental and physical health: relationships and mechanisms. *Environment international*, *77*, 35-41. https://doi.org/10.1016/j.envint.2015.01.012

Tunstall, S. M., Penning-Rowsell, E. C., Tapsell, S. M., & Eden, S. E. (2000). River restoration: public attitudes and expectations. *Water and Environment Journal*, *14*(5), 363-370. https://doi.org/10.1111/j.1747-6593.2000.tb00274.x

van Hoven, B. (2003). Using CAQDAS in qualitative research. In N. Clifford & G. Valentine (Eds.), *Key methods in geography* (pp. 461-476). Sage Publications.

Verbrugge, L., & van den Born, R. (2018). The role of place attachment in public perceptions of a re-landscaping intervention in the river Waal (The Netherlands). *Landscape and urban planning*, *177*, 241-250. https://doi.org/10.1016/j.landurbplan.2018.05.011

Vining, J., Tyler, E., & Kweon, B. S. (2000). Public values, opinions, and emotions in restoration controversies. In R. Bruce Hull (Ed.), *Restoring nature: Perspectives from the social sciences and humanities* (pp. 143-161). Island Press.

Völker, S., & Kistemann, T. (2011). The impact of blue space on human health and well-being–Salutogenetic health effects of inland surface waters: A review. *International journal of hygiene and environmental health*, *214*(6), 449-460. https://doi.org/10.1016/j.ijheh.2011.05.001

Waikereru Ecosanctuary. (2020). Waimatā River. https://www.waikereru.org/river/

Waimatā Catchment Erosion Management Project. (2019). *Waimatā Catchment Erosion Project*. https://www.waikereru.org/assets/documents/WaimatāCatchmentErosionProject.pdf

Waimatā Catchment Restoration Project. (2020, June 10). *Waimatā catchment restoration project*. https://www.facebook.com/Waimata-Catchment-Restoration-Project-1124072038386l2/

Poverty Bay Herald. (1903, May 30). Waimatā Water. *Poverty Bay Herald*. https://paperspast.natlib.govt.nz/newspapers/PBH19030530.2.46

Weber, M. A., & Stewart, S. (2009). Public values for river restoration options on the Middle Rio Grande. *Restoration Ecology*, *17*(6), 762-771. https://doi.org/10.1111/j.1526-100X.2008.00407.x

Westling, E. L., Lerner, D. N., & Sharp, L. (2009). Using secondary data to analyse socio-economic impacts of water management actions. *Journal of environmental management*, *91*(2), 411-422. https://doi.org/10.1016/j.envman.2009.09.011

Westling, E. L., Surridge, B. W., Sharp, L., & Lerner, D. N. (2014). Making sense of landscape change: Long-term perceptions among local residents following river restoration. *Journal of hydrology*, *519*, 2613-2623. https://doi.org/10.1016/j.jhydrol.2014.09.029

White, M., Smith, A., Humphryes, K., Pahl, S., Snelling, D., & Depledge, M. (2010). Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. *Journal of Environmental Psychology*, *30*(4), 482-493. https://doi.org/10.1016/j.envp.2010.04.004

Williams, D. R., & Patterson, M. E. (2008). Place, leisure, and well-being. J. Eyles & A. Williams (Eds.), *Sense of place, health and quality of life* (pp. 105-119). Ashgate Publishing Limited.

Wohl, E., Lane, S. N., & Wilcox, A. C. (2015). The science and practice of river restoration. *Water Resources Research*, *51*(8), 5974-5997. https://doi.org/10.1002/2014WR016874

Yazd, S. D., Wheeler, S. A., & Zuo, A. (2020). Understanding the impacts of water scarcity and socio-economic demographics on farmer mental health in the Murray-Darling Basin. *Ecological Economics*, *169*, 106564. https://doi.org/10.1016/j.ecolecon.2019.106564

Zou, D., Lloyd, J. E., & Baumbusch, J. L. (2020). Using SPSS to analyze complex survey data: a primer. *Journal of Modern Applied Statistical Methods*, *18*(1), 1-22. https://doi.org/10.22237/jmasm/1556670300

Appendix I : Participant Information Sheet (Questionnaire - Individual)

PARTICIPANT INFORMATION SHEET
(Individual)

Project Title: Rivers, residents and restoration: Local perceptions of the Waimatā River
Supervisor: Prof. Gary Brierley
Co-supervisor: Dr. Gretel Boswijk
Student Researcher: Danielle Cairns

My name is Danielle Cairns and I am a Master's student in the School of Environment at the University of Auckland.

