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# Restoration of Mauri (Life-Force) to Okahu Bay: Investigation of the Cultural, Social, and Environmental Restoration

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**Restoration of *Mauri* to Ōkahu Bay**

**Emily Freilich**

**BA Thesis in Environmental Analysis**

**Pomona College**

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## **Abstract**

Indigenous peoples around the world are increasingly taking control of their lands and applying management practices that fit with their cultural, social, and ecological knowledges and needs. At the same time, environmental restoration practitioners and scholars are also increasingly calling for authentic community participation in environmental restoration. This thesis investigated the restoration of *mauri* (life-force) to Ōkahu Bay, Auckland New Zealand. Ōkahu Bay is part of the land and waters of Ngāti Whātua Ōrākei, a Māori *hapū* (sub-tribe). The *mauri* of Ōkahu Bay has been severely degraded in the past century from the impacts of colonization, including urban runoff, a sewer pipe going directly into the bay, and sedimentation. Since the 1990s, Ngāti Whātua Ōrākei have been restoring the bay with the vision of having, “waters fit to swim in at all times, with thriving marine eco-systems that provide sustainable kaimoana [seafood] resources to a Ngāti Whātua Ōrākei community who have strong daily presence in and on the bay as users and kaitiaki [guardians].” This thesis investigates the current status of Ōkahu Bay, how Ngāti Whātua Ōrākei is driving their restoration process, and what the lessons this restoration has for moving beyond community participation in restoration to community-driven restoration.

Through building their institutional capacity and maintaining relationships with businesses on the bay and the Auckland city council, Ngāti Whātua Ōrākei is continuing to successfully implement environmental restoration projects and reconnecting people to their bay through their worldview. That said, *hapū* members are still not seeing their *whānau* (family) swimming in and caring for Ōkahu as much as they would like. They want to see more of a focus on restoration in the city and the *hapū*.

Overall, this investigation showed that a clean environment is essential to build community and a community is essential to build a clean environment. This community-driven restoration, while not perfect and not everyone wants to be part of it, has great potential to truly reconnect people with their environments, decolonize the land and the people, and create thriving ecosystems and people that benefit themselves, the Ōkahu, and wider Auckland community.

## **Acknowledgments**

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## **Introduction: The Restoration of *Mauri* to Ōkahu Bay, Auckland New Zealand**

This thesis explores how Ngāti Whātua Ōrākei, a Māori *hapū* (sub tribe) is restoring the *mauri* (life-force) to Ōkahu Bay in Auckland, New Zealand. It explores how they are using a community-driven restoration process to truly reconnect the community to their environment. This thesis explores how we can move beyond community participation in restoration to true community involvement in their environments. It's about how Ōkahu Bay improved its wellbeing from the past and how it will be improved in the future. It gives space to imagine what a world with wellbeing in the environment and wellbeing in our self-defined communities looks like.

Ōkahu Bay is a small bay in Auckland, New Zealand, the largest city in New Zealand with almost 1.4 million people (Figure 1). The bay is hemmed by Tamaki Drive, a busy commuting road into the city, on the south end; the Ōrākei Marina on the southwest end; and a seawall on the east end (Figure 2). The bay itself is about 23.5 hectares and has a catchment of about 100 hectares. Three stormwater drains going into the bay, 2 from the sides and one in the middle. Ōkahu Bay is comprised of a grassy area with the only toilets for several kilometers, a few grills and picnic tables, and a beach covered in shells and often seabirds. Across the street, Tamaki Drive, there is a playground and Ngāti Whātua Ōrākei's *urupā* (cemetery). Ōkahu Bay is located east of the commercial port in Auckland and one bay in the Waitemata Harbour and Hauraki Gulf (Figure 3). Ōkahu Bay lies in the Ōrākei Local Board. About 86,000 people lived in the Ōrākei suburb in 2016 (Auckland District Health Board 2016). In 2013, 4.5% of the population identified as Māori, 2.3% as Pacific peoples, 18% as Asian, and 76% as Europeans or other ethnic groups.

Ngāti Whātua Ōrākei has been restoring Ōkahu Bay since about 2012 when Richelle Kahui-McConnell, the former environmental manager wrote the Ōkahu Catchment Restoration Plan. She wrote the plan by asking *whānau* (families) what a health bay would look like to them and translated their words into cultural, community, and scientific indicators. She heard their stories of the past and their hopes for the future. The overall vision for the restoration is to have, “Waters fit to swim in at all times, with thriving marine eco-systems that provide sustainable kaimoana resources to a Ngāti Whātua Ōrākei community who have strong daily presence in and on the bay as users and kaitiaki (guardians)” (Kahui-McConnell 2012). This statement shows the restoration is much bigger than environmental restoration, but is really about reconnecting the community with their environment. They want to have clean water that people can go into all the time and they want their people to not only use the bay but also care for the bay and have knowledge about the bay. The *hapū* wants to be able to collect seafood from the bay again to eat and to build community and want people to have fun in the bay again. In a Māori worldview, having the

community involved in the bay is essential for restoring *mauri*. I will explain more in the following Māori Worldviews section. For a more complete exploration of the plan, see Kyle Jensen's BA thesis (Jensen 2017).

As if being important for an entire nation of people is not enough, this restoration holds lessons for marine restoration fields; community based restoration fields; and implementation of the demands of the international indigenous movement. This restoration is part of the global shifts working to decolonize people and lands. Indigenous peoples around the world are increasingly taking control for their lands, waters, and cultures and reviving them in their worldviews. Among other aspects, they are working to undo the damage done by European colonial nations with capitalistic notions separating humans from the environment in order to exploit nature for profit. To exploit nature, settlers dehumanized indigenous communities and dispossess them from their lands: "Historically and today, tribal occupation of colonized land in the U.S. had been viewed as an obstacle to profitable capitalist appropriation" (Poupart 2002, 144). In addition to seizing land, colonizers dominated people by attempting to destroy tribal cultures. In these ways, settlers used environmental degradation and cultural damage together to achieve similar goals.

Feminist and Marxists scholars are at the fore of many of the critiques of how capitalism and scientific knowledge generated in a capitalistic society have exploited the environment. For example, ecofeminist philosopher Carolyn Merchant argues that so-called Western science is built on oppressive thinking and methods. In one example, she traces the origins of the scientific method by looking at Francis Bacon's political and social worldviews (Merchant 2003). Francis Bacon is commonly credited with creating the scientific method. Merchant argues that his position as a white, Christian, European male informed his views of science, making science into a dualistic and patriarchal field. His fundamental view separated humans (European men) from Nature. Merchant follows this broad argument in other works, arguing that a certain reading of the Bible justified exploitation of women, indigenous peoples, and the environment (Merchant 2004). Merchant's critiques take big picture views of Western science, Western society, and Christianity. This view is useful to understand that patriarchy, colonialism, and racism are created by colonizers. Her critiques point to how colonial knowledge processes are different from indigenous knowledge processes. For instance, in writing about the Māori concept of guardianship, Maori Marsden (1992) similarly used Western knowledge and its dualisms separating humans from the environment as a contrast to Māori worldviews. He argues that capitalism justifies the exploitation of nature by separating people from the environment and turning nature into a dead commodity that can be exploited and sold. Māori education scholar

Linda Smith (1999) similarly critiques Western science for its tendencies to deconstruct the natural world and view parts as isolated rather than trying to find connections as Māori researchers do.

Indigenous movements have turned these and other critiques into activism and implementing their demands for self-determination and rights to live as indigenous peoples. While indigenous people have been fighting colonization since the beginning of colonization, modern indigenous movements took place in conjunction with the US Civil Rights movements and anti-war protests (Wilkes 2006). Indigenous rights movements take place at the local level and at international levels through the United Nations and the International Labor Organization (Niezen 2003). Through years of work on representation in international domains, the United Nations adopted the United Nations Declaration on the Rights of Indigenous Peoples in 2007, affirming the right to health, culture, and self-determination (United Nations General Assembly 2007). At local levels, indigenous rights, self-determination, and worldview struggles have especially born out in water governance and water use (e.g. Simms et al. 2016; Fox et al. 2017; Niezen 2003). The water governance demands stand in direct opposition to the colonial view that water is a resource to be fully allocated for human use (Fox et al. 2017). Instead, many indigenous people view that bodies of water and rivers are part of them, sacred, and integral in their cultures and practices. For instance, for the Anishnaabe people in what is now Michigan, “water in all its forms is considered a living member of the GTB’s [Grand Transverse Band] extended family” (Fox et al. 2017, 525). Worldwide, fights over water use have come to head with dam projects, diversion projects, and pollution. As in Ōkahu Bay, polluting and poisoning water physically, communally, and spiritually harms the water and related tribe.

In the past few decades, these calls for justice and self-determination and critiques of capitalism have entered in environmental restoration work. Scholars, community, and ecological restoration practioners increasingly undertake projects that include community values and community consultation (Berkes 2004). The “community-based conservation” field is particularly popular in developing and low-income areas as an attempt to balance development and environmental conservation. The ideas that communities know the most about their environments and their personal and communal needs and will be more inclined to protect the environment when they have input and decision-making powers drives community-based conservation (Ribot 2002). The Society for Ecological Restoration includes several sections on the importance of community involvement in their *Guidelines for Developing and Managing Ecological Restoration Projects* (Clewell, Rieger, and Munro 2005). For example, Guideline 30 states: “Establish liaison with the



public and publicize the project. Local residents automatically become stakeholders in the restoration... If residents favor the restoration, they will protect it and vest it with their political support. If they are unaware of the restoration and its public benefits, they may vandalize or otherwise disrespect it” (Clewell, Rieger, and Munro 2005, 10–11). Practitioners recognize that including the community will help build care for the ecosystem and make a successful restoration, even if involving stakeholders takes more time and money in the short term.

Further scholars are pushing against expert-dominated restoration and increasingly working with community and indigenous knowledges. Similar to community-based conservation, scholars recognize that, “local people see and care the most” (McCarthy et al. 2014) and are the most qualified to talk about their land. Moller et al (2009) acknowledge in their study of traditional ecological knowledge and shorebirds that, “there is an emerging consensus that communities are more likely to change their actions if their own, socially accepted knowledge system predicts the need for change” (271). They also argue that traditional ecological knowledge helps fill in gaps in the often short time frames in which scientific studies take place.

However, these movements have had problems. Often community-based conservation programs are still driven by outside researchers. These researchers use consultation but make decisions on their own (Wehi and Lord 2017). In many developing countries especially, community-based conservation programs have been prone to elite capture because the researchers and restoration practitioners do not properly define what they mean by community or recognize the power structures and heterogeneity within the so-called community. Moreover, some scholars level the critique that in popular conceptions, indigenous knowledge is often discussed more by non-indigenous people without understanding the nuances, histories, and adaptability of the knowledge: “It appears the more IK [indigenous knowledge] is championed by nonindigenous people, the more it is co-opted by them and becomes a reified, abstracted universal concept of ecological knowledge and an information-based taxonomy of place” (Wohling 2009, 2). Wohling sees some uses of indigenous knowledge as different forms of colonialism, where indigenous people are now, “burdened with an... irksome and romanticized new identity of ‘spiritual wisdom and ancient ecological knowledge” (Wohling 2009, 6). Further, many ecological restoration papers call for community participation, but have little evidence of what it looks like and how to distinguish between community consultation and true community ownership (von der Porten and de Loë 2013; Wehi and Lord 2017; Baker, Eckerberg, and Zachrisson 2014). In places where indigenous peoples have realized settlement rights, the restoration work still needs to navigate the “what next” (Niezen 2003).

In this context, Ngāti Whātua Ōrākei's restoration works not only for themselves but also as an exploration of what it can look like to implement the demands of indigenous rights movements and the calls from community and scholars for increased community participation in environmental restoration. Ōkahu Bay is only about itself but has lessons in what local knowledge can look like, how local knowledge is used or not used in making decisions, and the realities in a community-driven restoration project. As this thesis will show, the health of the environment and the health of the community cannot be separated. People need clean water to come together as a community but the water needs to community to care for it in order to make a clean environment. Ngāti Whātua Ōrākei has made immense progress in their restoration and has aspects that they can work on in the future to help improve the *mauri*.

### **Personal Position**

I live in the United States and am of European ancestry. I came to New Zealand through the Frontiers Abroad study abroad program in the spring of my third year of college [university], knowing nothing about Māori people and worldviews or about New Zealand in general. I went to school at the University of Auckland for a semester and worked with Dan Hikuroa. I completed the ecological surveys in Chapter 4 for my semester project and stayed through July to extend that work for this thesis by doing interviews and surveys. I was undertaking this work with the support of Ngāti Whātua Ōrākei. I am clearly an outsider with limited relationships within the *hapū* and New Zealand. I want the reader to know that this thesis more reflects what I could understand as a visitor rather than a detailed community-based research project or long-term ethnography.

### **Māori Worldview**

Māori worldviews are at the center of Ngāti Whātua Ōrākei, Ōkahu Bay, and the Ōkahu Catchment Ecological Restoration Plan. Hence this thesis will attempt to center on a Māori worldview and use that as a method of analysis. A worldview is a set of values, beliefs, and perspectives that explain the world. Worldviews shape how people understand the world and what is going on around them. Worldviews constrain what is possible and what is not possible. It helps to show what is right and wrong and how to relate to others. The rest of the thesis cannot be understood without an understanding of a Māori worldview and ways of relating to the environment and to each other. While it is challenging to explain a worldview, especially as an outsider, I will explain some of the terms and concepts I use throughout the thesis.

The Māori worldview starts from the Te Kore, the void, and a place of endless possibility. From Te Kore came Te Pō. Te Pō is both darkness and physical form. Then came Te Ao Mārama, the world we live in now, a world of light. Te Ao Mārama is also a term for the Māori worldview. Rangi-nui and Papatūānuku, the sky father and earth mother, live in Te Ao Mārama and are the primal parents of the natural world and humans. Māori value ambiguity and allow that Rangi and Papa have anywhere between 10 and 6-dozen children. Their children are *atua* (gods). The children include Tangaroa (god of the sea), Tāwhirimātea (god of the wind), Tāne (god of the forest), and Rongo (god of cultivated foods). Te Ao Mārama is based in the creation that everything in this world originates from Rangi and Papa and therefore everything is connected in *whānau* (familial) relationship.

*Whakapapa* is a central part of Te Ao Mārama as a way of understanding these connections and grounding oneself in lineage. *Whakapapa* is commonly translated as genealogy. However, *whakapapa* is much deeper than a genetic connection to family. It is an understanding that everything and everyone are connected and all come from the same place. As Māori health researcher Mason Durie explains, “Māori views of the world are based on the position that the environment is an interacting network of related elements, each having a relationship to the others and to earlier common origins,” (Durie 1998, 22). Māori acknowledge that we all come from something and are all going forward into the future. *Whakapapa* is not hierarchical, making any generation, their actions, and their ideas as important as those in the past and in the future (Mikaere, 2011). *Whakapapa* is used for ideas, objects, and events as well as for human lineage. It can be used to understand how an event came to be, to understand the history behind it, and conceive of a future. It can be used for trees, for tables, for houses, for fish, for mountains. As Mikaere says, “Every person is linked to the generations to come and to those that have been before. Every person has a sacred connection to Rangi and Papa and to the natural world around them,” (Mikaere 2011, 211). There is a spiritual and familial obligation to care for the Earth and one’s community in it. Māori are related to, or belong to, the land on which they reside, making a reciprocal caring relationship between Māori and their environment: “To Māori, the land is part of the living body of the tribe. It is not just that they are sentimentally attached to it because they have lived there all their life and because their ancestors are buried there. Inseparable from the land are the multiplicity of spirit beings which make up the mana of the tribe” (Roberts et al. 1995, 10). Because of this relationship, Māori do not have a concept of land ownership; land is communal and people belong to land and gain their identity, wellbeing, and power from the land.

Māori Marsden shows that *kaitiaki* come from *whakapapa*. *Atua* were the original *kaitiaki*: “The ancient ones (*tawhito*), the spiritual sons and daughters of Rangi and Papa were the ‘Kaitiaki’ or guardians. Tane was the Kaitiaki of the forest; Tangaroa of the sea, Rongo of herbs and root crops, Hine Nui te Po of the portals of death and so on... And whilst man could harvest those resources they were duty bound to thank and propitiate the guardians of those resources” (M. Marsden 1992, 16). People are connected by *whakapapa* to the *tawhito* and original *kaitiaki*. People then have an obligation to continue the tradition of *kaitiaki* and gain *mana* (social authority) from Rangi and Papa by caring for their ancestors. However, being a *kaitiaki* is more than a spiritual practice: “While it may be tempting to romanticize this approach to life, I believe that it is essentially practical: our ancestors understood very clearly that our survival is dependent upon the way in which we interact with the world around us.” (Mikaere 2011, 289) *Kaitiaki* help ensure the environment and hence the community are healthy and taking care of each other spiritually and physically. *Kaitiakitanga* is much more than the simple definition of “guardianship” but is a centering principle that binds all aspects of Māori familial, social, and environmental relationships. Because Māori are related to the land, there is an inseparable link between people and the environment. The *kaitiakitanga* construct recognizes that caring for the environment and for others is essential for all physical, mental, emotional, and spiritual health (Edwards 2010).

Through taking good care of lands, waters, and communities, Māori gain *mana* and *mana whenua*. *Mana* is prestige or power gained through social relations and doing good work. Anyone can gain or lose *mana* through their life. *Mana whenua* refers to authority over land and waters for taking care of them. *Whenua* means land but also means placenta, showing the importance of *whakapapa* and the connection between land and people’s personal connections and histories. Having *mana whenua* for an area gives a *hapū* or *iwi* the power and responsibility to make decisions for the land and waters that further the wellbeing. With strong *mana whenua*, others will respect those decisions. Because *hapū* and *iwi* have reciprocal relationships to the land derived from *whakapapa*, *mana whenua* is granted by the land (Clark 2001). *Mana whenua* comes from having a presence and from taking care of the land and each other or for being *kaitiaki*.

As we can see, Māori believe that everything is physically and spiritually connected. There is no real separation between the spiritual and the present or between environment and people. *Mauri* then is a concept that recognizes these connections and that wellbeing comes from having *mana*, having a healthy environment, and caring for the wellbeing of ancestors, the *hapū*, individuals,

and the environment. *Mauri* has been translated as life-force or life principle (Hikuroa, Slade, and Gravely 2011). It is a force that runs through all living and inanimate things and is also the force that binds them together. *Mauri* is holistic and culturally-grounded. Focusing on *mauri*, whether in environmental restoration or in human health, looks at the ecologic, social, cultural, and economic aspects of a system together (Morgan 2006).

## **Methodology**

This thesis is based mostly in the stories that people told me. I am attempting to combine social science, ecology, and chemistry tools under a *mātauranga Māori* (Māori knowledge) framing. In practice, this means that Ngāti Whātua Ōrākei's needs and interests drove the questions I asked in both the scientific and interview sections. Throughout the thesis, I refer to interviews and less frequently to surveys. I completed sixteen semi-structured interviews with people in the *hapū* and others that are involved in the restoration and/or work at businesses at the bay. Nine of the interviewees were *hapū* members and seven were from local government, working with the *hapū* or managed businesses at Ōkahu. I gave all interviewees a participant code. Quotes from *hapū* members are numbered as TW#. TW refers to *tangata whenua*, a term used in New Zealand to refer to indigenous people. The others are numbered as M#. I completed these interviews in July 2017. Interviews ranged from 20 minutes to three hours, with most around one hour.

I refer to the survey periodically through the thesis and I included the results in an appendix. I gave a short semi-structured survey to people at Ōkahu Bay. I asked the questions and recorded the answers. I found that people gave richer answers when I asked and listened to the answers rather than handing out paper surveys and waiting for them to write answers. The survey was 7 questions and took about one minute to complete. I surveyed on five separate days and had 43 participants. The survey was not large enough or over a varied enough time period to be representative of overall Ōkahu Bay users. However, the answers give an indication of how the wider Auckland community that uses Ōkahu Bay views the bay and what they want to see in the future. I use the answers more as interview responses than a traditional survey.

In addition to interviews and surveys, I also completed ecological quadrat surveys to continue monitoring the shellfish in Ōkahu Bay. While the survey used classical ecological methods, the questions were based on those Ngāti Whātua Ōrākei wanted answered for their restoration and advocacy. Through the scientific analysis, I hope to show that science is not proclaiming to be the truth but adding to the other forms of knowledge that can also remember and explain the dynamics at Ōkahu Bay. As Harmsworth and Tipa (2006) posit in their report *Maori*

*Environmental Monitoring*, “traditional concepts whilst utilizing modern research and science are central to development of iwi and hapū planning and environmental monitoring approaches.” We used indicators that draw from and build on the *hapū*’s *mātauranga* and further their restoration goals.



Figure 1: Ōkahu Bay, Auckland New Zealand. Central city skyline is in the background and the grassy area in the foreground. Photo by the author, 2017.

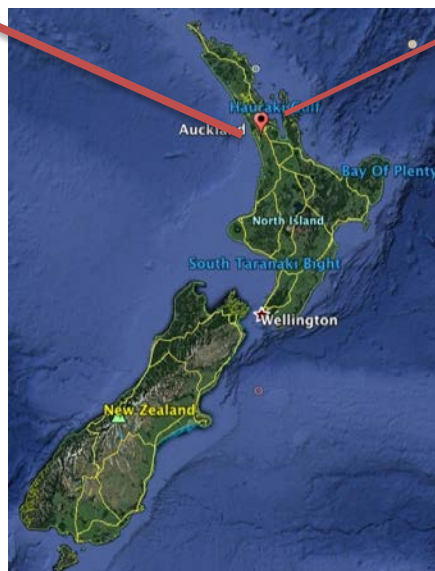


Figure 2: Ōkahu Bay Overview. Landmarks and features at and around the bay are marked. The stormwater outflows are marked A, B, or C and are marked with red dot



Figure 3: Ōkahu Bay and Bastion Point (in the pink section) within the Waitemata Harbour (light blue next to the pink) and Hauraki Gulf (dark blue on the northeast). These places will be referred to periodically in the thesis.  
 Source: Aguirre et al, 2016.



## Chapter 1: History of Ōkahu Bay

This chapter highlights some of the history of Ōkahu Bay and Ngāti Whātua Ōrākei to give context to the particular colonization and decolonization processes at work. This history has been told elsewhere (e.g. Clark 2001; Morrison 1999; The Waitangi Tribunal 1987). However, the history is essential to understand the importance of the restoration, what people are saying, and the methods they use in restoration. I will discuss Ngāti Whātua Ōrākei's ancestry and power in Auckland. I will then trace the colonization processes, Crown land grabs, and environmental and cultural degradation, followed by the protests and grievance and settlement processes. I end the chapter with the current state and perceptions of Ōkahu Bay.

All *iwi* (tribes) and *hapū* descend from ancestors and can trace their ancestry to one of the original *waka* (canoes) that sailed to *Aotearoa* (New Zealand) from Hawaiiki. Tuputupuwhenua is Ngāti Whātua's ancestor and Māhuhu-ki-te-rangi is their *waka* (Taonui 2005). Tuputupuwhenua emerged from the ground as a spring. The *waka* landed in Northland before going traveling to the west coast of the North Island and landing between the Kaipara Harbor and Hokianga Harbor. Several *iwi* and *hapū* inhabited *Tamaki Makaurau* (Auckland). *Iwi* desired Tamaki was because it had plentiful food sources, *waka* launching areas, and, with over 50 volcanoes, had many prime sites for *pā* (forts) (Badham 2011). Ngāti Whātua Ōrākei occupied Auckland starting in the 18<sup>th</sup> century after alliances with and campaigns against other *iwi* ("Ngāti Whātua Ōrākei" n.d.). Led by Tuperiri they absorbed other *hapū* and established a *pā* at Maungakiekie (One Tree Hill) (Badham 2011). Now, Ngāti Whātua Ōrākei traces their ancestry to the Ōkahu Bay and wider Auckland region: "I see it [Ōkahu Bay] as my ancestor. It was the fingernail of my ancestor. My ancestor was the Waitemata. The bay is seen as this ancestor" (TW5). The *hapū* traces their ancestry to Ōrākei, calling themselves the people of Ōrākei. Ngāti Whātua Ōrākei established a village at Ōkahu Bay and fished and grew food at the bay (Figure 1).