I would like to invite you to participate in my research. This study is focused on the Waimatā River and the proposed restoration project that will be undertaken. The study aims to investigate the values and relations between residents and river users in the catchment and the Waimatā River and how these shape perceptions of restoration. Similarities and differences in response will be compared across different groups in the catchment (upper/lower catchment and outside of the catchment). You have been identified as someone that lives within the Waimatā Catchment or interacts with the river frequently.

Your participation will take the form of an online questionnaire. The questionnaire should take approximately 5-10 minutes to complete.

Participating in this study will give the opportunity to voice personal values and opinions on the Waimatā River. Knowledge collected from the research on perspectives and aspirations for the future state of the Waimatā River may be used by the Waimatā Catchment Restoration Project Group to support and guide the restoration work.

Data from the questionnaires will be analysed and results published within the thesis. Research may be included in subsequent publications or at conferences in future. This data will only be available to the research team and will be stored on a University of Auckland hard drive, protected by passwords, for a period of six years. After the six-year period, information will be destroyed.

Participation in this questionnaire is voluntary. By completing the questionnaire, you are giving your consent to participate in the study. The questionnaire is anonymous, no names, email addresses or IP addresses will be collected.

Questionnaire Link: https://auckland.au1.qualtrics.com/jfe/form/SV_1AnxDELwmyiFXbT

QR Code:

Thank you very much for your consideration of being involved in this project and helping to make it possible. Please contact me on the details provided below if you have any further questions.

Postal address: C/- School of Environment,
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: dcai652@aucklanduni.ac.nz

You may also contact my academic supervisor, Prof. Gary Brierley:

Postal address: C/- School of Environment
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: g.brierley@auckland.ac.nz
Phone: +64 9 923 8956

Alternatively, the Head of School, Dr Julie Rowland:

Postal address: C/- School of Environment
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: j.rowland@auckland.ac.nz
Phone: +64 9 923 7412

For any concerns regarding issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, at the University of Auckland Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 14/08/2020 for three years. Reference Number: 2577

Appendix II : Information Letter (Questionnaire – Group Leader)

INFORMATION LETTER
(Group Leader)

Project Title: Rivers, residents and restoration: Local perceptions of the Waimatā River
Supervisor: Prof. Gary Brierley
Co-supervisor: Dr. Gretel Boswijk
Student Researcher: Danielle Cairns

My name is Danielle Cairns and I am a Master's student in the School of Environment at the University of Auckland.

I would like to invite individuals from your group to participate in my research. This study is focused on the Waimatā River and the proposed restoration project that will be undertaken. The study aims to investigate the values and relations between residents and river users in the catchment and the Waimatā River and how these shape perceptions of restoration. Similarities and differences in response will be compared across different areas in the catchment (upper/lower catchment and those outside of the catchment that interact with the river). Your group has been identified as people that live within the Waimatā Catchment or interact with the river frequently.

Participation in this study will take the form of an anonymous online questionnaire. The questionnaire should take approximately 10-15 minutes to complete. Following the questionnaire, individuals will be asked to express interest in participating in a semi-structured interview that will take place at a later date.

Combined data collected from questionnaires and interviews will be used to gain an understanding of community perspectives on the river and restoration. Participation in this study will give an opportunity for public engagement with restoration processes and to have their values and opinions taken into account and integrated.

Data from the questionnaires (and interviews) will be analysed and results published within the thesis. Research may be included in subsequent publications or at conferences in future. This data will only be available to the research team and will be stored on a University of Auckland hard drive, protected by passwords, for a period of six years. After the six-year period, information will be destroyed.

Participation in this questionnaire is voluntary. Completion of the questionnaire is considered consent to participate in the study. The questionnaire is anonymous, no names, email addresses or IP addresses will be collected.

We ask that you pass the Participant Information Sheet and link to the questionnaire (below) on to your group.

Questionnaire Link: https://auckland.au1.qualtrics.com/jfe/form/SV_1AnxDELwmyiFXbT
QR Code:

Thank you very much for your consideration of being involved in this project and helping to make it possible. Please contact me on the details provided below for questionnaire information and links or if you have any further questions.