James Cook and his expedition visited New Zealand in 1769. For the next several decades more Europeans slowly started settling in New Zealand. In 1840, the British Government crafted a treaty, Te Tiriti o Waitangi (The Treaty of Waitangi). The treaty was a power-sharing agreement between the Crown and Māori, giving Māori rights to their lands and waters while allowing British settlers to claim citizenship. In 1840, Te Kawau, the chief of Ngāti Whātua at the time, offered 3,000 acres of land to Governor Hobson to move the capital from Russell to Auckland. This land now forms much of the Auckland Central Business District (CBD). Ngāti Whātua Ōrākei offered land with the expectation that in return they would have equal influence in how

Auckland developed. Because Māori did not have land ownership, this offering of land was instead a *tuku rangatira*, a gift between chiefs to show respect and establish alliances (I. H. Kawharu 2001). Ngāti Whātua Ōrākei retained authority and belonging to the land. Ngāti Whātua Ōrākei kept the 700 acres in Ōrākei that was the *papakāinga* (village) and made it clear this would stay with the *hapū* forever. This land contained the *marae* (meeting house), fishing areas, and homes (The Waitangi Tribunal 1987). The British obviously did not see this gift as an alliance and took the land to continue their efforts to dispossess Māori and kill Māori culture.

Through the 19<sup>th</sup> and 20<sup>th</sup> century the Crown continued to divide and confiscate Ngāti Whātua land. Despite intense resistance to land seizures and sales, the Crown gave 13 individuals title to Ngāti Whātua Ōrākei land. Those with titles often sold their lands in the hopes of retaining the rest of the village (The Waitangi Tribunal 1987). Te Kawau realized very soon that the Crown was not going to respect his gift of land as an alliance. In 1853 he sent a letter to Governor Grey as the Governor was leaving Auckland to return to England. The letter expresses Ngāti Whātua's love for the Governor, peace towards the British, and urges the Governor to protect Ngāti Whātua's interests:

This is our love - the love of the people who protect the Europeans... Friend, the Governor- when you arrive at the other side, tell the Queen about the good arrangements you have made in regard to the formation of a township on our land, and let this land be reserved for our own use, for ever, and let us have a Deed for it, so that it may be safe (Davis 1855)

This letter is a show of power and diplomacy. There are no concessions in the letter. Te Kawau wants his power and his people respected and their agreements upheld. Presumably, however, the Governor and the Queen ignored the letter.

As the Crown continued to take land, Ngāti Whātua fought back through other means. Ngāti Whātua represented themselves in, “eight actions in the Maori Land Court, four in the Supreme Court, six appearances before Commissions or Committees of Inquiry, and fifteen Parliamentary Petitions” (The Waitangi Tribunal 1987). However, none of these convinced the Crown to uphold their treaty obligations. Auckland was the gateway to this new country and a rapidly developing port city; the Crown did not want Māori “eyesores” greeting new arrivals (Morrison 1999). In the 1880s, the Crown took Bastion Point through the Public Works Act to make defenses against a supposedly impending Russian attack: “The government deemed the Russians were going to attack. The Russian didn't even know they were going to attack. We were disposed for a Public Works Act for something that wasn't going to happen, that was a lie” (TW5).

Further, many European settlers loved yachting and wanted to build yacht clubs and harbors to house them around the city's waters (Peart 2016). The yachters desired the Ōrākei Block, Ngāti Whātua Ōrākei's remaining land, because it has a beautiful view, is well protected from wind, and was between several fancy European neighborhoods. Due to these pressures and the desire to push out Ngāti Whātua Ōrākei, the Crown deliberately made life in the *papakāinga* difficult. They would not give Ngāti Whātua Ōrākei access to running water, internal sewage, or permits to repair or rebuild their houses (Morrison 1999). The Crown showed their power over Ngāti Whātua Ōrākei and continued attempts to kill the *hapū*, along with other *iwi* and *hapū* around the country.

In addition to physically dispossessing Ngāti Whātua Ōrākei from their land and ancestry, in 1910 the Crown used the Public Works Act to lay a sewer pipe with all of Auckland's sewage running directly into Ōkahu (Figure 2). The *hapū* protested the pipe since it proposed in 1905 (Dann 2010), and "we fought against it for many years" (TW6). The pipe polluted the bay, the *hapū*'s food sources, and made people sick. It was really disgusting to live there when the sewage was released. As one older *hapū* member told me, "That's where they used to open the floodgates and on the outgoing tide, all the sewage went out into the harbor. It was horrible. It was horrible," (TW6). Not only was this physically deadly but it was also an immense cultural insult. For Māori water is considered sacred and must pass through *Papatūānuku* (Mother Earth) before humans can touch it. As the Waitangi Tribunal put it:

There could have been no greater insult to a Maori tribe even if one were intended. The disposal of human waste to water, especially in such great volumes offends all sensibilities of Maori people, particularly in proximity to the main habitation place, profaning that which is sacred. It would have indicated to Ngāti Whātua what Auckland thought of them even without the spiritual connotations of Maoridom. It may also have indicated that Auckland expected they would soon no longer be there. (The Waitangi Tribunal 1987)

The sewer pipe itself was also higher than the land so it blocked harbor access from the *papakāinga* and caused the *papakāinga* to flood every winter (Auckland Museum 2016). In 1932 the city built a road, Tamaki Drive, over the sewer pipe, creating linkages for more people to access Ngāti Whātua land and entrenching the remainder of the sewer pipe. Though the pipe was shut down in 1962 (Fitzmaurice 2009), Tamaki Drive and the continuing storm water outflows bring urban runoff, heavy metals, and sediment that still poison Ōkahu Bay.

That said, despite the Crown's best efforts, the sewer pipe was not immediate death for the tribe. People still lived in the villa and grew *kai* (food) in gardens, fished, and gathered *kaimoana* (seafood). People regularly swam in the bay. Overall, the *hapū* was still connected to their lands and waters. Interviewees told me the bay still had abundant fish. One interviewee described how he fished for all 30 families in the *hapū* through the 1940s and 50s (Figure 3). At that time the bay was still a functioning ecosystem:

As a young fellow, fishing in this bay was so plentiful... And my brother and I... every day we had to go fishing. My father used to say, what's good for my table is good for everyone's table. We had to go fishing everyday to feed the *hapū* because there's no work around. When we came in if we were sitting in the boat coming in, we got a clip across the ear. Because where we were sitting in the boat should have been fish" (TW 6). They used to catch, "everything." This included sprats, parore, snapper, black fish, trevally, kahawai, mussels, and pipi. Around Rangitoto Island, a volcanic island about 6 kilometers from Ōkahu, they used to collect kina, paua, and crayfish.

The Crown dispossession continued as Auckland developed. Finally, when Queen Elizabeth was set to visit in 1952, the government decided to take out the *papakāinga* to make it nice for the Queen to see. In December 1951, the Crown torched and razed the remaining homes at the *papakāinga* (Morrison 1999). A newspaper marked the event with the headline, "Orākei Maori Shacks Destroyed: Area to be Cleared by Christmas." The Crown built state homes up the hill from Ōkahu Bay on Kitemoana Street. Some of the interviewees and their families grew up in these houses. The Crown burned the turned the land at Ōkahu Bay into a public park. Ngāti Whātua Ōrākei became state tenants on their own land. The Crown confiscated all the land except for the ¼ acre of the *urupā* (cemetery) at Ōkahu Bay (Auckland Museum 2016). As one *hapū* member pointed out, "We were given a place to die. So a gift of three and half thousand acres created a dispossession of around 77,000 acres" (TW5). Many of the elders died within a year of being evicted (Waitangi Tribunal 2017).

Still, people did live in the houses in Kitemoana Street. Kids used to go down to the bay regularly. Several interviewees born in the mid 1950s said they, "spent all my life at Ōkahu Bay growing up," (TW3). The kids used to hang out and collect pipi together: "We used to collect pipi, oysters off the rocks, and our brothers used to go out to the breakers and get the mussels... We didn't always take it home. We sometimes sat there and ate it. Crack crack," (TW3). On the weekends kids would spend all day at the water (TW1, TW3). In addition to gathering pipi snacks, people still netted to gather food for the family: "We used to put the nets in down there

and Dad would go around with all of us standing in the water down there like that. There was quite a few families that did that... One of the other uncles, he used to walk along the tide there with his spear gun” (TW3). Through the 50s and 60s fishing at Ōkahu Bay was still a family activity.

However, though people were still fishing, they also noticed that fish populations were declining. Even after the sewer pipe was shut off, urban runoff was still killing fish and shellfish: “The University came down and did a lot of tests on the water... and said that the disappearance of all the shellfish was due to what was in the water. Including all these boats here that have large lumps of lead as keels... People were very concerned about it. But we got to the point where nobody was listening. Nobody in the city. In the *hapū* we challenged it right up until today. But it’s like it is. They talked about progress. Progress was great but at our expense,” (TW 6). People stopped collecting kaimoana in the 1980s when the populations got too low and too polluted (TW5). As this interviewee and ecological tests show, heavy metals from the road and boats, pathogens from storm water and boat sewage, and increased rates of sedimentation as land was cleared for development work to fundamentally alter marine ecosystems and deplete populations. Background sedimentation rates in the Waitemata Harbour are 0.01-0.3 mm per year (Grant and Hay 2003). After Māori settlement, the rate increased to 1 mm per year. After European settlement it jumped to 2-3 mm per year. With intense urbanization, the sedimentation rates since the 1950s are now 6-9 mm per year. This sediment chokes fish gills, reduces the amount of light and oxygen in the water, and brings heavy metals with it. This continued colonization was a low point for the *mauri* of the bay and the *hapū*. The environmental degradation took away the decisions people had for their lives, for what food to eat, and connections to their ancestors and home waters.

In 1976, the City pushed for more “progress” by announcing plans to develop high-rise houses on Bastion Point to generate maximum income from “city” lands (Morrison 1999). This was a tipping point for Ngāti Whātua. The Crown’s move occurred at the same time as the Māori cultural revival was gaining strength. The Māori cultural revival was inspired in part by the US Civil Rights Movement and international indigenous movements. Joe and Rene Hawke, Ngāti Whātua Ōrākei members, participated in the historic Māori Land March in 1975, a march from the top of the North Island to Wellington, the capital. The March highlighted Crown abuses of the Treaty of Waitangi. When the Crown put forth plans to develop Bastion Point, a section of Ngāti Whātua Ōrākei, led by Rene and Joe Hawke after their experiences in the March, built tents and occupied Bastion Point. The occupation started January 5, 1977. The occupation made a point

that this was Ngāti Whātua land and they would not be moved or undercut any longer. As Walker described in a description of Māori activism, “Pakeha [European] confusion over the Maori Land March had hardly subsided when Bastion Point was occupied by the Orakei Action Committee in January 1977. For 507 days protesters defied the Government and the Supreme Court, to dramatize the unconscionable dealings of past Governments” (Walker 1984, 277). The occupiers expressed their grievances and pain, but also built stronger community through the occupation. The occupation is a major development in the Māori sovereignty movement. The protestors occupied their land until May 25, 1978 when 800 police and military personnel and one Sioux helicopter evicted the protesters and arrested 222 people for trespassing on their own land (Morrison 1999). With this protest and violent eviction, the nation saw Ngāti Whātua Ōrākei’s struggles, dispossession, and dreams. Ngāti Whātua Ōrākei and the Crown started negotiations and 10 years later in 1987, Ngāti Whātua Ōrākei and the Waitangi Tribunal<sup>1</sup> released their report of the history of grievances and recommendations for reparations and reconciliation. This activism showed the value of a long-term vision and commitment to a cause and a people.

There is little published or interview information on the period between the occupation of Bastion Point and the Waitangi Tribunal report. The tribunal returned with a 315-page report of grievances and recommendations (The Waitangi Tribunal 1987). They recommended that the Crown pardon the *hapū*’s \$200,000 debt and give the *hapū* \$3 million in cash to buy land and housing necessary for re-establishing themselves on their land. They recommended the Ōrākei *marae* be returned to the Ngāti Whātua Trust Board and recommended that the parks on the Ōrākei headlands, including the *papakāinga* and Bastion Point, be returned to the *hapū* and governed through a partnership between Ngāti Whātua Ōrākei and Auckland City Council. The recommendations were negotiated and settled through the Orakei Act 1991. This vested land to the Trust Board; returned Whenua Rangatira, the land at Bastion Point, to the *hapū*; and established the roles and duties of the Trust Board (*Orakei Act 1991* 1991). It also established the Ōrākei Reserves Board to co-govern the returned parks in trust for Ngāti Whātua and the people of Auckland. The Reserves Board consists of three Ngāti Whātua members, one of whom is the chairperson, and three Councillors, one of whom is the deputy chairperson (Blair 2002). The Government paid Ngāti Whātua Ōrākei the recommended \$3 million for housing and other development. The land is now held in trust for the community, not held individually.

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<sup>1</sup> The Waitangi Tribunal is a body that investigates and makes recommendations of Māori claims relating to Crown breaches of the Treaty of Waitangi.

However, while this was a legislative success, the true meaning of the legislation and *hapū* dreams still has to be implemented. While Ngāti Whātua Ōrākei got some of their land back, it was highly degraded:

Ngāti Whātua have received some of their resources back as part of the grievances that we faced. But people see that as the silver bullet to our issues of 170 years. But I challenge that. How long does it take to get over a 170-year hangover? Secondly how come the land we get back isn't in the state we gifted it? We gifted it in a high state of well being. It's being returned to us in a really poor state. So when I think of my guardian prerogative, we aren't even ready to be enlightened because we are trying to protect the *whenua* that we gave in a high state of well being (TW5).

The settlement claim, land, and money are just the first step in a long process to return the land back to its high state of wellbeing and to build Ngāti Whātua Ōrākei's ability to act as guardians. As with other indigenous sovereignty and settlement successes, they still had to figure out the, "what next."

Ngāti Whātua Ōrākei used the money and Trust Board structure mandated by the Orakei Act to invest and build financial and institutional resources that allow them to fulfil their dreams. Ngāti Whātua Ōrākei negotiated with Housing New Zealand, the state housing authority, to buy the 102 state homes in the Ōrākei Block. They bought land in the Central Business District and land owned by the railway. This has been turned into commercial properties that are rented to developers for high rises. This money is invested and used for the *hapū*, funding programs, health care, and scholarships, among other needs (TW1). The community values and dreams drive this economic development, rather than the other way around. As one of the Ngāti Whātua Trust Board members described, "This is not about money, this is about the future and how we're going to make it good for all of us. The money is a tool, but nothing more than that. And it's about a whole lot of other things. Not the least being, the reclaiming of our partner history in Auckland," (Hunia 2010). The Trust Board's goals are not to make profit but to build a future for their people and rebuild their *mana whenua*.

Ngāti Whātua Ōrākei has also written and begun to implement reserve management plans. In 1999 it published the *Whenua Rangatira Reserves Management Plan*. This plan included replanting *Takaparawhau* (Bastion Point) with over 250,000 native plants (Blair 2002). The plantings restore the *mauri* to the *whenua* as well as serve as a launching point for implementing Ngāti Whātua Ōrākei social and environmental values throughout Auckland. Ngāti Whātua Ōrākei aims to be the best and most grounded managers and guardians in Auckland. They aim to

transform Auckland to be more environmentally and culturally friendly: “We’re trying to be an exemplar on our land to say, “Hey, Auckland! This is how you do it,”” (TW5). This serves many purposes including cleaning up the waters and the lands, reconnecting more people to the land, and reaffirming Ngāti Whātua Ōrākei’s authority in Auckland.

In 2012, Ngāti Whātua renegotiated with the Crown, resulting in the Ngāti Whātua Ōrākei Claims Settlement Act 2012. In this act the Crown officially recognizes Ngāti Whātua Ōrākei as *tangata whenua*, recognizes the land taken from Ngāti Whātua Ōrākei, and apologizes for making Ngāti Whātua landless and for failing to uphold the Treaty of Waitangi. Also in 2012, Richelle Kahui-McConnell, an environmental manager for the *hapū*, built on her earlier ecological surveys of Ōkahu Bay and interviews with *hapū* members to make the Ōkahu Catchment Ecological Restoration Plan (Kahui-McConnell 2012) (Appendix B). This plan identifies the *hapū*’s values and objectives for restoration. As I said in the introduction, the overall vision is to have, “Waters fit to swim in at all times, with thriving marine ecosystems that provide sustainable kaimoana resource to a Ngāti Whātua Ōrākei community who have a strong daily presence in and on the bay as users and kaitiaki.” This encompassing vision is broken into smaller goals. These sub-goals are given performance indicators. There is a scientific, cultural, and community indicator for each goal. With this plan, Ngāti Whātua Ōrākei is documenting, communicating, and implementing their dreams.

This history of activism is inspiring and critical to understand. However, asking colonizers for recognition and restitution does not encompass the history and the dreams of people. It is about what comes after the activism. The interesting and constructive story, the one that Ngāti Whātua is proud of and needs to be told louder, is the building and realizing of real dreams. It is the long-term vision to build the *hapū*’s resources towards truly supporting their people and allowing them and their *whānau* to thrive. Activism turns into advocacy and partnerships. Ngāti Whātua Ōrākei is actively implementing restoration projects to advance the restoration plan and *hapū* dreams.

### **Current Restoration Work at Ōkahu Bay**

Ngāti Whātua Ōrākei currently makes decisions about Ōkahu Bay that support their worldview and restoration process. As will be discussed in Chapter 3, Ngāti Whātua Ōrākei is improving relations with Auckland Council as a trusted partner. Having a presence at local government meetings allows the *hapū* to have an influence in citywide decisions and decisions specific to Ōkahu Bay. They also build trust to better implement their goals and ask for help when needed. Building personal relations between points of power in the city is critical to building a public face



and respect. Through contracted reports and well-written restoration plans (e.g. Kahui-McConnell 2012; Afoa 2014), the *hapū* clearly communicates their worldview and goals. Laying out the worldview and their goals explicitly makes working with them and supporting them more accessible to people outside the *hapū*. After writing restoration plans, it is not the *hapū*'s responsibility to educate people on their worldview but for the people with which they are meeting to educate themselves accordingly. In this way, Ngāti Whātua Ōrākei can use their time working with people rather than educating people on the same topics every time.

Ngāti Whātua Ōrākei has also built strong relationships with Auckland Council and local universities to help the *hapū* research questions they want answered and continue monitoring the physical and ecological changes. As one interviewee said, they have, “students at our beck and call” (M7). If they have a question, they have many students that can help them answer it with the skills and the extensive resources at the local universities. Almost every semester and summer in the past 5 years students have researched benthic communities (organisms that live in the bottom of the bay), heavy metals from storm water runoff, sediment characteristics, and/or bathymetry (submarine topography) in Ōkahu Bay (Kainamu 2012; Beckwith 2013; Mikol 2012; Kahui-McConnell 2012; Stimson 2017). These projects have built on Ngāti Whātua Ōrākei's knowledge of the bay and helped them advocate for themselves in front of Council. They have also been one of the most committed groups in Auckland Council's Community Shellfish Monitoring Program. This helps the *hapū* assess *tuangi* and pipi population trends, but also keeps Ōkahu Bay in Council's mind and in Council's public reports.

More than making relationships, Ngāti Whātua Ōrākei has implemented several restoration projects aimed at improving water quality in Ōkahu. In August 2014, with help from Revive Our Gulf, Orakei Water Sports, Okahu Landing, and Auckland University, Ngāti Whātua Ōrākei started a mussel reef restoration project to help clean the water through filter feeders (Figure 4). The project laid down 6 tons of mussels (M7). A PhD student and a Masters student at Auckland University are studying the trial plots in Ōkahu and other areas around the Hauraki Gulf to assess the success and help people learn from and improve the process. Unfortunately, many of the mussels did not survive (M4). While this was disappointing, “the thing about marine restoration is that it is such a new field that you just have to keep trialing new methods” (M7). Ngāti Whātua Ōrākei is committed to using the research from community groups and university students to learn about the restoration process and improve restoration practices in the future.

In 2017, Ngāti Whātua Ōrākei tried mussel reef restoration again through a different approach. In August 2017 they put a *taura* (rope) with mussels on it on the vertical pylons in the bay (Figure 5). Ngāti Whātua Ōrākei weavers made the *taura* out of flax from their land. Māori traditionally use flax for weaving. This project is an example of using *mātauranga* (Māori knowledge) and western science to implement creative solutions that bring the community together in the restoration process (M7). In addition to continuing the flax harvesting and weaving practices, the *taura* builds on stories from the original journeys to Aotearoa. *Waka* used to have mussel-woven *taura* dragging behind the *waka* as they voyaged from Hawaiki<sup>2</sup> to Aotearoa (Newsroom 2017). These mussel *taura* will be monitored monthly and the mussels will hopefully reproduce next year. A recent monitoring survey showed the mussels are thriving (D. Hikuroa pers. comm. 2017).

Ngāti Whātua Ōrākei also makes decisions on how the bay is managed. The environmental manager realized that Auckland Council was cleaning the beach of all the driftwood and seagrass, taking about habitat for insects. Council agreed to stop beach cleaning. Since then, birds have returned to the bay and it is now likely the most diverse bay in Auckland in terms of bird life.

### **Current Perceptions**

People in Auckland and *hapū* members have diverse perceptions of Ōkahu Bay's current state. Survey participants were more likely than *hapū* members to praise Ōkahu Bay for being a nice natural area in the city and a safe place to go with their families. When asked if there was anything they would like to see in the future for the bay, most survey participants said they liked it as it was. One participant praised how nice it is to have a natural area and the luxury of living in city where you can access nature. Others said they want it be, "preserved and carry on being a bay" or kept pristine like it is. Some participants said they wanted to come more often. However, some survey participants thought it was dirty and wanted the bay to be cleaner.

*Hapū* members, on the other hand, were more pessimistic about the state of the bay. Some people I interviewed swim in the bay at high tide, but recognize that not everyone does. Some families tell their kids to not swim in the bay while others think it is okay (TW8). Some *hapū* members rarely go to the beach. Some people go across the road to the *urupā* and church but do not cross to the beach (TW1). One *hapū* member said she had not swum in the bay for a long time: "It doesn't look too nice. When the tide's out it's not a very nice sight. It's sad because it was never

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<sup>2</sup> In Māori tradition, Polynesian people originally lived on Hawaiki. Hawaiki is also where humans are born and where they return to after death.

like that when we were kids” (TW3). People generally agree that the bay has a long way to go before the *mauri* is restored: “It still needs lots and lots of work. It still needs lots of tender loving care. Just to get that feeling back” (TW9). However, *hapū* members also recognize and appreciate the work that has been done: “But when it’s a full tide it looks cleaner, so hopefully that is an indication of its health” (TW9).

Ōkahu Bay and Ngāti Whātua Ōrākei show great resilience to colonization and pollution as they moved from activism to implementing their settlement and restoration plans. The next sections will analyze how Ngāti Whātua has rebuilt authority and care in Ōkahu Bay and what impacts that work is having so far in the ecology in the bay.



Figure 1: Ngāti Whātua Ōrākei papakāinga (village) at Ōkahu Bay, 1907  
Source: 7-A1691, Sir George Grey Special Collections Auckland Libraries

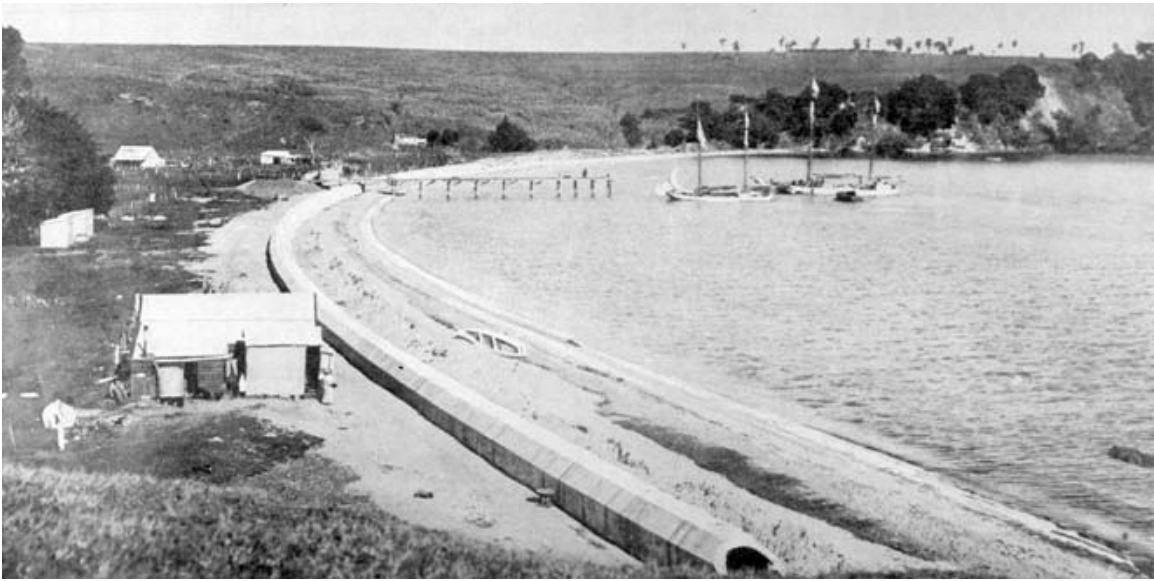


Figure 1: Sewer pipe construction at Ōkahu Bay in 1910, houses to the left are the papakainga  
Source: 7-A2929, Sir George Grey Special Collections Auckland Libraries

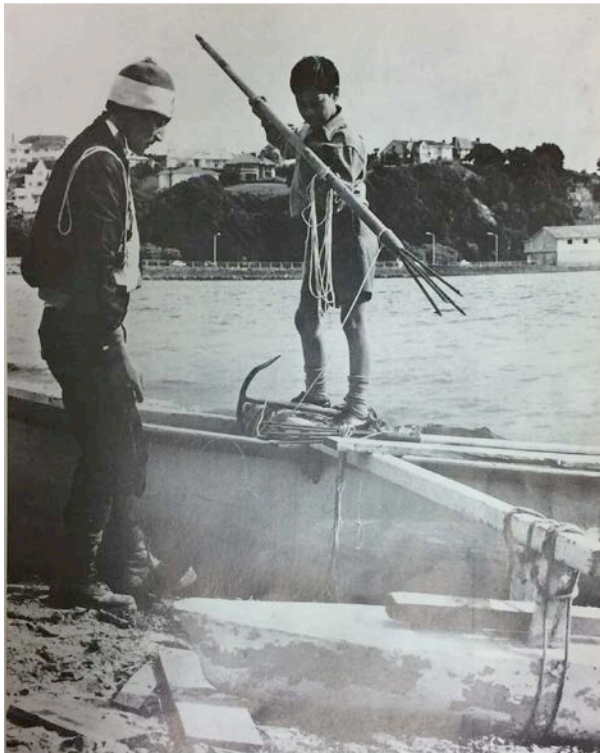


Figure 2: Preparing to fish.  
Source: Hey Boy! By Jane and Bernie Hill (1963)



Figure 4: Ngāti Whātua Ōrākei members helping to install mussel reefs, 2014  
Source: “Waterways cleaned with mussel power.” Stuff.co.nz. 29 August 2014.  
<http://www.stuff.co.nz/auckland/local-news/east-bays-courier/10434404/Waterways-cleaned-with-mussel-power>



Figure 5: Mussel *taura*. Woven flax with live mussels. Source: <https://www.stuff.co.nz/auckland/local-news/central-/95558972/mussel-laden-ropes-aim-to-restore-okahu-bay-shellfish-bed>

## Chapter 2: *Mana Whenua* and Building Daily Users

The previous chapter discussed the history of Ōkahu Bay and the legal and legislative negotiations Ngāti Whātua Ōrākei went through to regain some of their land and accelerate their journey in cultural revitalization. This chapter assesses the civic engagement that the *hapū* (sub-tribe) and others engage in as well as the strengths and possibilities with partnerships between the *hapū* and non-profits, Auckland Council (Council), and businesses. Restoration could not happen effectively without respect for Ngāti Whātua's *mana whenua* (authority)<sup>3</sup> or without partners that listen to and understand the *hapū*'s worldview and concerns. Some of the greatest progress towards restoring the *mauri* to Ōkahu Bay has been in rebuilding Ngāti Whātua Ōrākei's social capital and daily engagement. Moreover, while people often talk about Ōkahu Bay as a dirty bay that needs help, that characterization does not do justice to the thousands of people and many organizations that are already doing restoration and rehabilitation work in Ōkahu Bay and the Hauraki Gulf.

This chapter builds on the field of indigenous governance and the theories around the importance of trust and capacity building to allow indigenous nations and colonial governments to work together. Von der Porten and de Loë (2013) describe indigenous governance as, “a field of scholarship which, generally speaking, examines subjects of indigeneity, self-determination, Indigenous knowledge, Indigenous values, colonialism, marginalization and race as they relate to Indigenous peoples and decision-making” (150). Self-determination is an important concept in Indigenous governance. Indigenous peoples demand recognition as the nations that they are when governments and organizations are working with them, rather than stakeholders that can simply be consulted at the same level as other groups. Mason Durie's (1998) analysis of Māori self-determination adds to this conversation. He shows the cosmological, historical, and political dynamics of self-determination. Māori self-determination is about the advancement of Māori people and protection of the environment for future generations. In the current context, Māori often express self-determination in terms of decision-making power. Further, Durie highlights the importance of land for building community capacity and culture: “Land is necessary for spiritual growth and economic survival. It contributes to sustenance, wealth, resource development, tradition; land strengthens whānau and hapū solidarity, and adds value to personal and tribal identity as well as the well-being of future generations” (115). Land, political rights, and spiritual and physical connections that come from it are critical to building a strong culture and

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<sup>3</sup> For an in-depth discussion on the *mana whenua* of Ngāti Whātua Ōrākei, see Clark, 2003

community. This analysis shows a grounded perspective on how Māori are practically working to achieve self-determination and what this means in daily life.

However, where indigenous peoples are included in planning, they are still often consulted as stakeholders rather than as nations (Wehi and Lord 2017; Simms et al. 2016; von der Porten and de Loë 2013). Schlosberg and Carruthers (2010) use a community capabilities framework to show that indigenous demands for political rights and land rights (their legal capacities) are directly linked to struggles for cultural protection, respect for sacred sites and practices, and the health of the environment. They define capabilities as building community skills and creating external power systems that enable communities to thrive: “By fighting for autonomy, land, respect, or political voice, indigenous activists are fighting for the capabilities necessary for their communities to function fully” (18). Securing rights is essential for communities to function as they wish, but also a means to retain and restore lands as a fundamental component of restoring themselves. However, Simms et al. (2016) argue that the discussion should be reversed from focusing on indigenous communities building capacity and fighting for themselves to governments building their capacities to understand and work with indigenous communities as sovereign nations with land and authority.

These scholars identifying problems call for processes where indigenous peoples take the lead, where their self-determination is recognized. Ngāti Whātua Ōrākei shows what those processes can look like in practice and how their specific relationships have changed over time. Further, they show how they can go beyond technical and scientific approaches to environmental management to actually work for their goals of restoring *mauri* and of building *kaitiaki* within them that have the *mana whenua* to collaboratively govern their lands and waters. These processes have real challenges that the *hapū* is capable of working through. *Hapū* interests and institutions, making them a partner in restoration rather than simply a stakeholder, largely drive the restoration of *mauri* in Ōkahu Bay. Acting as a partner gives the *hapū* actual decision-making power and recognizes their authority and valued position. This power builds from how some in the *hapū* define self-determination. One person said that self-determination is, “playing a leading role, in the *kaitiakitanga* of the bay, looking after it, at all levels, actually doing the *mahi* (work) and having a distinct role in the direction of the place” (TW2). In regards to whether they are playing a leading role, this person responded that, “it ebbs and flows between us and the council, depending on the membership of certain committees. But in terms of knowing, wanting what’s best for the place, yeah certainly.” Ngāti Whātua Ōrākei knows what is best for the bay because

they have a presence and have a worldview that connects to Ōkahu Bay through *whakapapa* (genealogy).

### ***Mana Whenua and Co-governance***

Ngāti Whātua is an urban hapū, holding *mana whenua* over areas inhabited by the largest city in New Zealand (Clark 2001). Though rural *hapū* may be able to show their *mana whenua* through direct occupation, Ngāti Whātua Ōrākei needs to show their *mana whenua* in several different ways. One of the methods is through valuing *manaakitanga* (hospitality). One interviewee argued that being able to host is one of the, “things that in essence make you Māori,” (TW2). They take pride in being good hosts to the people of and visitors to Auckland and in showing that they have the best land management practices: “We’re trying to show that we have always wanted to give, we have always wanted to share the spirit, we’ve always wanted to share *mana*,” (TW5). They have a long history of wanting to be partners in authority with the Crown, as mentioned in the last chapter. In this context, much of the land Ngāti Whātua Ōrākei currently controls is managed for the *hapū* and for the people of Auckland as a whole. The principles of *manaakitanga* and *kaitiakitanga* (guardianship) are behind the *hapū* governance efforts. The restoration is not only about cleaning water and getting more *kaimoana* but also about having the authority to make decisions over the land, authority that comes from internal work and external recognition from the general public. One *hapū* member showed that some Auckland members do not fully understand the *manaakitanga* aspect:

But when I say it’s ours, we don’t own it. We belong to it. And so there’s been a lot of people in my last couple of years in my journey with the iwi who say, “well you got all your land back and I paid for that as a rate payer.” And I say to them, “I don’t get what you paid for. It was public land and it is still public land. All we cared about was the *mana* to care after the land. (TW5)

Though the *hapū* has land back, it needs to also restore the power to make decisions, to self-determine, and to care for the land in ways they see fit.

As outlined in the Orakei Act, Ōkahu Bay is managed through a co-management structure with Auckland Council. This is an expression of the values of *manaakitanga* and valuing the land and sea for the people of Auckland and the *hapū*. This system of co-management has changed through time. *Hapū* members recognize that the relationship between Ngāti Whātua Ōrākei, Auckland Council, other stakeholders has improved in the past decades. Ngāti Whātua is now more in control and makes more decisions about the bay and how the park function. In the past, Council



did not trust them with the same capacity: “In my time at the trust we had to liaise a lot with Auckland City about everything there... They used to do a whole lot of work there too but they established a secretariat for that and appointed people to look after that, we just used to get reports back as to what was going on there and what was good and what was not so good. Council was being a bit anal about use and flows on the bay” (TW1). Ngāti Whātua Ōrākei improved the relationship by building their formal institutional capacity: “The original Whai Maia<sup>4</sup> office consisted of 4 or 5 people total... Now the organization is a lot bigger... We’ve got people that have been involved for a long time and Council has seen this progress over time. We talk directly to mayors as they come in, we talk to prime ministers, leaders of opposition, we host dignitaries from other countries as they come in” (TW2). As a strong and visible institution, Ngāti Whātua Ōrākei can now host dignitaries, have a presence at hearings and meetings, and overall function more effectively and on a broader citywide scale. Through the institution, they are able to build a bigger presence in the city and in public as hosts and as *tangata whenua*. This presence is crucial to having authority, decision-making power, and self-determination over their land and for their ancestors.

One exciting example of Ngāti Whātua Ōrākei’s improved advocacy and trust in the city was Council’s decision in 2015 to remove the moorings at Ōkahu Bay. The moorings were built in the 1930s to anchor boats and seaplanes. Over time, boat owners parked their boats and have not moved or cleaned them. The boats pollute the bay with heavy metal contamination, make the bay less accessible and less safe for paddlers and boats, and represent an imposition on Ngāti Whātua’s *mana whenua*. In 2015 before hearings for the Auckland Unitary Plan, *hapū* member Donna Tamaariki represented the recreational users at Ōkahu Bay. As she said, “I have worked with the user groups at the Okahu Landing for many years. There is mutual respect understanding with all the groups. I have been given the mandate to represent; Ferg’s Kayaks, Auckland Sailing Club, Waterwise, Auckland Canoe Club, Hauraki Sports, and Orakei Water Sports regarding the development of the Eastern (ugly) end of the Okahu Landing” (Tamaariki 2015). *Hapū* member Moana Tamaariki represented the cultural interests and Richelle Kahui-McConnell represented the environmental aspects. The decision went through without much questioning because of the strong knowledge they had about the impacts of the moorings and each individual boat on the moorings (TW 9). They showed Ngāti Whātua Ōrākei continued use and presence at the bay through their testimony and the relationships they have in the city. This is one legislative success that now needs to be implemented.

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<sup>4</sup> The Tribal Development branch of the Ngāti Whātua Ōrākei Trust

Similarly, interviewees outside the *hapū* expressed deep respect for Ngāti Whātua Ōrākei and the restoration work they are doing, showing how their *mana whenua* and *mauri* have improved on the ground. For instance, one business owner said that Ngāti Whātua is very good at managing the bay and maintaining the naturalness (M1). He said Ōkahu Bay was much nicer than the more commercialized adjacent bays. Business managers and community groups also recognize Ngāti Whātua Ōrākei's increased institutional capacity and respect the authority they have with the bay. One representative from the Auckland Outboard Boating Club said the club would want to work through Ngāti Whātua Ōrākei for any restoration work: "We have found them they are a very professional organization. We would like to institute ideas but we don't want to do it without them. They are currently looking at their overall strategy for ecological and cultural restoration and rejuvenation so we'll just work in their timeline," (M4). Calling them a "professional organization" reflects that the Trust Board has established relationships through normalized governmental and business channels and operates in a similar manner to other organizations, but is fundamentally guided by their worldview and values. The marina and Restore Our Gulf, a mussel reef restoration organization, similarly show they trust and support Ngāti Whātua Ōrākei's approach by donating money and supplies. The marina donates \$25,000 a year for an educational grant and Restore Our Gulf donated \$20,000 for Ngāti Whātua Ōrākei to buy mussels for the mussel reef restoration project.

As the above examples show, Ngāti Whātua Ōrākei is not the only group that values the health of the bay. Other users often express more environmentalist values, rather than *hapū* values, yet still show a complementary commitment to a healthy environment and engaging people at the bay. These relationships extend to most of the businesses at the bay. Ngāti Whātua Ōrākei has good working relationships with the business and the businesses work well together in their commitment to a clean environment and helping normal people have access to boating at Ōkahu. The Landing, a boat takeout and storage area, values helping make boating accessible and keeping their costs low to encourage people to clean their boats regularly (M2). They have a strong ethic about environmental health. They are Blue Flag certified, meeting a strict set of environmental criteria. The Landing used to contribute a lot of pollution to the bay, but recently they started putting all their waste to sewage and filtering any runoff to be cleaner than tap water (M2, M7). While the Landing manager did not express the values Ngāti Whātua expresses in a Māori worldview, he wants to support Ngāti Whātua, engage people with the water, and teach them environmentally sustainable practices. The community aspects of The Landing add to bringing *whānau* and the Auckland community into the bay as caring users. The Marina similarly argues that boaters have a strong environmental ethic because they are always in the water. They

are working to get more kids on the water by donating boat rides and helping people connect with the ocean and why it is important.

That said, though Ngāti Whātua and Auckland Council have improved their relationship, *hapū* members are still frustrated that Council does not listen or act on their concerns in a timely manner. Many interviewees said that Council does a lot of talk and little action. For instance, various groups and Council have been discussing plans to stop the runoff from Tamaki Drive for over 15 years with little hope a plan will be implemented soon (TW9, M2). Council has also undergone several restructuring processes in the last couple of years, which makes relationship building difficult as committee composition changes (M2). While people recognize the challenges and competing interests local government faces, they want Council to be proactive in planning rather than solely reacting to crises (TW2). Council could make many decisions in its stormwater management and sewer systems that would actively improve the *mauri* of the bay and reduce the risk of flooding across the street.

Further, while the business, non-profit, city, and *hapū* allies have strong working relationships and respect for each other, everyone I talked to wanted more communication. Interviewees talked about the need for communication between user groups to know what work they are doing to improve their environmental practices (TW2). *Hapū* members for instance did not know if the businesses are improving their practices and did not know about the Landing's Blue Flag certification: "I just don't know what they [the marina and Landing] are thinking. We can go, oh that marina there, they are making the water dirty, but I don't know. They might be doing some great stuff on the inside... got no idea" (TW2). The user groups have a responsibility to tell the community about their improvements and setbacks. This communication can take place as meetings between groups, increasing public signage, passing out information flyers to the *hapū*, and/or public reports and media coverage. Ngāti Whātua also needs to better show what progress it has made and what still needs to be done. There is little information on the Ngāti Whātua Ōrākei website about the Ōkahu Bay restoration and how people can get involved. Many people want to be part of the restoration but do not know how because of the limited communication. Communication between parties about what work they have done and what work they can do would help strengthen the community involvement and amplify the impact of the work they are already doing (M4).

Similarly, Ngāti Whātua Ōrākei and the restoration work still need more recognition throughout the city. People want to see more communication about the significance of Ōkahu Bay in history

and for the *hapū* (M1, M5, TW6). They argue that by knowing the history of the bay, people will shift their thinking from, ““Oh it’s such an ugly bay,” [to] “why is it an ugly bay and can we do anything about it,”” (TW9). Ngāti Whātua faces the challenge of being *kaitiaki* in an urban environment where they do not have legal title to most of their lands (Blair 2002). Some street signs have Ngāti Whātua place names to signify their position, but most are other Māori words or British names (Clark 2001). Some *hapū* members are frustrated that Ngāti Whātua Ōrākei is not better recognized, that, “the only thing that we have that indicates our rights, our rights as Ngāti Whātua is a rock down at town... A rock with a brass placard on it” (TW 6). The public “branding” (TW2) and image of Ngāti Whātua is just as or more important than the legislative recognition. Ordinary people are not reading legislation and with new immigrants and visitors coming in every day, having more public recognition as *tangata whenua* is important to the *mana whenua* of the tribe and *mauri* of the bay.

Further, while it is often appropriate to discuss institutions as a whole, in reality, individuals in the organizations drive relationships and the effectiveness of the implementation (Ramstad et al. 2009). This is an obvious point but one that is often overlooked in academic analyses. Changes in membership of committees, Council departments, and leadership in businesses impact how these groups and people work together and how restoration is implemented. Getting everyone to understand each other’s values and actions takes time and requires people to actively build relationships (M2). I saw in the interviews that when non-*hapū* people talked about working with Ngāti Whātua Ōrākei, they were often largely talking about working with the former Ōkahu Bay project manager. This person built many of the relationships between Ngāti Whātua Ōrākei, businesses, and the city. By doing great work as the person focused solely on Ōkahu Bay, she built trust throughout the city and hence her decisions and ideas were heard with little pushback. Having one person to lead the relationship building, coordinate research, and organize outreach programs kept a focus on restoration. As the manager said, “it is all about relationships, really. Over time if people trust you and you build up that relationship lots of people will basically say that’s cool, whatever you want. With the mussel stuff: the divers are for free, the mussels are free, paying for the *taura* (rope) was funding by somebody, pretty much everything was in kind or externally funded. So it’s not a challenge, just being inventive with how you bring people in” (M7). When some business managers on the bay described their relationship with Ngāti Whātua Ōrākei, they discussed their respect for the environmental manager as the person they work with and push for programs and projects to be implemented (M2).

However, these relationships and projects the manager established are in flux right now. The funding for the project manager position was recently dispersed into other areas of Ngāti Whātua Ōrākei and the manager was let go without training someone and handing off those relationships first (M7). No one was hired to have a specific focus on Ōkahu Bay, to keep organizing programs, envision and implement restoration projects, and work with Council. While ideally there would be a team of people with a specific focus on the *mauri* restoration behind the *hapū* where all members are *kaitiaki* and users, the bay is not yet at that point. Right now it is unclear if some programs, such as the student programs, monitoring similar to the Community Shellfish Monitoring Program, or future restoration projects will continue in the near future. Though Ngāti Whātua Ōrākei has a long-term, 100-year vision, interviewees expressed some uncertainty on what is happening in the next couple years. From what I know, the Trust Board is not looking to hire someone specifically focused on having a *hapū* member working on decision making and directing Ōkahu Bay relationships.

### ***Education and Daily Engagement***

While the co-governance structure and organizational allies Ngāti Whātua Ōrākei has are important in decision making and having a public face at the bay, Ngāti Whātua Ōrākei's restoration values are different than most environmental restoration because bringing people in and having a culture where *hapū* members use and care for the bay is an integral part of the restoration. Focusing on institutions and the Ngāti Whātua Ōrākei's role in formal decision-making misses the connected ways in which Ngāti Whātua Ōrākei builds *mana whenua* and *mauri* at Ōkahu Bay and around Auckland. They build *kaitiaki* and practice *kaitiakitanga* from institutional perspectives and through community perspectives. This next section will discuss how individuals are brought into the bay as engaged users and *kaitiaki* in practice.

Older interviewees lamented that their kids and grandkids are not in the bay as much as they were when they were younger: “They chill out at the Parnell Baths<sup>5</sup> and all those things you can jump off. There's nothing at the beach anymore” (TW3). The *hapū* therefore wants to bring in more people to build community at Ōkahu Bay. Ngāti Whātua Ōrākei and the former project manager run *rangatahi* (youth) programs, educational programs, and school holiday programs at Ōkahu Bay to help bring young people into the bay as *kaitiaki*. These programs are aimed at getting people to the bay and connecting personally. This personal connection is one of the most important aspects of restoration. It gets people to shift their thinking about the bay and have a reason and the knowledge to care for Ōkahu: “So that has nothing to do with whether or not you

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<sup>5</sup> Swimming pool complex that is a 12 minute drive from Ōkahu Bay

can harvest *kaimoana* but they are still starting to swim in their bay. Just getting in there is the biggest thing” (M7). Starting by swimming in the bay and feeling a connection to Ōkahu Bay as people used to in the past is one of the most critical parts of restoring *mauri*. Through connecting by swimming and using the bay, people then understand the responsibility and have the knowledge to lead in decision-making. Through building personal relationships, Ngāti Whātua Ōrākei is revitalizing their cultural connections, improving the health of the community, and having people have fun at Ōkahu again.

Another program that was incredibly successful in the past was the Community Shellfish Monitoring Program (Figure 1). This was a program run by Auckland Council but coordinated by interested community groups. Community groups get sampling information, methods, and access to the Council ecologists. The program mostly focuses on monitoring tuangi (*Austrovenus stutchburyi*, New Zealand cockles) because they are a popular food species and good indicator of pollution (M5) (Figure 2). Participants also monitor pipi (*Paphies australis*) at Ōkahu (Figure 3). The environmental project manager coordinated the Ōrākei School to be involved with the program at Ōkahu. Three grades of elementary school students were involved, allowing the older and experienced kids to mentor the younger kids as they had done the survey for multiple years (TW8). The manager would go to the school and teach a lesson about the history of the bay, the importance of ecological monitoring, and the methods they used (M5). They would then go to Ōkahu Bay and do a survey under the manager’s advisement.

The program had multiple levels of successes. First, data from about 10 years of surveys at Ōkahu Bay is recorded in Council’s archives. This allows researchers, the Ministry of Primary Industries, and the community to see potential changes in the tuangi populations. This allows the community to advocate for themselves for structural changes to Ōkahu or to support the need for increased restoration. Second, the students are engaged at the bay for three years, playing in the mud, and building knowledge about Ōkahu Bay. It challenges the misperceptions kids and their *whānau* have that the bay is dirty and lifeless. The students learn about how the bay used to be and together work through why it is not that way anymore (Maihi 2013). The students are incredibly excited to be digging in the mud, to find tuangi and pipi, and collect data. They learn environmental science in their own marine environment through a *kaitiakitanga* lens. Some have even gone on to study marine biology in university because of their experiences in the program (M7). Teaching students in the *hapū* to be *kaitiaki* and use ecology methods to benefit the *mauri* of the bay and their *whānau* is critical to building capacities and engaging people. The students that are marine biologists can bring a Māori worldview into traditionally European biology

studies. Students can tell their parents and other kids about what they saw, telling people that did not know there were still living organisms in the bay about it. After learning the history, seeing what is there now, the problems the bay is facing, students have very strong ideas about what they want to see in the bay. The students want, “More pipi! Less mud, clean sand, more seafood, a waterslide, more whānau in our bay,” (Maihi 2013). Supporting the vision of students and children is essential to listening to the youngest generation of *kaitiaki* and teaching them how to hold on to and implement those dreams. The Community Shellfish Monitoring Program was one significant way that children and their families gained a deep understanding and connection to Ōkahu Bay and built community around sharing knowledge of the bay and learning solutions.

Unfortunately, Auckland Council cut funding to the Community Shellfish Monitoring Program in 2015 (M5). Council cut the budget of several of its smaller programs as a cost saving measure. There is now no institutional support for the monitoring but some interested groups are still monitoring. Students did not survey Ōkahu in 2015 and 2016. No program has come in to replace the monitoring though people are interested (TW8). Hopefully schools will continue with the monitoring, both to keep consistent information on the ecological state of the bay and to still encourage students to have fun in the mud.