Postal address: C/- School of Environment,
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: dcai652@aucklanduni.ac.nz

You may also contact my academic supervisor, Prof. Gary Brierley:
Postal address: C/- School of Environment
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: g.brierley@auckland.ac.nz
Phone: +64 9 923 8956

Alternatively, the Head of School, Dr Julie Rowland:
Postal address: C/- School of Environment
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: j.rowland@auckland.ac.nz
Phone: +64 9 923 7412

For any concerns regarding issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, at the University of Auckland Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 14/08/2020 for three years. Reference Number: 2577

Appendix III : Questionnaire

Waimatā River Restoration Questionnaire

Q1 What is your age group?

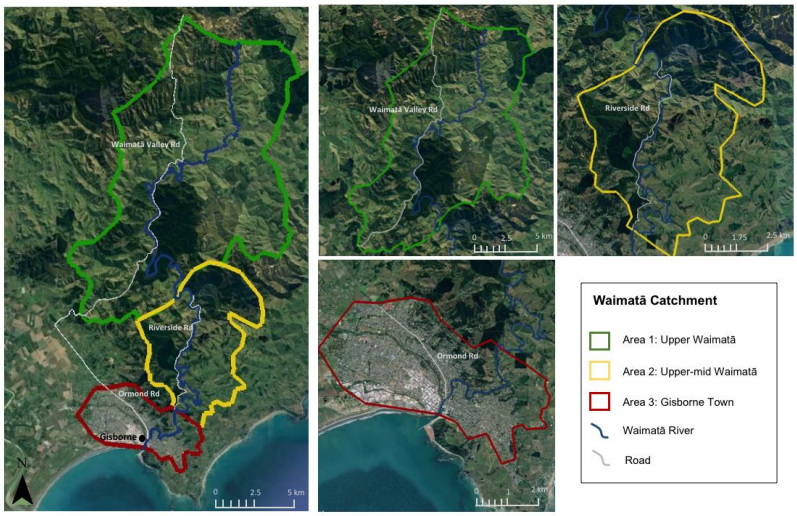
- 16 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 – 64
- 65 and older

Q2 What is your gender?

- Male
- Female
- Gender diverse
- Prefer not to say

Q3 What is your location within the Waimatā Catchment? (refer to map on next page)

- Area 1: Upper Waimatā (along and upstream of Waimatā Valley Road)
- Area 2: Upper Waimatā (along and upstream of Riverside Road)
- Area 3: Gisborne town (urban catchment)
- Area 4: Outside of the catchment



Q4 How long have you resided near or interacted with the Waimatā River?

- Less than a year
- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q5 How do you interact with the Waimatā River? (select all that apply)

- Walking
- Rowing
- Waka ama
- Kayaking
- Swimming
- Fishing
- Other (please specify)
  _____

Q6 Which area(s) of the Waimatā River do you interact with? (refer to map from Q3) (select all that apply)

- Area 1 (along and upstream of Waimatā Valley Rd)
- Area 2 (along and upstream of Riverside Rd)
- Area 3 (lower Waimatā/Turanganui River)
- None

Q7 Do you believe uses of the Waimatā River have changed over time?

- Yes (if so, why?) _____
- No

Q8 How satisfied are you with the current state of the Waimatā River? (circle answer)

Very unsatisfied Very satisfied

0 1 2 3 4 5 6 7 8 9 10

Q9 How healthy do you believe the river is?

Very unhealthy Very healthy

0 1 2 3 4 5 6 7 8 9 10

Q10 What are your key concerns for the Waimatā River? (select all that apply)

- Erosion
- Water quality
- Water clarity
- High nutrient concentrations
- Riparian vegetation removal
- Forest clearance
- Low biodiversity (aquatic and terrestrial species)
- Flooding
- Invasive species
- Other (please specify)

_____

Q11 Do you believe the health of the Waimatā River has changed over time?

- Improved
- Declined
- No change

Q12 What do you believe to be pressures on the Waimatā River? (select all that apply)

- Forest clearance
- Vegetation removal
- Agricultural runoff
- Urban development
- Industrial processes
- Other (please specify)

_____

Q13 What do you value the Waimatā River for? (select all that apply)

- Attractive scenery, sights, sounds
- Economic benefits (forestry, agricultural, tourism, commercial activity)
- Recreation opportunities
- Learning value
- Biological diversity
- Spiritual value
- Intrinsic value Heritage/historic value
- Therapeutic value
- Future value
- Wilderness value
- Other (please specify)

_____

Q14 Has the way you value the Waimatā River changed over time?