Ngāti Whātua Ōrākei members also work in other ways to get people on the water and connected personally. The revitalization of *waka* has been one of the projects of the revitalization of Māori culture that started largely in 1960s and 1970s. Ōrākei Water Sports, co-founded by two *hapū* members, is one of the major *waka* clubs getting people on the water. Ōrākei Water Sports is built from cultural values around *waka* but also competes in *waka* races around the country. The club was formed as, “an expression of who we are, our commitment to the bay, our connection to the bay,” (TW9). The club adheres to cultural practices such as treating *waka* as living entities, saying a *karakia* (prayer) before going into the water to recognize that they are the guests of Tangaroa (god of the sea), and practicing *rāhui* (ban) if there is a body found in the water or something else affecting the *tapu* (sacredness) of the water. Being in a *waka* helps connect people to nature and teaches people that nature is always in control (M6). Multiple people paddle *waka*; *waka* is therefore can also be a physical and symbolic tool to bring people together (TW2).

Though the form of the *waka* has changed over time, the values and community associated with it have not. One person that used to only support traditional carved *waka* now supports the accessibility of the commercially made *waka*: “The progress in fiberglass has done a lot for our people. Because the fiberglass is readily available, we have more of our people on the water and I

think that's one of the greatest things, one of the many great things that have happened to our people" (TW6). This is important because indigenous groups often have to fight perceptions that their culture is static and needs to look exactly as it did at an arbitrary past time (Steinman 2016). The new technologies and clubs are not a degradation of Ngāti Whātua's culture but amplification and incredible tools for reconnecting with the water, with *atua* (gods), and with *whānau*.

These practices build respect for the water and allow people to be connected with the water, the *waka*, and each other. The club involves people of all ages and from any background. Being involved regularly allows people to see the bay and understand its movements through weeks, seasons, and years:

We can say what the bay feels like, what it looks like, what it smells like, what it tastes like. Because we're there all the time... We described a spot once at the rock wall as feeling dead. And when they did the tests there, there was a lot of sedimentation there.

There was a lot of heavy metals there. (TW9)

People hold knowledge in the restoration and the *mauri* of the bay even if they are not sanctioned managers or government officials. Ōrākei Watersports not only connects people through *waka*, they also help out with restoration activities such as bringing out the mussels for the mussel reef. They initiate collaborations for restoration that comes from any different reasons for caring for the bay.

Ngāti Whātua Ōrākei's governance and engagement efforts show that relationship building between institutions, between organizations, between individuals, and between individuals and their environment is critical to driving restoration. In accordance with their worldview Ngāti Whātua Ōrākei focuses not only on engaging formal decision makers but also the community users and decision makers, the people that build the real power. They show what valuing local and indigenous knowledges looks like in practice. These relationship-building processes are challenging, as they require many organizations and people to communicate effectively and understand all the worldviews and values at play. However, Ngāti Whātua Ōrākei is now fully capable to push their restoration when they maintain their focus on Ōkahu Bay.



## Photos



Figure 1: Students working on Community Shellfish Monitoring at Ōkahu Bay

Source: Moana My Ocean- Ōkahu Kaitiaki, [https://www.youtube.com/watch?time\\_continue=85&v=DJv2NH-](https://www.youtube.com/watch?time_continue=85&v=DJv2NH-)

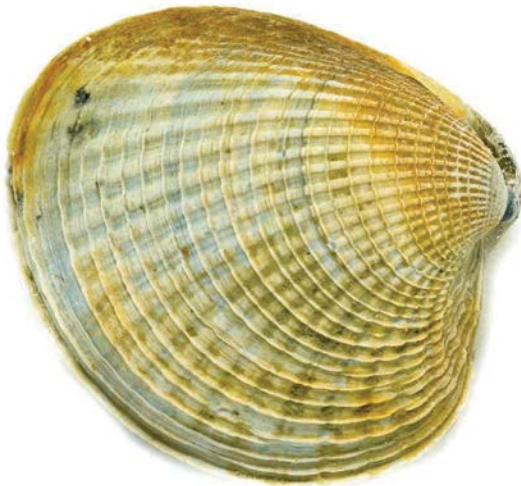


Figure 2: Tuangi. Size is about 30 mm

Source: <http://www.marinelife.ac.nz/species/727>



Figure 3: Pipi. Size about 30 mm

Source: <http://www.marinelife.ac.nz/species/956>

### Chapter 3: Is the “kai” in kaimoana? Food Sovereignty and Food Safety Assessment

Restoring the *mauri* to Ōkahu Bay includes not only getting people to play in the bay, but also restoring the *kaimoana* populations in the bay. I wanted to learn how Ngāti Whātua Ōrākei members and the wider Auckland community conceive of *kai* in Ōkahu Bay and this can inform the restoration and the future vision. The Ōkahu Catchment Ecological Restoration Plan includes provisions for increasing customary take, but I wanted to understand how people view *kai* now and their motivations for collecting *kaimoana* from Ōkahu Bay in the future. This chapter will discuss food sovereignty to connect the struggles in Ōkahu Bay to wider indigenous movement frameworks and assess if this is an appropriate concept for Ōkahu Bay. I argue that the food aspect of the restoration has potential to bring people together and care the earth, their cultures, and their communities. However, the water needs to be clean for those relationships to be built. *Hapū* members want to collect *kaimoana* from Ōkahu Bay again but only think of the fish species as *kai* when the populations are at sustainable levels.

Indigenous peoples around the world use food sovereignty as a framework to describe eating and growing food as an everyday act of resistance to colonization and to rebuild culture. La Via Campesina, an international peasant solidarity network, first used the term “food sovereignty” at the 1996 World Food Summit to argue against neoliberal reforms and corporate control of food sources (Via Campesina 2003) At the Nyéléni Forum for Food Sovereignty, the over 500 representatives of food producers and peasants defined food sovereignty as:

The right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts the aspirations and needs of those who produce, distribute, and consume food at the heart of the food systems and policies rather than the demands of markets and corporations. (Nyéléni, 2007: 1).

This definition of food sovereignty highlights the power structures in global food systems and the lack of choice and decision-making power individuals and marginalized groups have.

Settlers control food to kill cultures and practices associated with food production, change people’s relationships with their land, and make them adjust to, “the white man’s way” (Whyte 2018). Practices to control food include degrading the environment through industrialized agriculture, outlawing foraging and hunting in parks (Wehi and Lord 2017; Whyte 2018), and killing food sources by putting a sewer pipe in Ōkahu Bay. This colonization reduces indigenous food species and causes people to lose knowledge on harvesting and sustainable management and breaks relationships between people and their lands. Cutting people off from their food sources

and cultural practices degrades people's health and cultural identities. Māori see their waterways as ancestors and they also form, "a source of collective identity," (McCarthy et al. 2014). Degrading land, waters, and food sustainability takes away many of the motivations people have to connect with their ancestors and to their communities (Niezen 2003).

Food sovereignty resists this colonization and rebuilds contacts between people, groups, and their natural ancestors. Food sovereignty is therefore an ideology and a set of practices that aim to rebuild culturally sound and environmentally sustainable food sources and food cultures. Winona LaDuke, an Anishanaabe activist and author in Minnesota, argues that, "Food sovereignty is an affirmation of who we are as indigenous peoples, and a way, one of the most surefooted ways, to restore our relationship with the world around us" (Platt 2013). Many cultures have forms of rituals around eating that reinforce hierarchies and communal bonds. In Canada, for instance, the potlatch ceremony, a ceremonial distribution of gifts and food, reinforces the community's relationships, trust, and bring people together through food (Whyte 2018). The histories, cultures, and barriers to food sovereignty are different for every group so food sovereignty looks different around the world. Various projects aimed specifically at food sovereignty work to reconnect people to land, to their cultures, to their values, and to their relationships in the community. Working through food motivates people to connect to the land and support the land's wellbeing as the land supports human wellbeing: "Farming and fishing and sourcing *kai* is paramount to the guardian way because it keeps us invested in that area. Because of course you want wellbeing. Of course you want that area to thrive" (TW5).

Several prominent Māori scholars and projects currently work to define Māori values around food and developing healthy and sustainable food sources. For instance, Hua Parakore is an initiative to certify locally-based organic farms that operate using *mātauranga Māori* (Māori knowledge) and build a collective of these farms (Hutchings et al. 2012). Twenty-two farms were part of the collective by 2012. The program practices respecting locally owned knowledge, organizing through tribal collective, practicing *kaitiakitanga*, and empowering Māori women. Overall, it is, "based on the infinite diversity and richness of kaupapa Māori that is located with diverse Māori tribal groups," (Hutchings et al. 2012). These farms value *whakapapa*: connecting to one's land, understanding the history of one's *kai* (food), saving and sharing seeds with others, and using Māori names for land and plants. The farms in the collective are different sizes and operate with different principles. For example, Mercy Tipene-Otukaio farms on 800 acres and grows, "everything that was traditionally consumed by Māori," (Hutchings 2015). Hineāmarau Ropati's 2-acre farm in Auckland grows food at the Papatūānuku *marae* for families and schools with 36

teaching gardens and a community garden for *whānau* in need. Many of the families involved are from *iwi* around but have moved to Auckland to work. Because of these diverse *whakapapa*, the garden has 12 tribal gardens where people learn practices from different *iwi*. These examples show that food sovereignty farm initiatives can take many forms but are all based around community and the pride and *mana* that come from growing and eating food from one's own land.

In a different example, in Whakatāne, a city on the East Coast of the North Island, a group of researchers and tribal members developed a program aimed at promoting holistic wellness, growing food, and making resources, policies, and strategies to enhance Māori health in their communities (Moeke-Pickering et al. 2015). They asked participants to share pictures of *māra kai* (food grown from the ground), *kaimoana*, and other foods to show what a healthy lifestyle meant to them and to share stories of the people with whom they used to gather, plant, prepare, and eat food. This food sovereignty initiative focuses on the health aspect, starting from the statistics that Māori have higher food insecurity, depression, and diabetes rates than other ethnic groups in New Zealand. This project shows that food sovereignty is structural and political but is also a personal and familial journey. It aims to incorporate culturally appropriate and empowering diets into daily life.

Though the Ōkahu Catchment Ecological Restoration Plan and many of the interviewees did not explicitly discuss food sovereignty, the concept is a useful framework through which to understand how people relate to the bay and how restoration can most effectively be implemented to fulfill community visions. Food sovereignty theories and the experiences of people around the world build on why people value Ōkahu Bay, how they have used the bay in the past, and the vision for collecting *kaimoana* from the bay in the future. Collecting *kai* is not just about eating from the bay but also about the relationships and family aspect around food. It is important to understand how people, mostly Ngāti Whātua Ōrākei but also some from the general community, view food and food sovereignty from Ōkahu to guide future *kaimoana* management. Food sovereignty frameworks uncover colonization in many connected aspects: health, community knowledge, family, environment, and decision-making. Understanding how people conceive of food can help inform how the community can be brought into the bay and restoration processes.

Ngāti Whātua Ōrākei people do not collect shellfish anymore though some people still fish in the harbor. They stopped, “when they [Auckland Council] said it was polluted, when they put signs up,” (TW7) and when the populations declined to where it was not worth the effort to collect. The sewer pipe and the continued pollution in the bay are tools of colonization, taking away the food sources and separating people from their lands, all with the physical evictions. This story adds another perspective to the stories of indigenous peoples around the world of colonizers using food to colonize people and starve them and change their worldviews to “the white man’s way.” The contamination in the bay is an affront to Ngāti Whātua Ōrākei’s *mana* by restricting their ability to take care of their land and themselves self-sufficiently, to their cultural knowledge, and to their food sovereignty.

Ngāti Whātua Ōrākei has been worried for several generations about the loss of knowledge associated with the loss of fishing areas: “I think among our people, we’ve certainly lost a lot of the skills and that’s saddening because everybody’s talking football. I hear my *whānau* they are all talking... and they are all talking fish stories! And they’ve never been in the water” (TW6). Others see that, “some *whānau*, they don’t even go near the water,” (TW1). Though people recognize that people have lost knowledge and interest in fishing, I did not hear any focused discussions on reviving the knowledge. The Community Survey Monitoring Program was acting as a way to connect students to elders and for students to create their own knowledge about the current state of the bay and where *kaimoana* are living. However, *hapū* members are still worried younger generations will not be able to collect *kaimoana* and will not have the valuable skills and experiences past generations had (TW9). Other researchers found similar concerns about losing knowledge in other *hapū* around New Zealand (McCarthy et al. 2014; Hutchings 2015). This shows an opportunity for communities around New Zealand to work together to share knowledge on how to engage people at their waters and lands and connect generations to sustainably pass on knowledge.

Moreover, some people in the *hapū* and in the general public seemed hindered from collecting *kai* because of fishing rules and the quota system. One *hapū* member got scared off when they inadvertently collected over the catch limit (TW6). It is not within the scope of this thesis to fully assess New Zealand’s quota management system and its political struggles, though that has been discussed elsewhere (see e.g. Durie 1998; Turner et al. 2013). In short, New Zealand established a quota management system (QMS) in the 1980s to limit fish stock depletion. The QMS distinguishes between commercial, recreational, and customary catches and establishes quota rights for commercial fishers. Māori felt that the original plan did not respect their treaty rights.

Some legislators assumed that Māori rights were just personal and customary needs and ignored the long history of trading fish between *iwi*. Māori sued to block the quota system, but were still divided on how they want to propose to divide fishing quota between *iwi*. Some *iwi* demanded that Māori should have all the fishing quota but others were more lenient. By coincidence, Sealord Products, shareholder of 26% of quota, was selling their stock and Māori and the Crown made a fast negotiation to have half ownership of Sealord. All *iwi* co-own this new venture, called Te Ohu Kaimoana/ the Māori Fisheries Commission.

While Te Ohu Kaimoana gives Māori some of commercial rights, the QMS still disproportionately favors large, wealthy fisheries and pushed out smaller fisheries (Turner et al. 2013). Moreover, the artificial distinction between customary, commercial, and recreational also makes fishing rules difficult for Māori to navigate. For customary fishing rights, each *iwi* nominates a *Tangata tiaki/kaitiaki* for their area. The Ministry of Fisheries then formally appoints that person. Tribal members who want to collect kaimoana through customary rights get a permit from the *Tangata tiaki/kaitiaki* and report their catches to the Ministry of Fisheries. This adds bureaucracy to accessing treaty rights and is more reporting than other groups have to do. The Crown does not require this complicated permitting and reporting system from recreational fishers. In surveys, some people were unsure if they were allowed to collect kaimoana from Ōkahu, reflecting a lack in communication on the kaimoana catch regulations and the *hapū*'s regulations. The crown's policies add barriers to Māori working through their own visions of food sovereignty. Though one of the objectives in the Ōkahu Catchment Ecological Restoration Plan is to "increase the number of *Tangata tiaki/kaitiaki*," (Kahui-McConnell 2012) no one mentioned this goal in their interviews. This could be due to the questions I was asking, but could also reflect a separation from the daily environmental restoration and lack of knowledge at the bay concerning the political and regulatory agreements. While interviewees did not explicitly mention this political context and history in their experiences with Ōkahu, this could become important as *kaimoana* populations increase and are safe to eat. The political context also dictates to what extent Māori as a whole can practice *kaimoana* food sovereignty and through what avenues.

One of the first bay users I surveyed showed the contrast between how some members of the public view benthic species and how Ngāti Whātua Ōrākei does. She strongly believed that the bay should be kept as a place for wildlife, not human use. When asked if she would want to collect shellfish from the bay she looked at me incredulously and said that she would definitely not want to collect shellfish because the bay should be a natural wetland reserve and that

collecting shellfish would affect the bird life. She visits the bay about monthly and did not have a history of collecting *kaimoana*. This view is one example of a preservationist viewpoint. Preservation tools are useful to allow the environment to recover from past harms. However, they can also prevent indigenous peoples from using an area and practicing important parts of their cultures. While fish populations do need relief from harvesting pressures, those making decisions for reserves need to better understand the impact on people's culture and food sovereignty. The power dynamics in this statement are important to understand. Banning fishing and harvesting are important tools for helping support environmental health and allow fish populations to grow again. Māori use *rāhui* (ban) to restore the normal state of land or waters if someone has died there or as a sustainable management technique to allow areas to regenerate (Mead 2016). *Iwi* and *hapū* establish a *rāhui* using their *mana whenua*. Here this ban is a sustainable management technique to effectively act as *kaitiaki* and is a sign that the *iwi* is respected. On the other hand, when a government agency bans fishing or someone advocates for banning fishing without consulting the community, it can unintentionally dominate a group's practices.

The views the wider community showed through my survey at Ōkahu Bay are still important to understand because Ōkahu Bay is co-managed with Auckland Council for the whole community. While the above comment was the only one calling for a fishing ban, 32 out of 44 survey participants had no interest in collecting shellfish from the bay. Most commonly, people said the bay was dirty, polluted, or too close to the city and so would not collect fish from it. One person said they remembered a time when the sewer pipe was in the bay, making it an unappealing place to collect food. Others said that they don't eat seafood that often and if they did would buy it from the store because it is easier. Another group had no idea there were shellfish in the bay and some responded they would be interested if they knew more about it and it was clean and abundant. Others did not know there was shellfish and had no interest in collecting. This is somewhat surprising given that collecting shellfish, particularly tuangi and pipi, is popular and fairly common in Auckland (Biswell 2009). These responses show that restoring the environment is critical to engaging in food sovereignty. People could only think of the bay as a dirty bay where in other places they might have thought of collecting *kaimoana*.

On the other hand, the Ngāti Whātua Ōrākei members I interviewed shared memories of collecting pipi with their families and friends. As I discussed in Chapter 1, some kids collected and cooked pipi on their way home from school every day. Others talked about fishing for kahawai (a large sport fish) and snapper, diving for paua (abalone) (TW 6). Similar to the participants in the Whakatāne project, interviewees had fond memories of fishing with their

families and friends: “We used to collect pipi, oysters off the rocks and our brothers used to go out to the breakers and get the mussels... And I used to go out and take the net with my granduncles... We didn’t always take it home. We sometimes sat there and ate it” (TW3).

Families built community by collecting *kaimoana* together and by bringing *kaimoana* to others: “I was lucky enough to have my grandparents living on the same street as me so when they were getting older we would go and collect their *kaimoana*. And then the children after me were doing it too. Oh it was just a generation thing that we did. Collecting *kaimoana* for all the old people” (TW3). Collecting *kaimoana* was a daily part of life and brought families together.

Similarly to food sovereignty activists, several interviewees are motivated to collect *kaimoana* from Ōkahu Bay again as a way to connect to the land and have a presence at the bay. When people substitute buying food from grocery stores for gathering and growing *kai* themselves, they lose connections to the land and waters and lose some of their motivation to be *kaitiaki*:

We’ve just allowed it happen and think “oh, we’ll just shop from the super market.” But actually that is a westernized thinking. It has taken us away from the behavior, from sourcing food from our bay. That is the key element. When you farm an area and you build a house in that area that means you will protect that area. We have somehow separated from the moral thinking of the bay because we have accepted supermarkets and that has taken us away from protecting the bay. So the bay has devolved. (TW5)

The bay *mauri* decreases when people stop fishing and caring about the bay through a reciprocal relationship. Supermarkets and buying food are not an equal substitute for the connection people get from caring for the land themselves. Restoring the water and *kaimoana* populations so people can collect again will restore the *mauri* and *kaitiakitanga* practices.

While the general public and some Ngāti Whātua Ōrākei members do not want to collect *kaimoana*, most *hapū* members I interviewed do. *Hapū* members valued the community aspects of *kaimoana* and want to share those experiences with their children: They want to share the experiences of collecting *kaimoana* with their children: “It would be so cool [to collect *kaimoana*]. I remember the joy of collecting *kaimoana* as a kid and to think our children haven’t had that experience” (TW9). Overall, they valued the community elements more than the actual eating and potential health benefits of local seafood. Only one person mentioned the health aspect of food sovereignty. While other food sovereignty initiatives are built around increasing access to healthy foods as one of the main pillars, Ngāti Whātua Ōrākei’s restoration focuses more on the community elements of restoration. There are several grocery stores near Ōkahu Bay so people do have access to buying healthy foods. People also think that *kaimoana* in Ōkahu Bay is not



healthy because of the heavy metal contamination (see below). Ngāti Whātua Ōrākei does have a focus on growing healthy vegetables in their organic garden at Whenua Rangatira. Ngāti Whātua Ōrākei gardeners plant *kai*, medicinal plants, and trees for carving (Tumahi-Kearns, Hawke, and Waipo 2015). They grow food for the *marae* and the community in general. They also compost all food scraps from meetings and events at the *marae*. The Ōrākei health wing promotes healthy eating, but the health initiatives are not explicitly linked with the restoration of *mauri* to Ōkahu Bay. It will likely be decades before the *kaimoana* in Ōkahu Bay is safe and sustainable for harvest so the immediate health initiatives do not include gathering local *kaimoana*.

Though most people I interviewed wanted to collect *kaimoana*, they only considered it *kai* when it was clean and sustainable. People will not, and should not, collect *kaimoana* if the water is not clean and the *kaimoana* aren't safe to eat. Several people added this qualifier to their answers: "Absolutely. Everyone would [want to collect *kaimoana* from Ōkahu Bay again]. I'm certain of that. If it didn't have risk of food poisoning, if it was of good enough quality, if it was sustainable as a resource, all of these things, if and only you would see loads of people down there," (TW2). Another person said, "if it [*kaimoana*] was plentiful I would [collect want to collect *kaimoana*]," (TW3). Right now, the species are an integral part of the ecosystem and the *mauri* of the bay, but not as food: "Actually they [*kaimoana* species] play a wider role in the ecosystem that is good to know about" (TW2). Several people think about *kaimoana* not just as *kai* but also as cleaners in the water and as part of the drivers in recovering the ecosystem, an understanding that needs to be better recognized: "Educate people on the importance of *kaimoana* in the bay for the health of the bay... It's doing a job! You take the cleaner out of the office, the office is going to look pretty crappy" (TW9). As seen with the quotes above, the ecosystem needs to be restored with the *hapū*'s need at the center before people can connect again to the waters and each other through *kai*. Right now the restoration is focused mostly on cleaning the water and getting people comfortable with swimming in the bay rather than collecting *kaimoana*:

You have to work within the context of your ability to change things. That's why a healthy bay that has our *whānau* in it, because there is more to it than just collecting *kaimoana*. Because it is about increasing their footprint on the bay so they are developing *waka* and staying down there and a building for them and the programs they are doing, the Waterwise programs, and everything is getting their kids in the bay. So that has nothing to do with whether or not you can harvest *kaimoana* but they are still starting to swim in their bay (M7).

Right now people need to be brought into the bay through community built around aspects other than gathering *kaimoana* because the populations are not ready to be harvested

Moreover, not everyone wants to collect *kai* again. Some *hapū* members are satisfied with buying *kaimoana* from the grocery store (TW1, TW8). Some did not know that there is or could be *kaimoana* in Ōkahu Bay and have not thought about the possibilities of collecting *kaimoana* on their own (TW1). With Te Ohu Kaimoana, the *hapū* can order food for *hui* as an *iwi* shareholder. This is much more convenient: “When we have big time *hui* (meetings) here we just use Te Ohu Kaimoana. It just turns up in the big fridge and just cook it off! It’s all there! It’s much easier. And it is an *iwi* owned company now,” (TW1). While Te Ohu Kaimoana allows the *hapū* to have the same species and cook it together, they are not connecting with Ōkahu Bay and caring for the health of the bay as a food source. That said these perspectives are important to highlight because they show how community values can be expressed in a contemporary context. Is it okay to give up fishing in the bay if the community is engaged in other activities at Ōkahu Bay? I did not ask how people made community cooking at *hui* and other *marae* events. Cooking for big events and eating culturally appropriate foods can bring people together, but ordering and cooking *kaimoana* from Te Ohu Kaimoana only happens for big events. People do not have the everyday or weekly interactions with the bay that they used to have and did not talk about cooking *kaimoana*, or other food, together. Working to restore Ōkahu Bay to where the community can collect *kaimoana* again is important for everyday food sovereignty, community connections, and restoring the *mauri* to the bay.

The interviews and surveys show the diverse ways that people think about food sovereignty and the various ideas that the *hapū* needs to contend with on the ground. It shows the importance of focusing on *kaimoana* species in restoration to help people connect through food. However, more than restoring *kaimoana* species, food sovereignty will come with clean water. At the root, people want clean water and from that *tuangi*, *pipi*, and mussels will become *kaimoana* again. Many interviewees therefore had a historical view of *kai*, remembering the joys of collecting in the past but do not collect *kaimoana* now because it is not safe to eat. People that did not historically collect from Ōkahu Bay do not think about the bay as a source of food, despite the popularity of shellfish collecting at other beaches around Auckland. More people will likely have an interest in and connection to the bay if there is *kaimoana* in there because they will have more of an immediate reason to start connecting with the waters. However, people need to connect with the bay as *kaitiaki* and users in order to restore the quality to where *kaimoana* can grow clean and sustainable. Though circular, we see that food sovereignty, environmental health, connection to the bay spiritually, and community relationships cannot be separated. Overall, people involved in the restoration of *mauri* to the bay want to see the bay as a place to build community through food and regain the past relationships to local food and to the bay.