- Yes (in what way?) _____
- No

Q15 Do you feel an emotional connection to the Waimatā River?

- Yes (if so, how would you describe it?)
  _____
- No

Q16 Has this connection changed over time?

- Yes - strengthened
- Yes - weakened
- No

Q17 Do you feel there is a relationship between the health of the river and societal wellbeing?

- Yes (if so, how would you describe this relationship)
  _____
- No

Q18 Do you feel restoration of the Waimatā River is necessary?

Very unnecessary										Very necessary
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Q19 Are you aware of the Waimatā Catchment Restoration Project?

- Yes
- No

Q20 What are your aspirations for the Waimatā River? (select all that apply)

- Increased aquatic life
- Increased biodiversity (aquatic and terrestrial species)
- Increased forest cover/vegetation cover
- Improved water quality
- Minimised erosion
- Swimmability
- Fishing
- Increased scenic beauty/attractiveness
- Increased potential for community spaces
- Minimised flood risk
- Increased public awareness around river protection and environmental knowledge
- Other (please specify)

_____

Q21 The Whanganui River has rights as a legal entity. Do you think the Waimatā should have a similar standing?

- Yes
- No

Q22 Any additional comments?

_____

Q23 Would you be interested in taking part in an interview on this topic at a later date?

- Yes
- No

Appendix IV : Participant Information Sheet (Interview)

PARTICIPANT INFORMATION SHEET
(Individual)

Project Title: Rivers, residents and restoration: Local perceptions of the Waimatā River
Supervisor: Prof. Gary Brierley
Co-supervisor: Dr. Gretel Boswijk
Student Researcher: Danielle Cairns

My name is Danielle Cairns and I am a Master's student in the School of Environment at the University of Auckland.

I would like to invite you to participate in my research. This study is focused on the Waimatā River and the proposed restoration project that will be undertaken. The study aims to investigate the values and relations between residents in the catchment and the Waimatā River and how these shape perceptions of restoration. Similarities and differences in response will be compared across different groups in the catchment (upper/lower catchment and outside of the catchment). You have been identified as someone that lives within the Waimatā Catchment or interacts with the river frequently.

Your participation will take the form of a semi-structured interview, with a duration of approximately 30 to 45 minutes. This will take place over the phone or over Zoom (online video conferencing platform). Interviews will be audio-recorded, provided permission from the participant has been granted. Recordings will be used to produce interview transcripts for analysis. The participant has the right to have the recording device turned off at any point of the interview. You will have the opportunity to review interview transcripts before analysis begins.

Participating in this study will give the opportunity to voice personal values and opinions on the Waimatā River. Knowledge collected from the research on perspectives and aspirations for the future state of the Waimatā River may be used by the Waimatā Catchment Restoration Project Group to support and guide the restoration work.

Data from the interviews (and previous questionnaires) will be analysed and results published within the thesis. Research may be included in subsequent publications or at conferences in future. Interview recordings and transcripts will only be available to the researcher. Transcripts and recordings will be stored on a University of Auckland hard drive, protected by passwords, for a period of six years. After the six-year period, information will be destroyed.

Participation is voluntary and participants have the right to withdraw from participation at any stage until two weeks after the interview, without giving a reason.

No names, addresses or specific ages will be available to anyone but the researcher and will not be published in the thesis or further publications. Each participant will be assigned a number, which will be used in the thesis and will be referred to as being located within the upper or lower catchment or outside of the catchment. If the participant allows, quotes may be used in the published report. In the case that your responses give information that makes you identifiable to those in the community confidentiality cannot be guaranteed.

Thank you very much for your consideration of being involved in this project and helping to make it possible. Please contact me on the details provided below if you have any further questions.