### ***Heavy Metal Testing***

Many people expressed concerns about the safety of the *kaimoana*. Student researchers have tested the stormwater runoff and sediments for copper, zinc, and lead, raising alarm at the safety of the water and the *kaimoana* (Beckwith 2013; Mikol 2012; Stockman 2014; Stimson 2017). Past studies in Ōkahu Bay found elevated levels of heavy metals in sediments under boat moorings (Stockman 2014) and around the stormwater drains, particularly after large storms (Mikol 2012, Beckwith 2013). The copper concentrations were above Auckland Regional Council recommended levels. Heavy metals from food can have adverse health effects but some are necessary in biologic processes. Copper is an essential trace metal and aids in many biological processes such as iron metabolism and immune system functions (Bost et al. 2016). However, excess and chronic exposure can cause liver toxicity (National Research Council Committee on Copper in Drinking Water 2000). Zinc is in many enzymes and proteins (Plum, Rink, and Haase 2010). The greatest risk of chronic zinc exposure is that high levels of zinc interfere with copper absorption, causing problems from copper deficiency. These two metals are therefore important in human and shellfish functioning, but chronic over exposure can cause health problems. Lead on the other hand is not safe at any level. Lead can replace calcium in bones and teeth, weakening bones (WHO 2017). It can also cause permanent neurological damage. Heavy metals can also impact organism behavior or survival. In lab studies McConway (2008) found increased trace metal concentrations in water decreased feeding rates and larvae settling rates for tuangi.

Zinc, copper, and lead are common in urban runoff from roads, cars, municipal waste and fertilizers (Grant and Hay 2003). Anti-fouling paint in boats also releases copper and zinc into the water (Stockman 2014). Heavy metals in water attach to the fine sediment entering the bay and concentrate in the sediments, in the water column, and in plankton as they take in water. Tuangi and pipi are filter feeders and potentially take in heavy metals from the water and sediment. However, metals can take on many ionic forms. Some metal particles may be in a form that organisms can absorb (bioavailable) while others are in a form that organisms cannot absorb. Different bivalve species take in and expel heavy metals at different rates and through different mechanisms (McConway 2008). Thus, the heavy metal levels in the water and sediments do not directly translate to heavy metal concentrations in organisms. In some cases, organisms concentrate heavy metals in their tissues while other organisms are efficient at expelling unwanted metals. Therefore, metal levels in sediments are not direct indications of the metal levels in living organisms.

## Methods

I collected 50 adult tuangi (shell length >20 mm) from Ōkahu Bay at low tide on July 19, 2017. I measured the water temperature, dissolved oxygen content, salinity, and pH using a YSI Professional Series Probe. I brought the tuangi to the lab and measured the shell length. I then shelled each tuangi, weighed the flesh, and stored them in a freezer at -20° C until digestion. I did not dry the tuangi because most food standards are listed by fresh weight and people eat them fresh.

Tuangi were digested for analysis in the Inductively Coupled Plasma Mass Spectrometer (ICP-MS). This machine measures heavy metal concentrations by separating ions in a solution. The solids need to be digested to a liquid to analyze in the ICP-MS. I cut the samples into 200 mg pieces and each sample put in an 80-mL Teflon tube. I added 5mL of 69% Tracepur HNO<sub>3</sub> (nitric acid) to each tube. The tubes were sealed and digested in an Ethos-Up Microwave reaction system for 20 minutes at 200° C. The samples are now liquid. I diluted the digest to 50 mL with deionized water and weighed again. The solutions were analyzed for copper, zinc, and lead in an Agilent 7700 ICP-MS. He mode was used to reduce polyatomic interferences. Calibration standards at 1000 ppm for each metal and 5ppb internal standards were used to calibrate the results.

I compared the ICP-MS results to New Zealand food standards for fish (FAO, 1983). These standards are relatively old but were some of the lowest allowable levels compared to Australian, US, and UK standards. These should be taken as an indicator of the maximum limits for human health. However, the levels also need to be balanced with how much a person is going to eat in a week and where they get other sources of copper and zinc in their diets.

## Results and Discussion

Overall, all the metal concentrations were under the New Zealand food safety standards for fresh fish (Table 1). Copper and zinc are elements people need in their diets so the levels in shellfish can have health benefits. Technically there is no safe level of lead in food so the lead levels are the biggest concern (US FDA/WHO).

**Table 1: Copper, zinc, and lead concentrations in tuangi**

<b>Metal</b>	<b>NZ Food Standard</b>	<b>Average (ppm) ± Standard Error</b>	<b>Range (ppm)</b>
Copper	30 ppm	4.021 ± 0.28	1.586-10.703
Zinc	40 ppm	18.86 ± 1.1	10.11-32.98
Lead	2 ppm	0.273 ± 0.023	0.074-0.480

While government standards indicate that the amount of tuangi people typically eat will have few to no adverse health effects related to heavy metals, the cultural and social perceptions of the *kaimoana* still need to be respected. People may believe that no level of lead in their food is safe or clean. These numbers show that tuangi in Ōkahu Bay are carrying detectable levels of heavy metals. Monitoring the metal concentrations as restoration efforts cleaning the water continue will be important to understand to what extent the metal concentrations are the normal levels in tuangi and to what extent they are elevated due to metal contamination. The moorings and the boats in Ōkahu Bay are going to be removed within the next couple years, removing a major source of lead from the bay. Moreover, tuangi in Ōkahu Bay may be safe to eat but the populations are not sustainable yet. Because the water in the bay is still contaminated and the populations are not at sustainable levels, people will continue thinking of tuangi and pipi as bay cleaners rather than local food sources.

## Chapter 4: Kaimoana and Biodiversity in Ōkahu Bay

As the last chapters discussed, people need the water to be clean and need *kaimoana* populations to be sustainable before people will consider it food. In addition to cleaning the pollution, people need more information to change negative perceptions about the bay and to help the *hapū* “advocate for themselves” (TW2). This chapter investigates the recovery of “thriving marine ecosystems that provide sustainable *kaimoana* resources to a Ngāti Whātua Ōrākei community” (Kahui-McConnell 2012). This research continues the long-term investigation of the restoration of *kaimoana* species, specifically tuangi (*Austrovenus stutchburyi*) and pipi (*Paphies australis*), that Richelle Kahui-McConnell started with her thesis in 2007 and continued with other university students (Kainamu 2012) and community members and elementary school students through the Community Shellfish Monitoring Program. I wrote this chapter in the style of a scientific paper so the methods, data, and conclusions can be used as comparison with future surveys and restoration studies. This chapter uses ecological survey methods, so-called Western science methods, showing how science can be used as a tool to further *hapū* goals when the research is guided by *hapū* worldviews and needs. Ngāti Whātua Ōrākei can use this research to advocate for themselves in Council meetings, communicate the ecological state of the bay, and engage others into changing their environmental practices to clean the water in the bay.

The stories of what the bay used to be motivated this research. In the past, no one was afraid to swim in the bay. Kids used to collect pipi together after school: “There used to be an old stone barbeque on the beach and somebody would always leave matches hidden under a stone on the grill and we would walk down here, get pipi, cook them on the barbie, and walk home” (TW4). People that used to be able to collect *kaimoana* want that again for their kids: “It would be so cool. I remember the joy of collecting *kaimoana* as a kid and to think that our children haven’t had that experience. To just sit on the beach and collect pipi together” (TW9). Now community members fear that, “my grandchildren will have more of a chance of catching a plastic bag than a fish” (TW5). Besides a reduction in *kaimoana* populations, *hapū* members notice other physical changes. Some mentioned that the bay had gotten muddier, consistent with data showing increased sedimentation rates since the 1950s (Grant and Hay 2003). The flushing in the bay changed when the marina was built in 2005 because it made a hard barrier. The decreased flushing reduced sediment flowing out the bay and gave rise to a particular smell (TW4). There is also more trash on the beach than before. Larger and greater numbers of boats are coming into the Port of Auckland, adding more pollution than in the past (TW2, TW7). Further, Auckland’s population and the number of cars on Tamaki Drive and the number of people using the beach

and adjacent beaches has increased. While some were discouraged by these changes, others are motivated by past stories to restore the *kaimoana* and water quality. Through the Community Shellfish Monitoring Program and student research, older people tell younger children their stories and motivate the younger generations to research and care for the bay.

The restoration is not just about being able to collect *kaimoana* but also being able to swim and not fear the water quality. In addition to their importance as *kaimoana*, benthic organisms, such as *tuangi* and pipi, and seagrass are water quality indicators (McLusky 1999). A benthic organism is one that lives in the bay sediment. Benthic organisms are largely confined to one area and so population health indicates water quality and ecosystem health (US EPA 2013). Pollution, sedimentation, and otherwise poor water quality negatively impact benthic organism health (Roper et al., 1988; McConway, 2008; Norkko et al., 2006). Sedimentation and heavy metal contamination are currently the greatest concerns in Ōkahu Bay. Sedimentation can decrease food availability. Heavy metals can stress benthic organisms and cause decreased feeding and growth rates (Townsend et al., 2009; McConway, 2008). Benthic organisms can also accumulate heavy metals, a potential hazard for human consumption (Townsend et al., 2009).

Seagrass beds around the world have also suffered from pollution, sedimentation, disease, and physical disturbances (Dromgoole and Foster, 1983). Seagrass used to cover much of New Zealand's estuaries, but has declined in the past century (Inglis, 2003). Seagrass is thought to be important for maintaining biodiversity by increasing habitat complexity, serving as nurseries for juvenile fish, and improving bed stability (USEPA, 2017; van Houte-Howes et al., 2004; Mills and Berkenbusch, 2008; Battley, 2010). Others, however, complicate this by noting that individual sites have immense variable in benthic diversity, indicating that estuary characteristics other than seagrass density significantly control community compositions (van Houte-Howes et al., 2004). Benthic ecology and seagrass dynamics are known to be highly site specific (Roper et al., 1988). They are influenced by a variety of factors such as sedimentation, hydrology, and climate, making it difficult to generalize between sites. It is therefore important to understand individual site dynamics to make the most effective restoration decisions.

Previous studies in Ōkahu Bay have shown *tuangi* numbers are increasing but the individuals are still small in size (Kahui-McConnell, 2007; Kainamu, 2012; Meadows and Ford, 2015). In addition to adding to the local knowledge, this work is part of a growing body of marine research and shellfish monitoring in New Zealand's bays and estuaries (e.g. Meadows and Ford, 2015; McConway, 2008; Lohrer et al., 2016). Only about 10% of New Zealand's seagrass meadows

have been mapped, so understanding seagrass dynamics in Ōkahu adds to information on seagrass restoration (Inglis, 2003). Some interviewees disagreed as to whether there used to be seagrass in Ōkahu or not. Some *hapū* members say it was not there, others say it was a different kind, some say it used to be there but smells different now, and others say it beneficial for supporting habitat diversity. Judging from other seagrass studies and explorer accounts in the 1800s, it appears there used to be seagrass around Ōkahu Bay. That said, research has been inconclusive on how seagrass affects benthic diversity (McConway, 2008; Hack et al, 2007). Ani Kainamu mapped seagrass in her 2012 survey and found that seagrass generally was in the middle of the bay while benthic organisms were generally clustered at the edges (Kainamu, 2012). It is possible this indicates that physical factors control where seagrass and benthic organisms can live, that seagrass limits the range of benthic organisms, or that benthic organisms prefer to live in on the edge of seagrass. As restoration continues, understanding these population dynamics is essential. Working in Ōkahu helps to build knowledge about restoration processes over the long term and how to engage people in the restoration processes.

This study focused on the *kaimoana* indicators in the Ōkahu Catchment Ecological Restoration Plan. The specific indicators were: increasing the customary take of *kaimoana*; an increase in the presence, abundance, and success rate of maturation of customary/target species and associated species; and increasing the native biodiversity around Tamaki. I also surveyed the seagrass density in the bay to assess how *kaimoana* density is correlated with seagrass density. I compared the seagrass and *kaimoana* densities to past surveys and historic aerial photographs to understand how the bay is changing with restoration. This research is important for the *hapū* to develop policy and ongoing management decisions in the bay and has applications for other groups looking to incorporate local knowledge into environmental management and relationships. More information, particularly information gathered through the Community Shellfish Monitoring Program, can help to change the negative perceptions some *hapū* members have about Ōkahu Bay:

The kids being involved in the bay and gathering of factual information will open the eyes of the wider *whānau*. And it encouraged talk about the bay with the *whānau* instead of going, “Oh it’s just the bay. Don’t swim in it.” By having those conversations it kept the bay alive really and everybody saw everybody’s contributions to it... How can we motivate them to still be involved so that they can give factual information that might change their perspective about the health of the bay? (TW8)

These surveys help to show that there is still life in Ōkahu Bay and still people caring about the bay. Moreover, this information is critical for marine restoration fields. Most benthic surveys and



restoration monitoring in published literature lasts less than two years (Cunha et al., 2012; Jenkins and Uya, 2016). Community members and students have been completing this survey since 2007. Ngāti Whātua Ōrākei's restoration monitoring has been doing is therefore filling a critical research gap and can show how restoration efforts may be successful with long-term monitoring. Overall this study aims to help Ngāti Whātua Ōrākei achieve their goals of self-determination and restore the *mauri* to Ōkahu Bay as well as contribute to a broader understanding about benthic and seagrass restoration ecology.

## **METHODS**

Survey design and methods are similar to those used in past surveys (Kahui-McConnell, 2007; Kainamu, 2012). My Frontiers Abroad classmates and I did most of the surveys in February 2017 and sampled missing points in May 2017. We completed all the surveys at low tide. We laid out eighteen transects perpendicular to the beach, each twenty meters apart (Figure 1). We sampled five points in each transect: 0m from shore, 15m, 30m, 45m, and 60m. We placed a 0.1 m<sup>2</sup> quadrat at each survey point and estimated the seagrass percent cover and substrate composition. We used a spade to remove all the material in the quadrat to a depth of 10 cm. We then sieved the material through a 2mm mesh and identified and counted all living organisms. We then returned the organisms to their original locations. We collected tuangi size distribution data in May 2017. We measured 100 tuangi from 0m from shore, 15m, and 30m, making a total of 300 tuangi measured. I chose these distances because they had the highest benthic density.

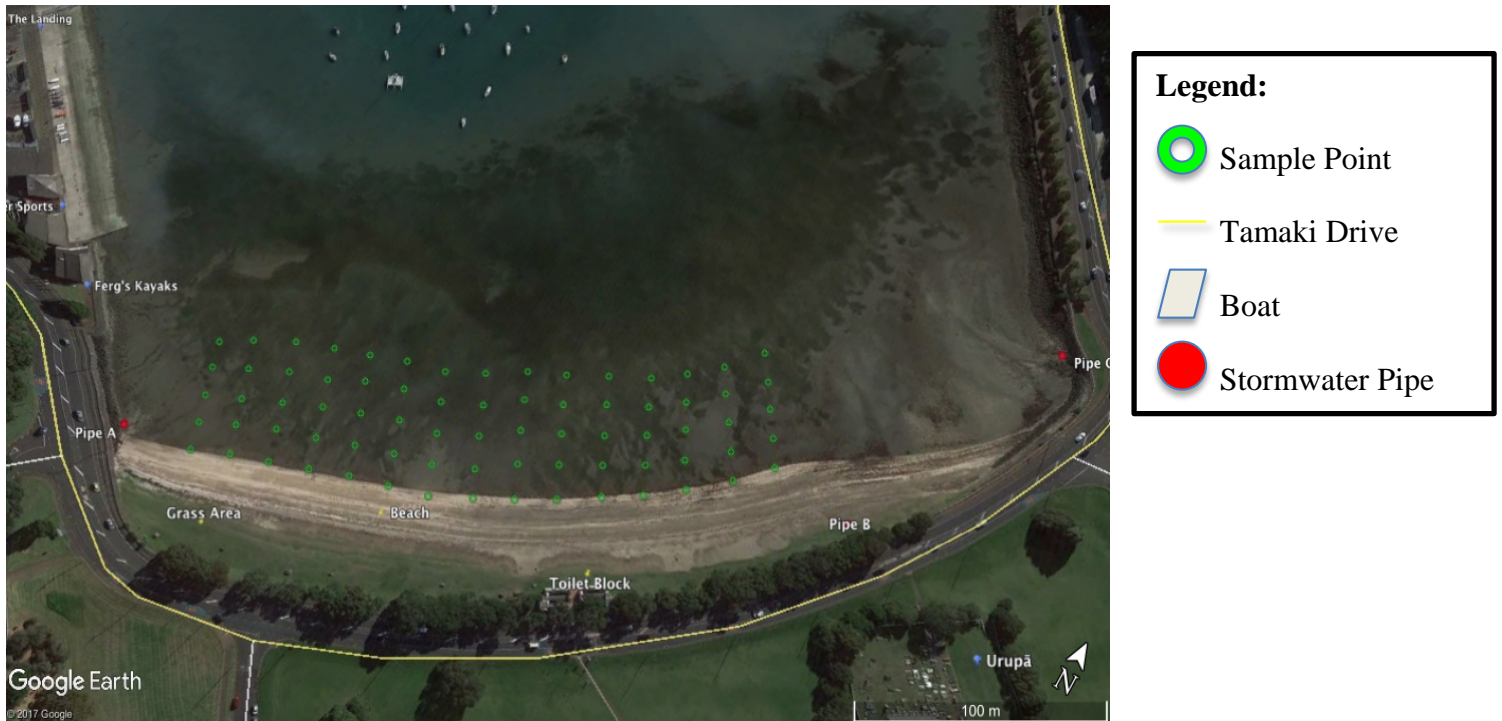


Figure 1: Sampling diagram at Ōkahu Bay, February 2017. We set up 18 transects 20 m apart with 5 points on each transect. Each point on the transect was 15m from the next. The stormwater outflows are labeled with red dots. Pipe A is on the west end, Pipe B in the middle, and Pipe C on the eastern end.

I calculated a Simpson's Diversity Index for each transect. Simpson's takes into account the number of species and the relative abundance of each species. It is on a scale from 0 to 1. I used Pearson's Linear Correlation Coefficient to analyze correlations between seagrass percent cover, diversity, and *tuangi* density. I chose *tuangi* density because they had the highest density, were most widespread throughout the bay, and are the most monitored species in other Auckland bays. The analysis primarily focused on *tuangi* and *pipi* populations because they were both benthic food species. Then compared the survey data from this year to past survey data. I used a linear regression to assess annual trends in *pipi* and *tuangi* density in Ōkahu Bay. Richelle Kahui-McConnell completed surveys in 2007 and 2008, Ani Kainamu in 2012, and community surveys were completed in 2009, 2010, 2011, and 2014.

I estimated the seagrass cover in the whole bay using aerial photographs from Google Earth. While ideally I would have used photos from the same time of year, I had to choose the clearest photos. I assumed the vegetated area represented 100% cover at the small scale.

## RESULTS

### *Benthic Survey*

Overall, we found 19 benthic, including *Macamona lilliana* (wedge shell), *Helice crassa* (tunneling mud crab), *Perinereis amblyodonta* (Weri moana/bristle worm), and *Cominella glandiformis* (mud whelk) (Table 1). This is higher than the 13 species found in the 2012 survey

(Kainamu, 2012). The Simpson's Diversity Index was 0.402 for the whole bay. This is a relatively low diversity score. The low score is because tuangi and pipi had high populations big numbers while other species had very low populations across the whole bay. The average tuangi density was 8.933 per 0.1 m<sup>2</sup> and the average pipi density was 2.10 per 0.1 m<sup>2</sup>

Table 1: Benthic species found at Ōkahu Bay in the February 2017 survey

Organism Class	Species and common names
<b>Bivalvia</b>	<ul style="list-style-type: none"> <li>• <i>Austrovenus stutchburyi</i> (Tuangi, New Zealand cockle)</li> <li>• <i>Macamona lilliana</i> (Hanikura, Wedge shell)</li> <li>• <i>Nucula hartvigiana</i> (Nut shell)</li> <li>• <i>Paphies australis</i> (Pipi)</li> </ul>
<b>Malacostraca (crustacean)</b>	<ul style="list-style-type: none"> <li>• <i>Halicarcinus whitei</i> (Pillbox crab)</li> <li>• <i>Helice crassa</i> (Tunneling mud crab)</li> <li>• <i>Alpheus euphrosyne richardsoni</i> (Snapping shrimp)</li> <li>• <i>Heterosquilla tricarinata</i> (Mantis shrimp)</li> <li>• <i>Bellorchestia quoyana</i> (Sand hopper)</li> <li>• Unidentified black and white striped amphipod</li> <li>• Unidentified plated amphipod</li> </ul>
<b>Gastropoda</b>	<ul style="list-style-type: none"> <li>• <i>Cominella glandiformis</i> (Mud whelk)</li> <li>• <i>Cominella sp.</i> (Unidentified cominella)</li> <li>• <i>Diloma subrostrata</i> (Harbour top shell)</li> </ul>
<b>Polychaeta</b>	<ul style="list-style-type: none"> <li>• <i>Pectinaria australis</i> (Sand-mason worm)</li> <li>• <i>Perinereis amblyodonta</i> (Weri moana, bristle worm)</li> <li>• <i>Scolecidia</i> family, smooth worm</li> <li>• <i>Spionidae</i> family, plated brown worm</li> </ul>
<b>Anthozoa</b>	<ul style="list-style-type: none"> <li>• <i>Anthopleura aureoradiata</i> (Small brown sea anemone)</li> </ul>

The tuangi and pipi densities are highly variable along the beach (Figure 2). There are peaks on the sides of the bay and the middle. This could indicate that the stormwater pipes are increasing *kaimoana* populations, possibly from adding nutrients or flushing sediment farther away from that specific area.

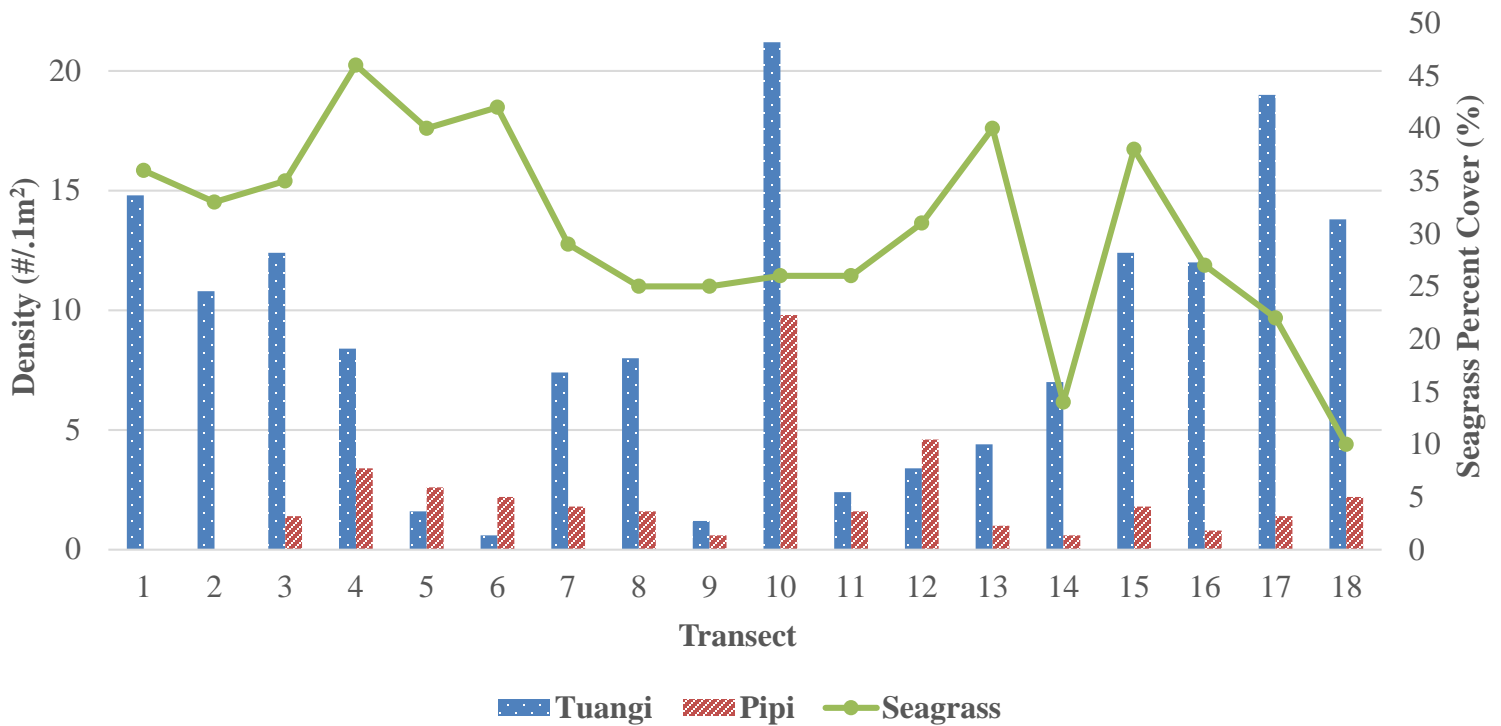


Figure 2: Average density of tuangi, pipi, and seagrass by each 60 m transect. Seagrass percent cover is represented by the green line and corresponds to the right-hand scale. Blue bars represent Tuangi density and pipi density is red bars and the left-hand scale. The kaimoana densities peak at the sides and the middle of the bay, possible reflecting improved flushing from the stormwater outputs on each side and middle.

The variability in the graph reflects the variability seen on the ground. Tuangi and pipi are located in isolated high density patches in the bay rather than smooth gradients (Figure 3). The heat map needs to be read with caution because there are large extrapolations between the points, but still shows general areas where there is high tuangi density. These high density places are consistent to where past students and monitoring found high *kaimoana* densities (M7).

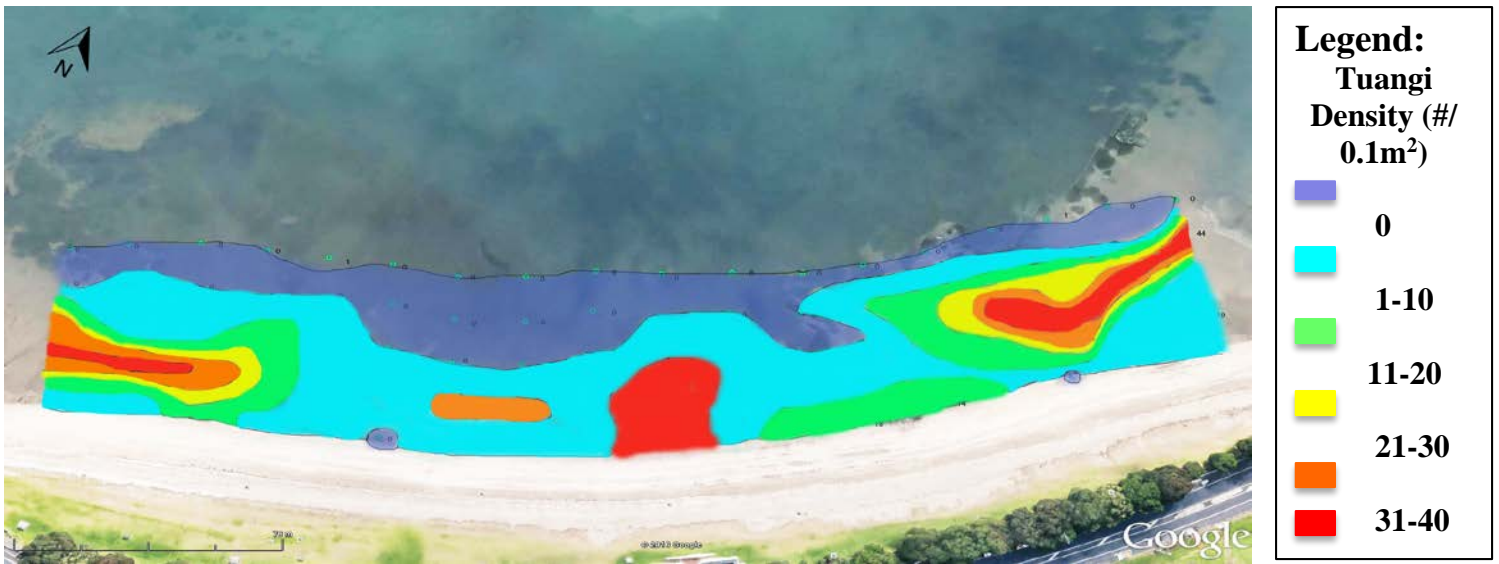


Figure 3: Tuangi density. Cool colors represent lower density and warm colors are higher density. Tuangi are present in patches around the bay

While there is variability when the transects are averaged along the shore, the trends are clearer based on the distance from shore (Figure 4). Pipi density is highest at the shore line. Tuangi density is highest at 15 m from the shore, though not significantly different than densities at 30 m from shore. Few pipi or tuangi were found 45 m and 60 m from the shore. Substrate and habitat difference from shore explain the density differences. 0 m from the shore was mostly coarse shell; 15m was sand, shell, and mud; 30 m was sand, shell, and more mud; 45 m and 60m were dense mud. Tuangi and pipi are filter feeders and cannot feed when there is too much fine sediment as the sediment clogs their gills. Dense mud is also anoxic, meaning there is little oxygen available and it is harder to live in. The sedimentation in the bay is likely hindering population growth.

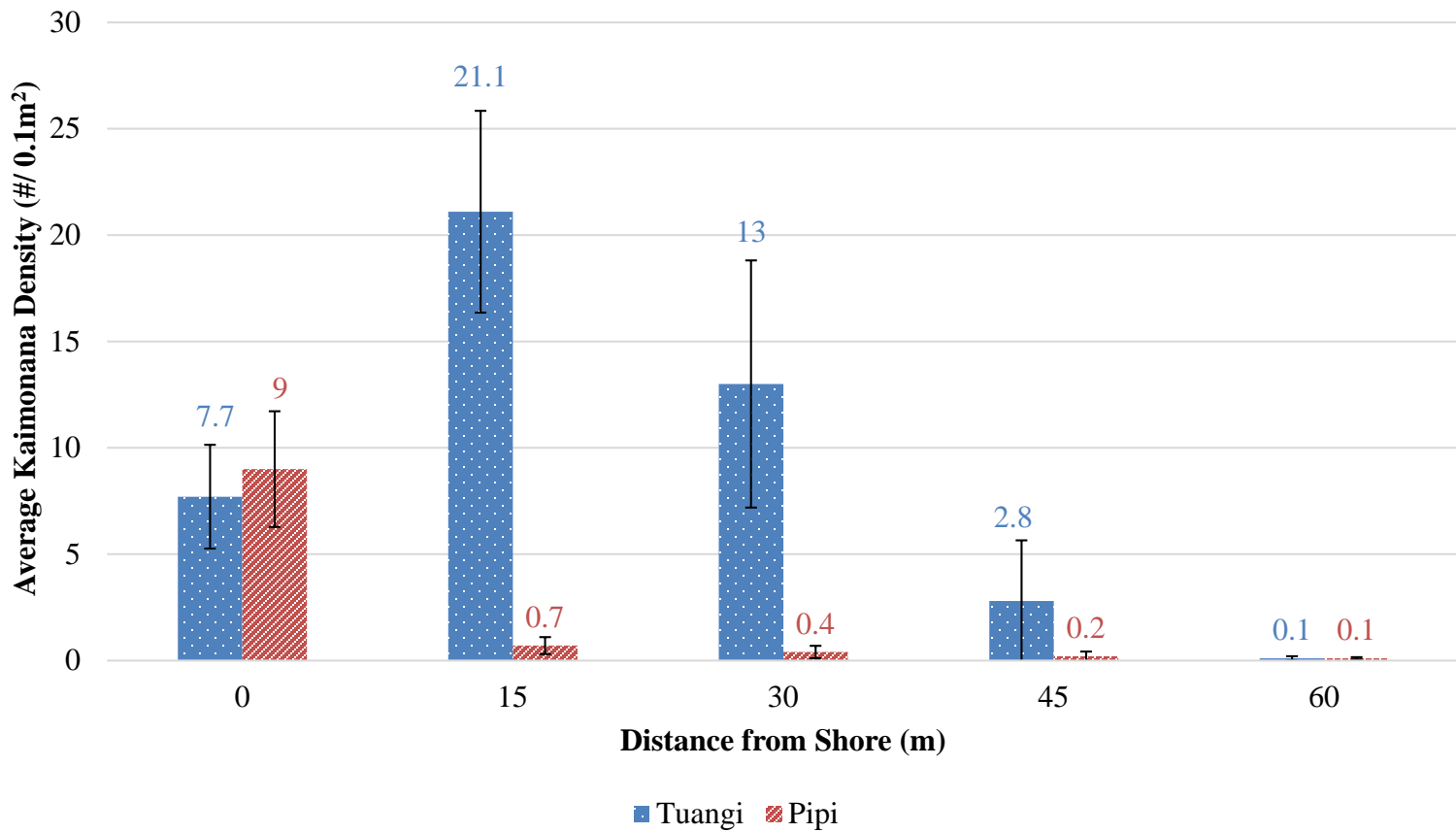


Figure 4: Kaimoana densities and seagrass percent cover by distance from shore. N above the bars is the average number of tuangi or pipi per 0.1 m<sup>2</sup>. Tuangi density is highest at 15 m and 30 m from shore. Pipi density is highest 0 m from shore. The changes in density are likely due to substrate changes from sand to anoxic mud. Error bars represent standard error.

### Comparison to Past Benthic Surveys

Pipi densities overall decreased since 2007 (Figure 5). The density was 9.48 per 0.1 m<sup>2</sup> in 2007 and 2.08 per 0.1 m<sup>2</sup> in the current survey. Linear regression shows a slight negative trend in density ( $y = -0.316x$ ). However, this is not significant due to other variability ( $R^2 = 0.046$ ). I am not sure why the populations increased in 2010-2013 and dropped again in 2014. Longer monitoring and knowledge from community members will help to determine if environmental factors caused the increase and decrease or if other factors are involved.

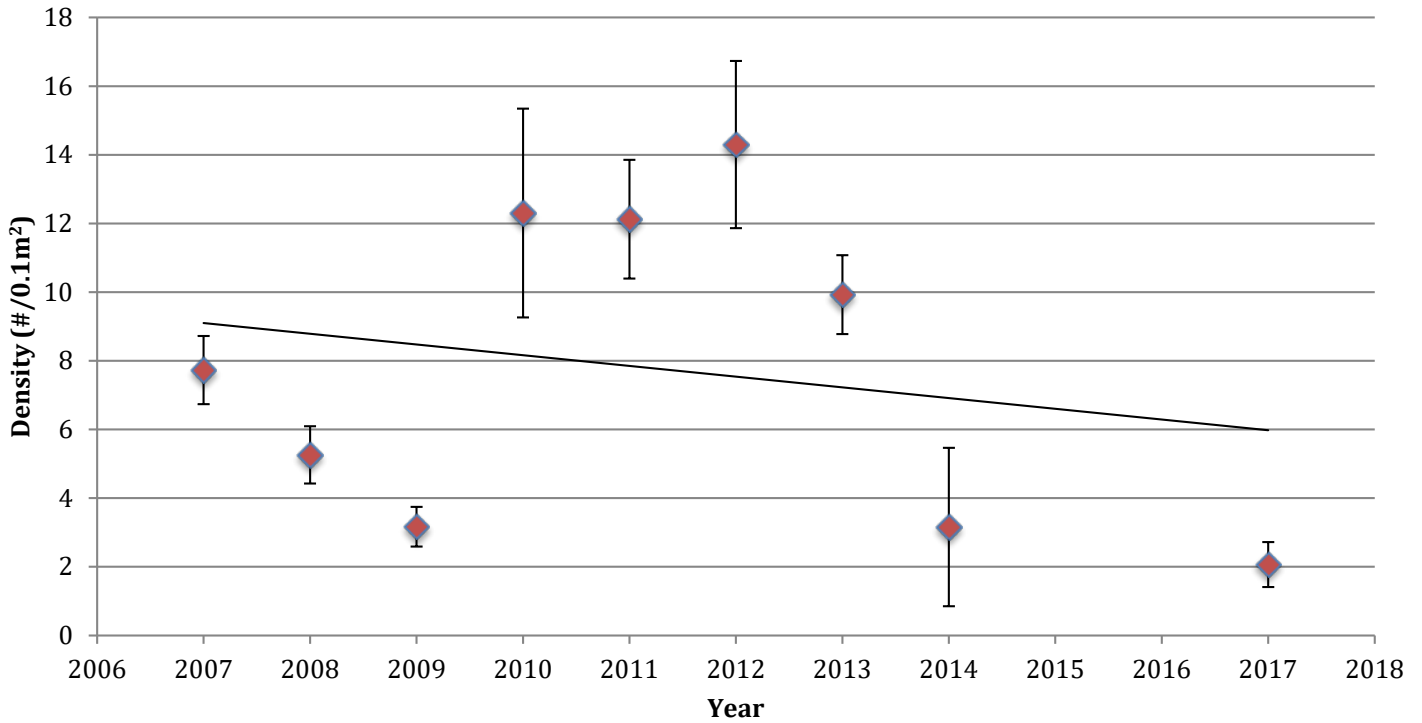


Figure 5: Pipi density per 0.1 m<sup>2</sup> ± standard error from 2007 to 2017. Change in density is not significant between years ( $y = -0.316x$ ,  $R^2 = 0.046$ )

Tuangi densities are higher than those 2007-2010, but lower than those in 2011-2014 (Figure 6). The density slightly increased ( $y=1.22x$ ), but is highly variable ( $R^2=0.33$ ). The variability between years may be due of pulses of recruits (Meadows and Richard, 2015). The variability can also can reflect where the transects happened to fall along the bay, whether they go through more or fewer of the high density patches. However, the steep decreases in population could also indicate higher environmental stresses after 2014 that reduced the populations.

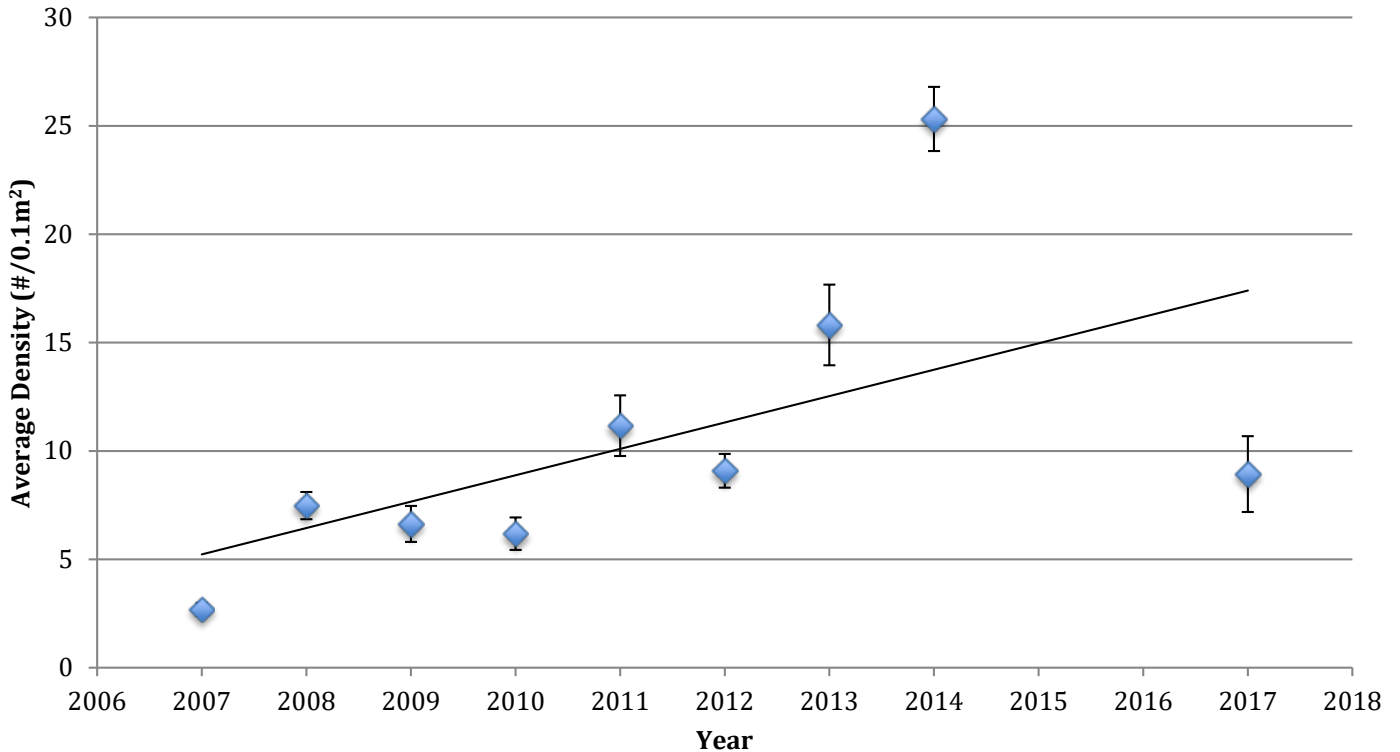
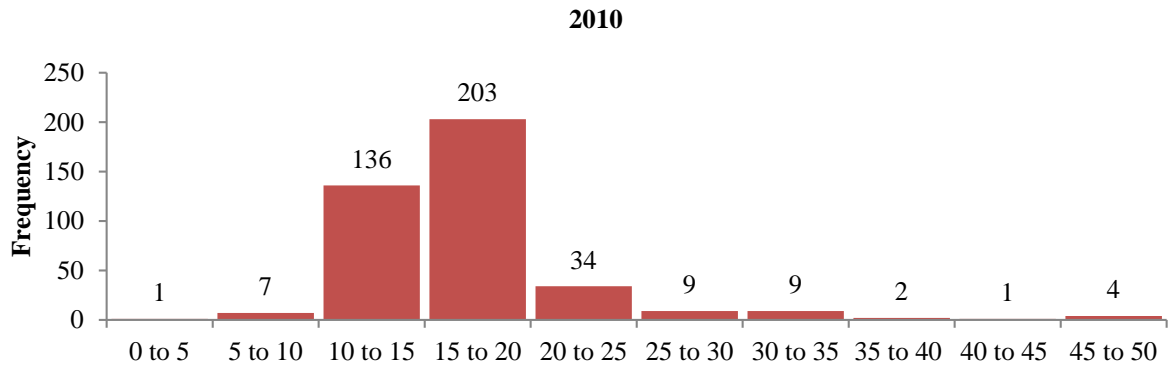
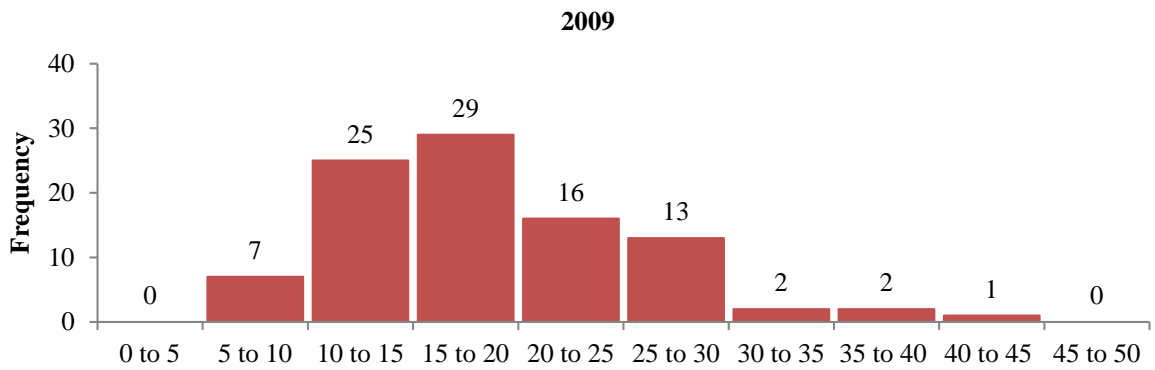
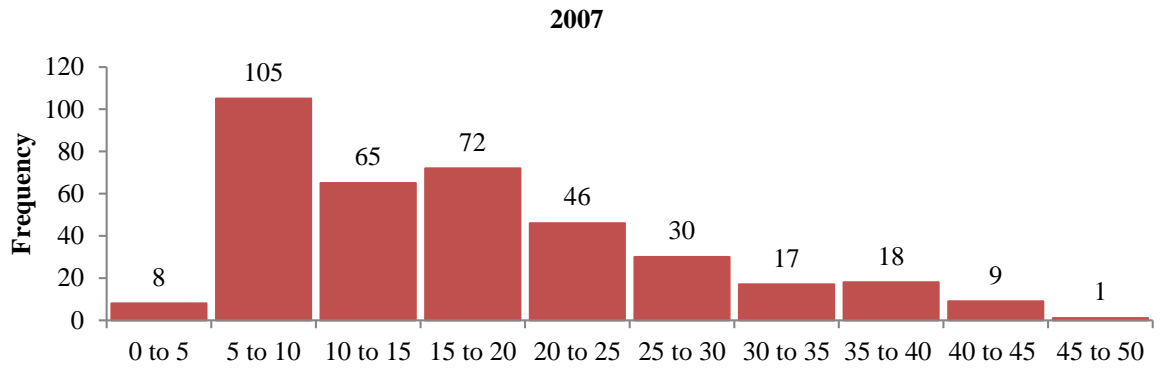


Figure 6: Tuangi average density per  $0.1 \text{ m}^2 \pm$  standard error from 2007 to 2017. There is not a strong linear increase between years ( $y=1.2179x$ ,  $R^2 = 0.33$ ).

I did not collect data on pipi size distribution but the community surveys collected data for 2007 to 2014. Papis are generally considered sexually mature at 40mm (Grant and Hay, 2003). Very few of the pipi are above 40mm (Figure 7). In general, the distribution concentrates around 10 to 20 mm.

We did collect size distribution for tuangi in 2017. Tuangi generally develop gonads at 18 mm and are considered sexually mature at 30 mm (Adkins 2012). In general, the size distribution increases from year to the next and then starts a cycle again (Figure 8).