Postal address: C/- School of Environment,
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: dcai652@aucklanduni.ac.nz

You may also contact my academic supervisor, Prof. Gary Brierley:

Postal address: C/- School of Environment
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: g.brierley@auckland.ac.nz
Phone: +64 9 923 8956

Alternatively, the Head of School, Dr Julie Rowland:

Postal address: C/- School of Environment
The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand
Email address: j.rowland@auckland.ac.nz
Phone: +64 9 923 7412

For any concerns regarding issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, at the University of Auckland Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 14/08/2020 for three years, Reference Number: 2577

Appendix V : Consent Form

Danielle Cairns
School of Environment
The University of Auckland
Private bag 92019
Auckland 1142
dcai652@aucklanduni.ac.nz

CONSENT FORM
(Individual)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project Title: Rivers, residents and restoration: Local perceptions of the Waimatā River
Supervisor: Prof. Gary Brierley
Co-supervisor: Dr. Gretel Boswijk
Student Researcher: Danielle Cairns

I have read the 'Participant Information Sheet' provided and I understand the nature of the research and why I have been selected. I have had the opportunity to ask questions and have had them answered to my satisfaction. I understand my participation is entirely voluntary and have the opportunity to withdraw at any stage, without giving reason.

- ☐ I agree to take part in this research.
- ☐ I understand that this research involves a semi-structured interview that may take 20-50 minutes.
- ☐ *I agree / do not agree* to be audio recorded. I may choose to have the recording device turned off at any stage of the interview. I acknowledge any recordings will not be processed by a third party.
- ☐ *I would / would not* like an electronic copy of the transcript of this interview.
- ☐ I understand that the digital recordings and transcripts of my interview will be stored on a password-protected University of Auckland hard drive for a period of six years, after which they will be destroyed. I may withdraw my data until two weeks following the interview.
- ☐ I understand that this consent form will be stored in a secure file at the University of Auckland for a period of six years, after which it will be destroyed.
- ☐ *I agree / do not agree* to direct quotes from my interview transcript being used in the final thesis and related academic publications. If quotes are used, they will be identified using my participant number.
- ☐ *I would / would not* like an electronic summary of the findings of this study, which can be emailed to me at the email address below.
  Email address: _____

Signed: _____

Name (Please print clearly): _____

Approved by the University of Auckland Human Participants Ethics Committee on 14/08/2020 for three years, Reference Number: 2577

Appendix VI : Interview Guide

Waimatā Interview Guide

General / Interactions

How long have you lived in the Waimatā catchment for?

- Have you always lived in this (upper/mid/lower) area of the catchment?
- Have you previously interacted with the river before living here?
- Do you live along or close to the Waimatā?
- How do you interact with the river?

Tell me about your experiences with the Waimatā River?

- How do you interact with it?
- What have you seen? / Is there anything particularly significant you have witnessed over time?
- Has the way you interact with the river changed over time?

Value/Connection

In what ways does the river play a part in your life?

- What does the Waimatā river mean to you?
- Why is it special to you?
- Where does your connection come from?
- Does your upbringing/culture/heritage play a role in your connection to the Waimatā?
- Does the Waimatā have any cultural significance to you?
- For what purposes does the river serve you?
- Has the way you value it changed over time? How so?

River Health

How healthy do you consider the Waimatā to be?

- What are your key concerns for the river and its health?
- Do you believe the river is getting better or worse?
- What do you believe needs changing for the Waimatā River?
- What do you believe a healthy river looks like?
- What are your aspirations for the future Waimatā River?
- How do you think this is best achieved?

Responsibility/Roles in River Health

Who do you believe is responsible for the health of the Waimatā River?

- Do you believe they are achieving this?
- What do you believe your role in this is?
- What do you think has been done to bring positive change on the river?
- Who profits from a healthy river?

Restoration

What do you know about the restoration project for the Waimatā?

- Do you recall any management interventions on the river in the past? If so what?
- What would you like to see come out of a restoration project on the Waimatā?
- What are your aspirations for the river – what would you like to see?

Public Wellbeing

Do you believe there is a connection between river health and public wellbeing?

- What are the benefits you have experienced in your interactions with the Waimatā?
- Do you believe time in nature/blue space/Waimatā contributes to your mental and psychological wellbeing? How?
- Do you believe time in nature/blue space/Waimatā contributes to your physical wellbeing? How?
- Do you believe the health of the Waimatā has an impact on your physical and/or psychological wellbeing? How?
- Have you observed this or experienced it yourself?

Legal rights

Do you think that the Waimatā River should have rights as the Wanganui River does?