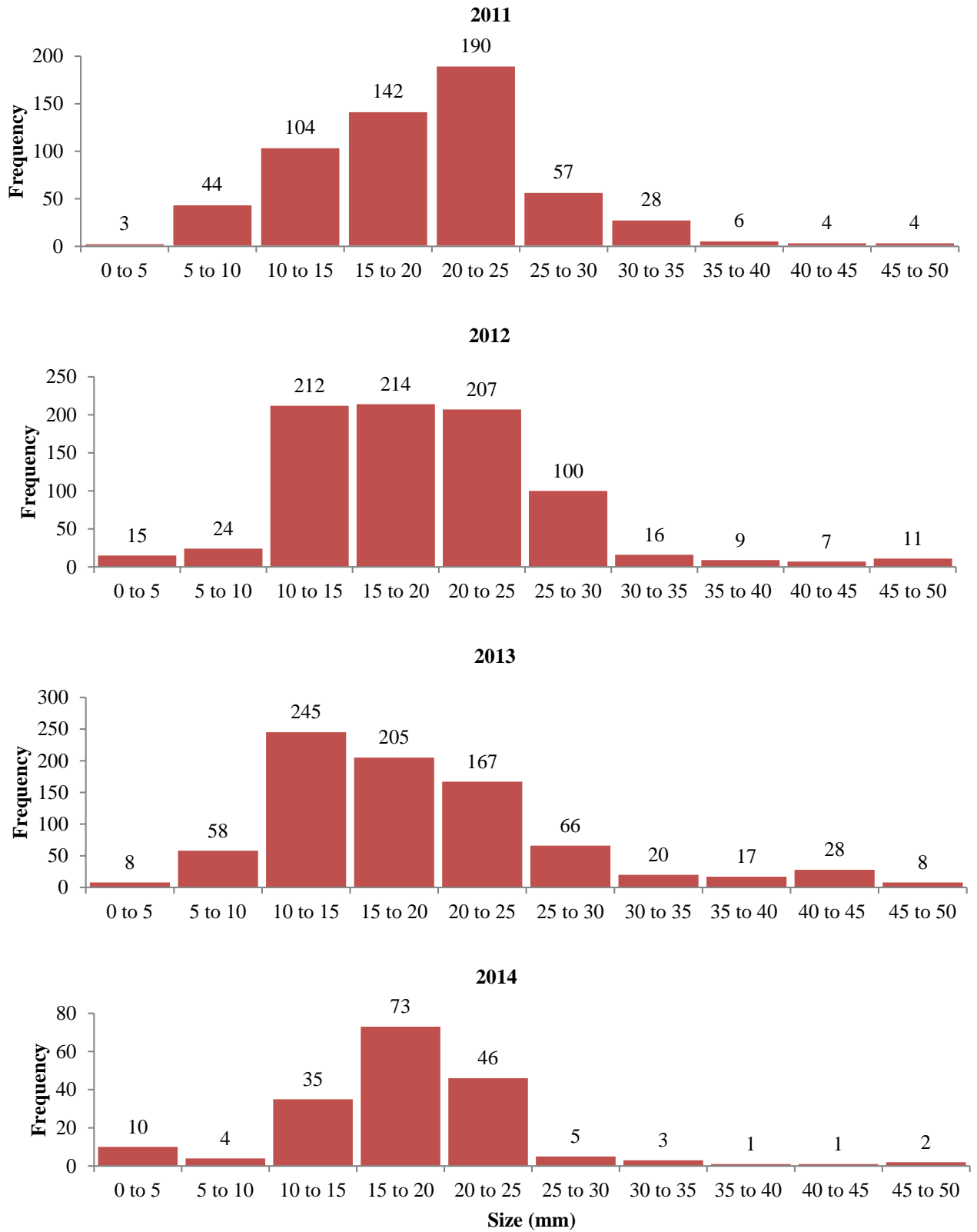
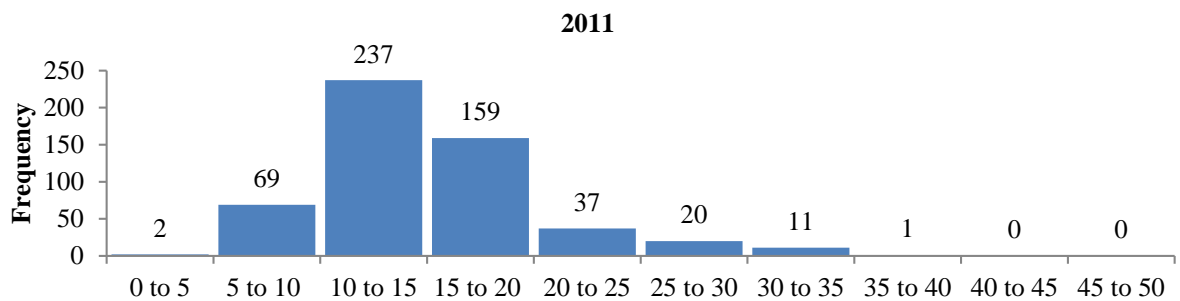
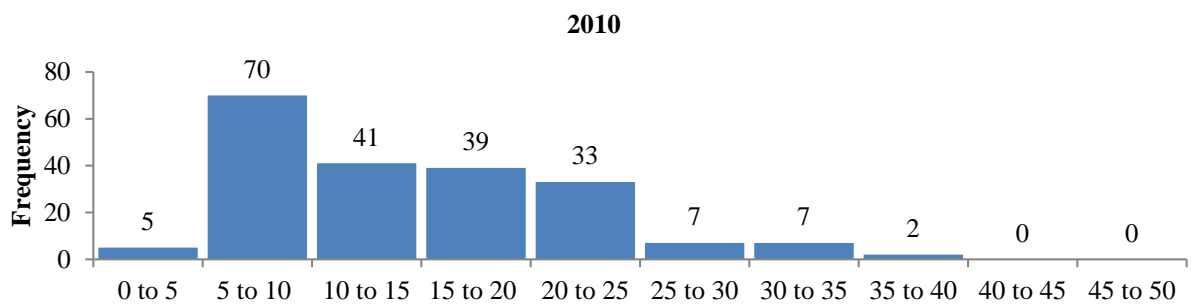
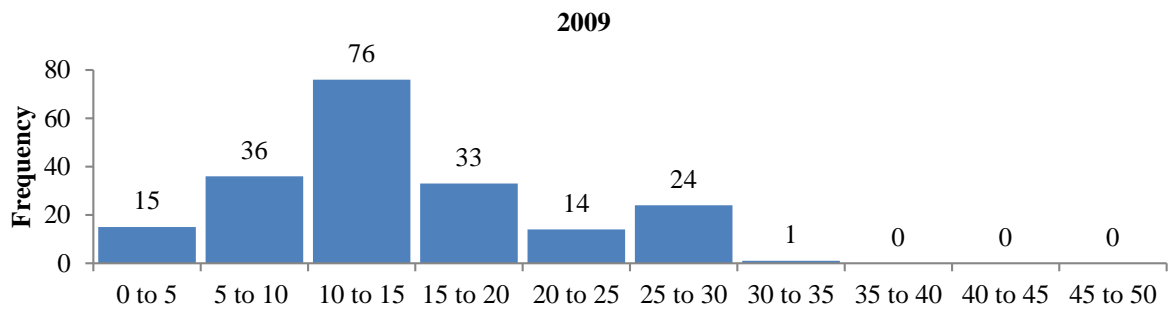
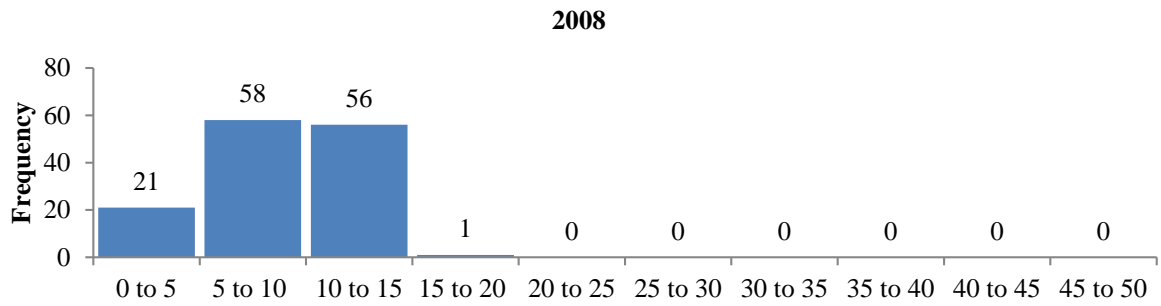
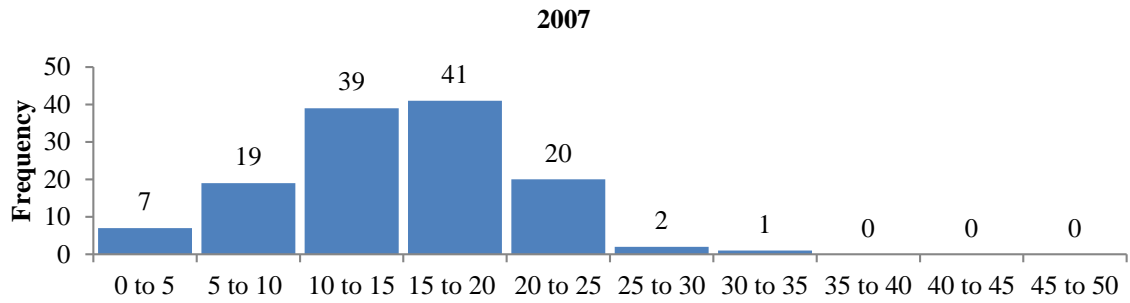


Figure 7: Pipi size distributions 2007-2014. The most frequent size classes are 10-15 mm and 15-20 mm. Note the Y-axis (count) changes with each graph. Size scale is left-closed.



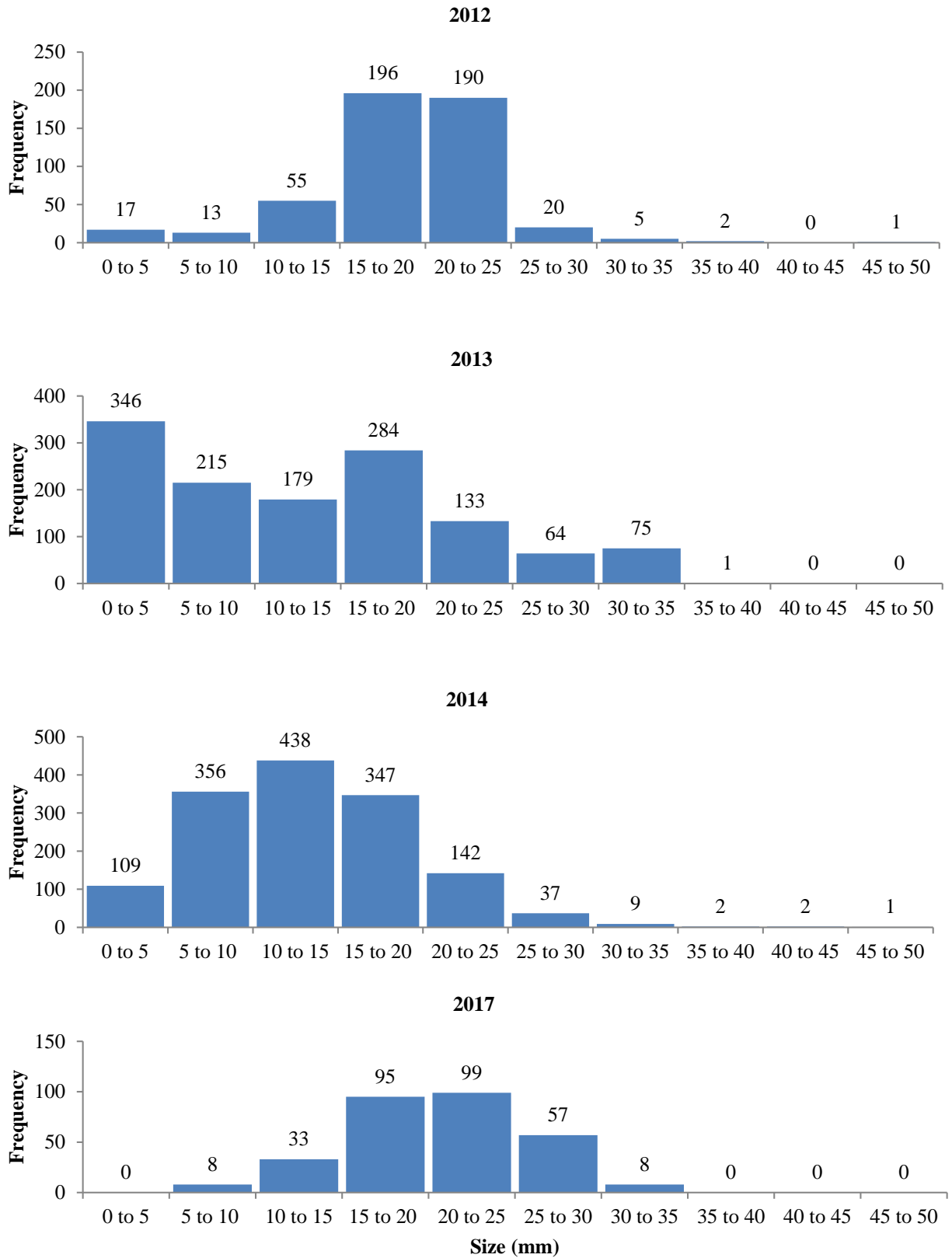


Figure 8: Tuangi size distribution 2007-2017. Sizes distribution increases then decreases every two years. Note the Y-axis scale (count) changes in each graph. Size scale is left-closed.

### *Seagrass Area Analysis*

The total area of the bay with seagrass has increased since the first available pictures in 2005 (Figure 9). This is likely due to improvements in water quality in the bay. The water quality has improved from marina waste diversions (M2). The Ōrākei Marina was built in 2005 as well, changing flow and sedimentation patterns in the bay. These new conditions may be better for seagrass growth in Ōkahu, but without sedimentation and flow analysis from before and after the building the effects are unclear. However, as with the tuangi and pipi densities, seagrass percent vegetated similarly decreases from a high in 2014 but shows signs of recovery by 2017.

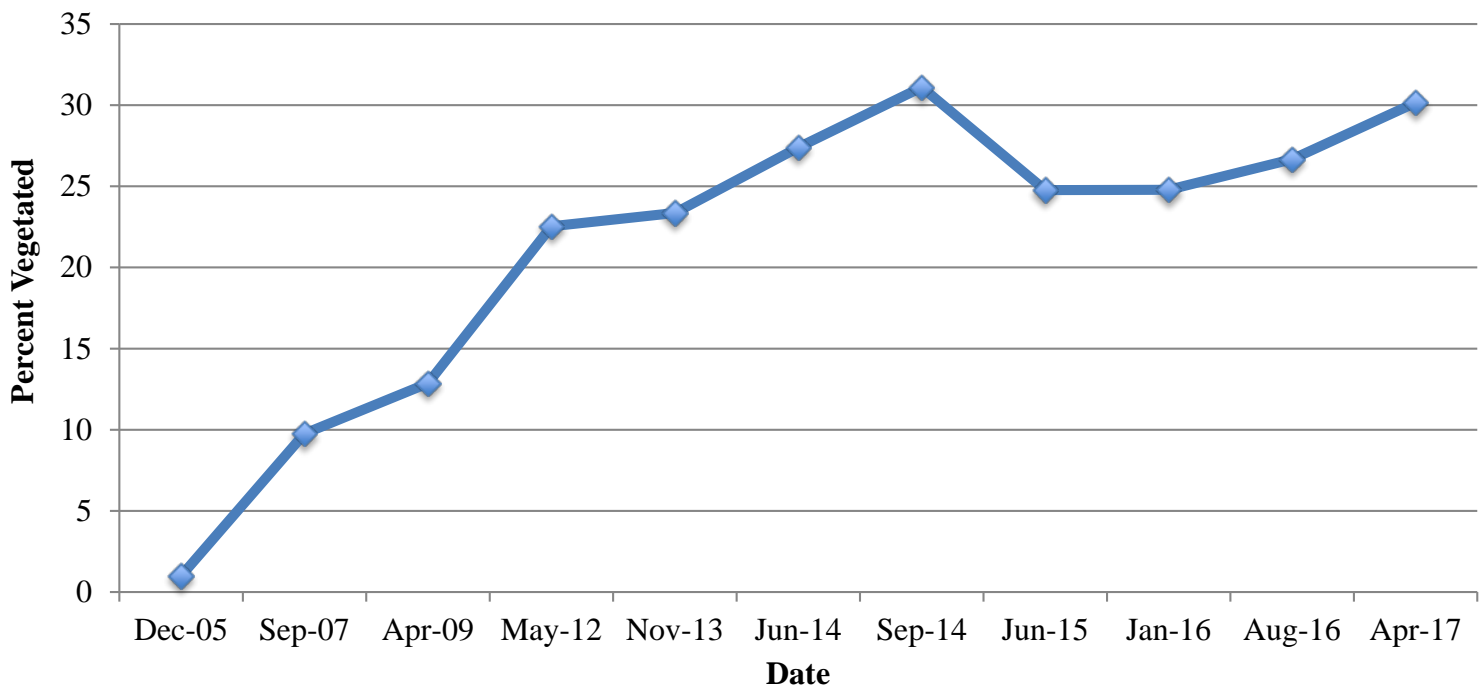


Figure 9: Seagrass percent cover in the whole bay from 2005 to 2017. Percent cover increases overall in this time

Overall, the increase in seagrass area can contribute to the increasing habitat diversity and support overall biodiversity and benthic productivity in the bay. While past studies show that an increase in seagrass area can contribute to increased habitat diversity and support biodiversity and benthic productivity (Lohrer et al., 2016; Leduc and Probert, 2010), in this case seagrass is generally more in areas with lower tuangi and pipi populations (Figure 10). This does not mean that seagrass is causing tuangi and pipi declines. Seagrass density goes from 0% cover at 0 m from the shore to peak at 48.6% at 45 m from the shore. Seagrass is found in areas with more mud

substrate. Seagrass density is negatively correlated with the tuangi density ( $r = -0.422$ ,  $p=0.00018$ ). Tuangi were usually found in areas next to seagrass patches rather than in the patches, though occasionally were found attached to the seagrass. Seagrass percent cover does not appear to have an effect on biodiversity ( $r = -0.047$ ,  $p= 0.678$ ).

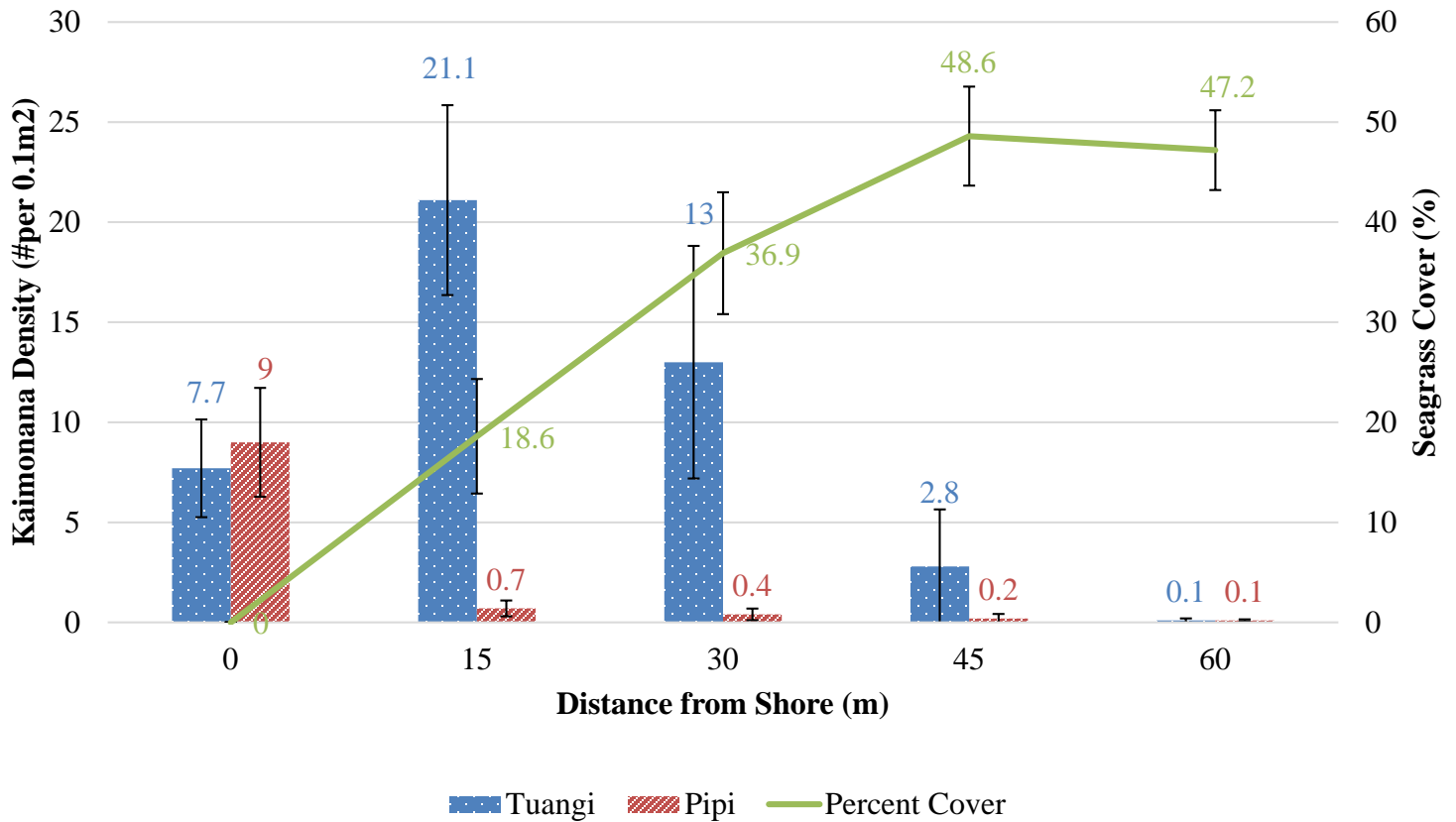


Figure 10: Tuangi, pipi, and seagrass average density by distance from shore. The green line and the right-hand scale represent Seagrass. Bars and the left-hand scale represent Tuangi and pipi. Tuangi density is greatest at 15 and 30m from shore. Pipi density is highest at the shore. Seagrass percent cover is highest at 45 and 60m from shore.

## DISCUSSION

This study is just another way of showing what Ngāti Whātua Ōrākei already largely knows about the *kaimoana* populations and water quality in Ōkahu Bay. People that are at the bay regularly know where the patches of *kaimoana* are, they know that the *kaimoana* has not recovered well, and they know that the bay is sedimented. As mentioned in an earlier chapter, people can feel that certain sections of the bay are dead (TW9). While Western science can come in and test that there are elevated concentrations of heavy metals in that section, people already have the knowledge about the state of the *mauri*.

Pipi and tuangi growth, reproduction, survival rates, and abundances are dependent on many factors including pH, temperature, wave action, substrate composition, heavy metal concentrations, food availability, and nutrient pollution (Grant and Hay, 2003; Marsden and Adkins, 2007; Norkko et al., 2006). These complex and ever changing interactions create significant variability between populations at different locations and in the population densities and age structures between years in the same location. This also makes restoration potential difficult to predict. That said, students and Ngāti Whātua Ōrākei have spent significant amounts of time monitoring the ecology and improving water quality in Ōkahu Bay. This work adds to the growing literature on tuangi restoration projects around New Zealand (e.g Marsden and Adkins 2010; Adkins 2012; Cummings 2006; Hewitt and Cummings 2013). The major risks for *kaimoana*, biodiversity, and health in Ōkahu Bay are similar to those in bays around New Zealand, including contamination from anti-fouling agents, urban runoff, sedimentation, nutrient inputs, storms, and development.

Overall, the biodiversity in Ōkahu has increased since last reported in 2012. However, some *kaimoana* species that used to be in the bay are still missing (TW6). The increases in seagrass may be supporting the increased biodiversity. Though tuangi and pipi are not found in areas with seagrass, they are found in nearby areas. It is unlikely that the seagrass is pushing out *kaimoana* species from the bay. However, seagrass may be trapping more fine sediment. Seagrass has been a part of the Ōkahu Bay ecosystem since at least recent memory. The seagrass may be trapping more fine sediment now because of the changes in flushing and increased sedimentation from urban runoff. The seagrass adds habitat diversity, oxygen, and nutrients to the water, likely helping to clean the water and support thriving ecosystems in the future.

Sediment characteristics appear to be a major organizing factor in tuangi and pipi locations. Mud has gotten closer to the shore since the marina was constructed, making the bay muddier than it has been in the past (van Kampen 2014). This survey agreed with results from other studies showing that pipi prefer sandy areas (Norkko et al. 2001; Cummings et al., 2002). Pipi are highly sensitive to increased silt and clay in the substrate (Norkko et al., 2001). They prefer to live in sand with 0-5% silt or clay. The observed declines in pipi density are not significant due to the high variability along the bay. However, the population may not be increasing because of the limited sandy area in the bay. The area near the shore is also subject to frequent disturbance by tides and people on the beach. The population hence may not be increasing because larvae and juveniles are not surviving or the existing adults are not reproducing enough to increase the population.

Tuangi are more resilient to silt and clay and are found in stable sediments that have a mix of sand and silts. Optimal silt and clay percentages for tuangi are likely around 5-10% with tuangi found in sediments consisting of up to 40% silt and clay (Norkko et al., 2001). Tuangi density and abundance has been highly variable since surveys began in 2007. This variability can be attributed to variable recruitment and larvae survival (Kainamu, 2012; Grant and Hay, 2003; Meadows and Ford, 2015). The size distribution moves in cycles, with smaller populations increasing in size over a few years and then decreasing in size again.

The variability in pipi and tuangi density between years could also be due to environmental factors. Increased environmental stressors could have caused the declines in population densities from 2014 to 2017. However, the gap in survey data in 2015 and 2016 makes it difficult to know if 2017 represents a sharp decline or if the population was steadily declining from 2014. This shows the importance of continued monitoring. While *hapū* members and other Auckland community members would likely know about environmental stresses and other changes to the bay between 2014 and 2017, without having tuangi and pipi density data from those years it is hard to know how to prevent similar declines in the future.

Though tuangi and pipi densities have not increased significantly, there has been a decade of sustained community engagement and deep interest in the *mauri* of Ōkahu Bay. This research is one of the longest continuous tuangi and pipi survey in literature. It has been defined by *hapū* goals and *mātauranga*. Future work improving the water quality through mussel shell filters, sand dune restoration, and moving the boat moorings in the bay will likely reduce heavy metals and anti-fouling substances in the water and sediment that may be restricting *kaimoana* growth and native biodiversity. Monitoring should continue in the future to better understand long-term trends and understand how environmental and human factors influence water quality and *kaimoana* populations. This is particularly important and exciting as the boats are removed and the mussels in the reef and *taura* mature and reproduce. In addition to increasing abundance of *kaimoana*, the engagement and increasing community control in the bay through decision making and monitoring programs is an essential part of restoring the *mauri*. Ngāti Whātua Ōrākei's long term vision for the bay supports the creative, community-centered solutions needed for effective rehabilitation.



## Chapter 5: Discussion and Visions for the Future

Ngāti Whātua Ōrākei's restoration of *mauri* to Ōkahu Bay gives an excellent example of a community controlled restoration process. Rather than just calling for centering the community in restoration, Ngāti Whātua Ōrākei is practicing community-driven restoration. They use current governmental structures to their advantage and combine marine research and their partnerships and creativity to implement their worldview and visions. Ngāti Whātua Ōrākei, along with Māori and ecological restoration scholars, has made it clear that the health of the environment, community, and individuals are all intimately connected. The restoration of one supports the others and none can be restored in isolation. Ngāti Whātua Ōrākei's values and understandings of histories, *mauri*, and interconnectedness between people and their environments drives the restoration in ways that keep the restoration grounded and maintain a long term vision. That said the restoration is not a romantic, smooth process. They are working through many challenges and face opportunities in the future to improve the restoration processes.

The restoration shows examples of ways to move from the technocratic and capitalist management of environmental systems to improving our relationship with our environments. Ōkahu Bay connects with many of the demands of international indigenous movements for self-determination, clean environments, and cultural recognition. While it is useful to connect with the international movement to remember that indigenous peoples around the world are not alone and connect in an overall Māori movement to address all-Māori issues, the implementation of the demands are at the local level (Waitere and Allen 2011). Ngāti Whātua Ōrākei focuses on their own *hapū* in the restoration and in the decision-making processes, but also recognizes that their restoration benefits the people of Auckland as a whole. This local focus comes from New Zealand history, Māori worldviews, and local dynamics. Before Europeans came, the concept of Māori did not exist; colonizers used the concept to homogenize Māori and take away their cultural uniqueness and identities, working to colonize them further (Waitere and Allen 2011). In terms of worldview, *mana whenua* means that a *hapū* can gain authority over their land but also does not have authority to speak for other land and other peoples. Finally, as other indigenous rights and restoration experiences show (e.g. Niezen 2003; Simms et al. 2016), the dynamics with the environment, colonizing government, community groups, worldviews, law, and local relations are highly site-specific; understandings from one case do not directly apply to other cases but may have general questions to consider. In this case, Ngāti Whātua Ōrākei's restoration has important

lessons on communication, respecting community values and goals, marine restoration techniques, and focusing on the human connection in restoration.

Ngāti Whātua Ōrākei has made immense progress in certain areas of the restoration process, including increasing their presence in decision-making and creating partners that support their worldview. Having a presence at local government meetings allows them to have an influence in citywide decisions and decisions specific to Ōkahu Bay and build trust to better implement decisions and ask for help when needed. Building personal relations between points of power in the city is critical to building a public face and respect. Through contracted reports and well-written restoration plans (e.g. Kahui-McConnell 2012; Afoa 2014), they have been clear on their worldview and their goals. Laying these out explicitly makes working with Ngāti Whātua Ōrākei and supporting them more accessible to people outside the *hapū*. After writing restoration plans, it is not the *hapū*'s responsibility to educate people on their worldview but for the people with which they are meeting to educate themselves accordingly. In this way, Ngāti Whātua Ōrākei can use their time working with people rather than educating people on the same topics every time, helping local government and outside organizations increase their capacity to work with Ngāti Whātua Ōrākei.

These lessons in community values, implementing our imaginations, and marine restoration techniques come together in the mussel reef restoration efforts and the mix of organizations and people that were involved (see Chapter 1). Ngāti Whātua Ōrākei is committed to using the research from community groups and university students to learn about the restoration process and improve reef restoration practices in the future. Their successes and failures add to marine restoration knowledge for themselves and for others doing similar work in the Hauraki Gulf and around the world. In addition, Ngāti Whātua Ōrākei is building *kaitiaki* in the *hapū*. The Community Shellfish Monitoring and educational programs at the bay has also done a fairly good job of engaging several years of children and encouraging them to study marine science:

“We definitely were starting to see changes, changes in kids doing science in school, going to university to study science. Because *whānau*, their families, come to me saying, “Oh my god, I can’t believe my baby wants to study marine biology. I don’t think she ever did before the monitoring.” Well okay that says that something worked! So that would be just teaching their babies about the marine environment in their own marine environment. (M7).

The children also come back and talk to their parents about Ōkahu Bay and the cool organisms they found and the fun they had. This can rebuild their parent’s interest in Ōkahu Bay and help to

show people that recovery is possible (TW8). Some kids pick up trash from the beach when they are there on their own, continuing physical stewardship actions on their accord. Building marine scientists that come from a Ngāti Whātua Ōrākei worldview both helps to engage students at the bay, creating a body of knowledge about the bay. This also can motivate students to increase the dialogues between *mātauranga* and ecological restoration fields. Orakei Water Sports also engages people at the bay by building community through *waka*. By being on the water they care for the bay and build knowledge of the regular feelings in the bay. One *hapū* member especially complimented Orakei Water Sports: “By the water sports club being down there that’s awesome because *whānau* are going down there and we have a big group of people doing *waka ama* on the water. For the health purposes for them but also because they are going down to the bay regularly” (TW8). Witnessing the changes in the *mauri* of the bay, both up and down in recent times, helps people connect and understand where they can help to care for the bay.

However, people still need to be brought into the bay in more intentional ways, at least for now. The *hapū* members I interviewed still have the perception that no one (or not that many people) go to Ōkahu Bay or really connect with and understand Ōkahu. Another major weakness is that there is no longer a person dedicated to overseeing and coordinating the restoration process and engagement. The former environmental manager was let go before training anyone else and the position was absorbed into other positions (M7). Having someone focused on the restoration pushed the vision into reality. While the *hapū* was involved in making the Ōkahu Catchment Ecological Restoration Plan and it was made with their words and their visions, the environmental manager started the initiative to make the plan and completed the interviews with *hapū* members. In many cases, this person made relationships with Council and with the businesses and community groups in Ōkahu Bay and the Hauraki Gulf. It is a massive undertaking and one interconnected with all aspects of the *hapū*, but still allowed to have some focus. No one was hired to have a specific focus on Ōkahu Bay, to keep organizing programs, envision and implement restoration projects, and work with Council.

In terms of management, some people would not say that there is “management.” I acknowledge that “management” is a technocratic notion and may not have been the appropriate word to use, but it still speaks to a gap in communication between the plan, the actions at the bay, and the larger *hapū*. When asked what she thought of the current management, one *hapū* member hesitated for a few minutes and said, “I don’t know if I’d ever describe there to be management of the bay. Would I want for there to be a more concerted effort to improve the health of the bay? Definitely.” (TW9). Another *hapū* member said, “I know it’s there but I really don’t know on the

ground what that means” (TW1). This points to several challenges in the restoration process. In some areas *hapū* members do not see the focused *hapū* involvement in management and idea generating. In general, *hapū* members are still disconnected from the management processes and how decisions are made. From what I have noticed and heard from one *hapū* member, it is easy to not think about Ōkahu Bay or the management unless it is in the news: “I don’t know about the current management structure at all. I’ve heard about what’s happening, I think one of my nieces is on the reserve board... If I hear about I listen. If it’s on the news I listen” (TW3). While this person wants to get involved, they do not think about the management and restoration regularly. Some important decisions, such as stopping beach cleaning were not well communicated to the overall *hapū*, speaking to a broader communication gap: “So that [stopping beach cleaning] was a win for me. And *whānau* won’t know that because there was no communication from Ngāti Whātua to their *whānau* except for my presentation to the Taumata [Elder Council]. We’ve turned that into a policy through the Whenua Rangatira Reserves Plan that there is no beach cleaning. But *whānau* won’t know there is a difference” (M7). Improving communication on management decisions and practices and helping people get involved may help change the negative perceptions some *whānau* have of Ōkahu Bay as well as help people get engaged in the restoration processes when they want to.

Further, while I am not part of the *hapū* and did not listen to informal conversations people have or know what happens at *marae* or other community meetings, I did not see much about the restoration outside of specifically researching Ōkahu Bay. Besides a link to the Ōkahu Catchment Ecological Restoration Plan, there is little information on the *mauri* of Ōkahu Bay on the Ngāti Whātua Ōrākei website. Adding more information or links to the research and projects that have been implemented would help to engage more people in the restoration and be more informed with the state of the bay. Further, some interviewees wanted to see more information at Ōkahu Bay about the restoration activities and Ngāti Whātua Ōrākei in general. Knowing what is already happening and the work that needs to be done may inspire some people to get more involved. It seems that *hapū* members want to be involved but are not quite sure where to start. Without the Community Shellfish Monitoring Survey and without a dedicated person at the bay organizing programs and events, some *hapū* members are concerned that people will not have conversations about the current state of the bay if the knowledge now is that the bay is dirty. Having more information in publically accessible places can help to generate conversation and build on the various forms and paths of knowledge that people in and out of the *hapū* have made.

Moreover, Ngāti Whātua Ōrākei can only do so much to clean Ōkahu. As one *hapū* member said, “You can only push your *waka* so far before you have to go see the big people... I think that if there is a way to remove those bigger hurdles then people like Richelle can do the big things” (TW8). Tamaki Drive (the old sewer pipe) and the stormwater runoff entering the bay is the root of the water quality and sedimentation problems. As I showed in the ecological surveys, *kaimoana* populations have not significantly increased despite a decade of restoration and community engagement, largely because the major infrastructure bringing pollution and sediment in the bay. To truly allow the bay to recover, Auckland Council needs to change the runoff infrastructure in the city. This acknowledges the historical and ongoing trauma from the sewer pipe but also would be the biggest impact on improving water quality and remove the barriers to allow Ngāti Whātua Ōrākei better implement their restoration. The Landing has made changes with their waste filtration system, but the city runoff pipes and the road do not have similar filtration systems. Auckland Council is not prioritizing this undertaking though it says it is committed to improving water quality and the overall environment (Auckland Council 2017). Several interviewees argued that Council will pay more attention if more people swim in the bay and demand changes to the stormwater infrastructure: “If you have people in the bay then you have leverage and then people want it to be changed and you need to change the status quo. Because why improve it if no one is going?” (TW8). As discussed in Chapter 2, Council and other groups have been discussing changing the stormwater runoff or adding filtration for about 15 years or more, but it is clearly not one of Council’s immediate priorities. Redoing the stormwater infrastructure to either have effective filtration or reroute it to another site would be a massive, time intensive, and expensive undertaking. Further 22,000 people use Tamaki Drive every day, making this an issue that Ngāti Whātua Ōrākei and Council would need to discuss with various stakeholders and understand the feasibility of moving the road. The power to make infrastructure changes lies primarily with Council.

Though not a problem now, management and enforcement of catch limits will be a future challenge for Ngāti Whātua Ōrākei. This may become a problem when tuangi and pipi populations are sustainable and safe to eat. In Auckland’s urban environment where multiple communities regularly use Ōkahu Bay, people will likely wipe out the shellfish populations if there is not enough enforcement: “If people collect *kaimoana* from the bay that would be fantastic. I think there needs to be some education for that. Because you know it’s such a small bay and will only ever be able to produce so much before it is decimated again” (TW9). Some survey participants mentioned that they would not want to collect *kaimoana* from Ōkahu because of the pressures of urban areas. *Hapū* members were concerned about ruining *kai* populations

again and about taking out the “cleaner” from the bay. One *hapū* member advocated for greater policing or external enforcement: “They would have to control the people that go and harvest the shell food. Because they go out and they are smaller now, the pipi, and they take buckets full. So there has to be stricter control” (TW6). He continued, “Far too often there’s going to be those that come down here and know the limits and they will take as many as they can and slide it under the bag.” One *hapū* member was thinking of ways to balance the environmental, ecological, and social interests with regards to *kaimoana*: “Maybe once a year we have a community pipi patch and so many are taken and we have a cookout at the bay. But really we need to acknowledge first what the *kaimoana* bring to the bay. It’s health first. Feed the bay before we feed ourselves” (TW9). Ngāti Whātua Ōrākei will have to educate *hapū* members and the wider Auckland community about the value *kaimoana* bring. They will have to decide how and when to responsibly harvest and who can harvest.

### **Visions for the Future**

Overall, *hapū* members want clean water and to have the *hapū* using the bay again. Clean water is essential for people to return to the bay but people are also essential for bringing clean water. As I learned in the interviews and other *hapū* members expressed in the Ōkahu Catchment Ecological Restoration Plan, *hapū* members want people to swim without fear and to hang out at the bay: “I just want to see this bay alive with people having fun. Families that aren’t scared for their children to swim in here” (TW4). The water needs to be clean to have people use the bay again and have a healthy ecosystem: “Clean water, because then, we still have activities based around that area, well ideally the water quality might be better than what it is, and if that happens then it follows that other things would repatriate the area” (TW2). Getting clean water requires changes from Council, more mussel reef and filtration projects, and *hapū* engagement and monitoring projects. People appreciate the work that has been done in the past, want to get involved, and want to see the bay improve in their lifetimes (TW3). Some *hapū* members feel a responsibility to give back to the bay: “The bay’s always brought good things to our family, so I think it’s time to reciprocate” (TW8).

The visions for the bay include *hapū* members leading and making decisions as *kaitiaki*. One of the goals of restoration is to remove the barriers that stand between the theory and practice of Māori cosmology (Jessica Hutchings 2002). They want to build the power and capacity to self-determine: “My ancestors must have been in a really happy state. When the environment was in a really healthy state. They could source kai from outside their door. So that’s what self-determination looks like to me... So that we don’t have to worry about the health and wellbeing

of the place we are living in” (TW5). By getting students involved at Ōkahu and bringing more *whānau* in to the bay, the community can advocate for themselves and can act as *kaitiaki* to improve the water quality and take care of the environment and community together.

When asked what they want to see in the future of the bay, most people had concrete ideas for engaging more people at Ōkahu Bay in their daily lives. *Hapū* members have many ideas on how to make the bay fun for families and want the bay to become a family place again. One *hapū* member wants to establish a *waka* racecourse and put in a slide and trampoline give people areas to play (TW4). Others support having more play areas in the bay. One *hapū* member talked about the pontoon that is in the bay now. The pontoon, “is a tool that *waka* paddlers use for training... But it also represents a real play space for kids. It really brings back life in the bay. More playing in the bay would be great” (TW9). Currently, no one swims in Ōkahu at low tide. One *hapū* member suggested putting in a tidal pool so families can safely swim anytime: “I’ve seen a lot of bays around Aussie and other areas around the world where they create a tidal pool. And the tidal pool is to create a safe place for families that they can get their children to swim. And especially at Ōkahu with how far the tide goes out, with a tidal pool in there the families can still go down there and have family time, the kids can still swim” (TW8).

In terms of making the bay a nicer place to visit through amenities, several survey participants and one *hapū* member talked about potentially putting trashcans back at the bay. While the trashcans were taken away to encourage people to be responsible and take their trash away, some people end up just leaving their trash at the picnic tables or bagged on the street (TW8). Many people from the wider community walk their dogs at Ōkahu every morning and want trashcans to drop their dog poop. Looking at the amount of trash between parks with trashcans and those without would help to make the decision on whether or not to bring back bins. One of the Auckland Council sanitation workers that works at Ōkahu picking up trash said they wanted to have rubbish bins at the bay. Other survey and two interviewees discussed that there is not a place to get food or drink within close walking distance of Ōkahu. Some survey participants absolutely wanted a café and one *hapū* member said it might be a nice way to further encourage people to stay longer. However, others were adamant that Ōkahu should remain a natural area and not commercialized as Mission Bay<sup>6</sup> is. One interviewee thought Mission Bay was disgusting while Ōkahu Bay is clean and natural. Some interviewees insisted Ōkahu should be kept as a natural area. Others went back and forth but thought there might be a good reason to have a food store or

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<sup>6</sup> Mission Bay is the next bay to the east of Ōkahu Bay. It has many high end shops and expensive cafes and restaurants.

stand: “In today’s world people like to be able to buy an ice cream or a coffee, so if that was that ability, maybe. To have a mobile caravan or just in general people that can sell on the beach... Which is a little bit sad, because it’s a consumerism world, but you know” (M3). Some argue that more families will come for longer if there are food and drink options. Ngāti Whātua Ōrākei will be able to decide if the *mauri* is enhanced if there are food options at the bay or if the *mauri* is degraded.

Importantly, these visions speak to the contemporary context of Ōkahu Bay rather than thinking it needs to be “pristine” or go back to a past state. Kids now hang out at Parnell Baths, a swimming complex with water slides and different pools. It is not that people do not like swimming but likely that people think Parnell Baths are more fun and cleaner. Bringing that fun and life into Ōkahu Bay helps to achieve the same community goals that people used to have. Bringing in people where they are and within the current context is essential to building a mass of people who use Ōkahu, informally talk about Ōkahu, and who advocate for Ōkahu. Being a *kaitiaki* or having the bay in a healthy state does not imply a certain condition or specific look but is a fluid concept that works for the overall health of Ōkahu and the community in the current context.

Those involved in the restoration see that much of the work involves community education to work on the actual issues in the bay but also involves changing people’s perceptions of the bay as just a dirty bay to one that is a family place. From changing perceptions, people will be more inclined to go to the bay and think about it more: “Some people are informed by fear and other perspectives. And some people are informed by fact. And the ones that are informed by fact are the ones that are probably more involved than others” (TW8). Not only will this encourage self-sustaining *hapū* engagement, but also, “if the people are going there then the higher powers in the Council are committed to maintain the high standard for the water and everything else like that. For me, it’s like if the people are there then that is another reason for them to bother about it” (TW8). This is a form of activism to make Council care about the water in Ōkahu Bay and put it on their list of priorities to change the pipes and road runoff. The argument is interconnected because more people will come to Ōkahu if the water is clean and if it looks nice: “Well I’d like for it to not be *paru* (dirty) anymore. And that would help make it look nice I suppose” (TW3). When asked if they thought more people would come to the bay if the flooding on the other side of road was fixed this person answered, “oh yes. Because a lot of people walk around there and cycle so you need something nice. Nice scenery.” People currently appreciate the bay at high tide when most of the mud and seagrass is covered but are less inclined at low tide when it does not



look as nice. Educating people on the importance of seagrass and the interesting organisms in the mud may help to make low tide look just as nice as high tide.

As discussed in Chapter 2, all users in the bay want more communication. Overall, the different groups have good relationships but can often miss information that's important to the others: "It just revolves around communication really. With other groups. If there's something we can do, we've just got open doors and that's pretty much it" (M3). *Hapū* members want to have a better sense of what other groups are doing to be able to understand the current state of the bay and how to work off the others:

At the end of the day, even for us, it comes down to communication, how we get that information out. We're all on social media more or less, we have letter boxes as well, we can go to meetings, so these are things we can do to get the information out, maybe our close neighbors can do the exact same things... I know they've got a relationship with us, and I know they've got people responsible for that, but maybe they need to do a little bit more about their attempts are as far as the ecosystem goes. So they could photocopy a small A5 piece of paper with some bullet points, walk along Kupe Street<sup>7</sup>, and put it in. Easy. (TW2)

Engaging people as users and *kaitiaki* not only means having a physical presence and being involved in taking care of the bay within the *hapū* but also knowing the current state and what others are doing and thinking about as well. While Ngāti Whātua Ōrākei is centered in the restoration, others are involved in their own way and the *hapū* and individuals in the *hapū*, not just the Trust Board, want to know what is going on and what it means. Communication is important to affirm Ngāti Whātua's place as decision makers and *kaitiaki*. It is also engages *whānau* to have a story that the bay is alive and the *mauri* is improving. As one *hapū* member said, "In my society, communication goes everywhere. That is how you make your *mana*" (TW5).

Ōkahu Bay has immense community, love, history, and challenges in its past, present, and future. Ngāti Whātua Ōrākei and others in the wider Auckland area are working hard to restore their communities and waters. Ōkahu "still needs lots and lots of work. It still needs lots of tender loving care. Just to get that feeling back" (TW9). It takes a long time to, "get over a 170-year hangover" (TW5). However, Ngāti Whātua Ōrākei is making this restoration successful through centering their worldviews and building from their *mana whenua* and holistic view to build respect and community. As this thesis has shown, the long history and connection to Ōkahu Bay

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<sup>7</sup> Many Ngāti Whātua Ōrākei people live on Kupe Street

through *whakapapa* and the current respect that Ngāti Whātua Ōrākei has built make this restoration possible. While there are challenges and gaps in implementation, Ngāti Whātua Ōrākei has the vision and capabilities to work through these and fulfill their visions. The *hapū* has laid out a vision through Māori cosmology to engage all their people as *kaitiaki*: “Our nation is guardians. We’ve forever known how to grow and to guard. That is the way of the *kaitiaki*. You can’t grow unless you contribute back to society, to the environment, to our people” (TW5). The restoration is based around making everyone *kaitiaki*, “because if everyone is a guardian, no one needs to be” (TW5). Ngāti Whātua Ōrākei is successfully showing to themselves, to Auckland, and to the world what being *kaitiaki* in an urban, contemporary environment can look like on the ground through their pragmatic decisions, relationship building, big vision, challenges, and successes. Beyond arguing for community involvement in restoration, they show why community is central in restoration and restoration is critical for community.

The restoration shows that a clean environment is essential to build community and a community is essential to build a clean environment. They build from each other and grant each other the ability to thrive. It confirms Durie’s (1998) assertion that land is critical for Māori self-determination. The restoration of *mauri* to Ōkahu Bay shows that implementing the imagination of a thriving world, of Auckland in a state of wellbeing, is a long process and necessarily a community-driven process. This community-driven restoration will make the sustainable changes that people and the environment demand. The *mauri* of Ōkahu Bay has improved and will continue to improve in the future. But as one of the interviewees said, we should go leave Ngāti Whātua Ōrākei to do their work because, “I’ve got a nation to rebuild. An environment to protect” (TW5).

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## Appendix A: Glossary

Definitions derived from *Māori Dictionary* and *Te Ara: The Encyclopedia of New Zealand*

- Ahi kaa: maintaining land by having a presence, literally translates to burning fires
- Aotearoa: Māori name for what is now called New Zealand
- Atua: god, ancestor with continuing influence
- Hapū: sub-tribe, made of a number of families that share a common ancestor, also means to be pregnant
- Hui: meeting
- Iwi: tribe, large group of people descended from a common ancestor and associated with a certain territory
- Kaimoana: seafood (kai means food, moana means sea)
- Kaupapa Māori: topics of concern to Māori
- Mahi: work
- Mana whenua: territorial rights, authority over land
- Mana: prestige, authority
- Māra kai: food grown in a garden
- Marae: Māori meeting and religious house
- Mauri: life-force
- Native Land Court: Established in 1865 to help sell Māori land
- Ngāti Whātua Ōrākei: people of Ōrākei, Māori sub-tribe that traces their ancestry to Ōkahu Bay and Ōrākei area of Auckland, New Zealand
- Pā: fort
- Papakainga: village
- Papatūānuku: Mother Earth
- Pipi: *Paphies australis*, an edible bivalve, endemic to New Zealand,
- Rāhui: ban on certain activities, generally to reduce harvesting pressure on an ecosystem or ban on going to an area or body of water if someone has recently died there
- Rangi-nui: Father Sky
- Tamaki: Māori name for Auckland
- Tangata whenua: people of the land, term Māori use to describe themselves as indigenous peoples
- Taonga: sacred, treasure, something prized, whether an object, species, idea, or technique,



- Te Tiriti o Waitangi (Treaty of Waitangi): Treaty signed between British Crown and Māori chiefs in 1840. The English and Māori versions of the treaty have different ideas of what the treaty does. The English version gave Britain sovereignty over New Zealand and gave the Governor the right to govern. The Māori version gave Māori rights as British citizens and ceded the right to govern the whole country to the Crown but retained rights to govern their own land, resources, and people
- The Crown: The New Zealand Government
- Tuangi: *Austrovenus stutchburyi*, New Zealand cockle, edible bivalve found around New Zealand
- Tuku rangatira: gifts between chiefs
- Urupā: cemetery
- Waitangi Tribunal: Established in 1975 to investigate breaches to the Treaty of Waitangi
- Whakapapa: genealogy, viewing the world through its connections rather than taking things apart to understand
- Whānau: family, also to be born

# THE ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN

*“What mana allows, indeed requires, is sharing”*

(Sir Hugh Kawharu, 2004)



NGATI WHATUA O ORAKEI

***Visionary statement: Waters fit to swim in at all times, with thriving marine eco-systems that provide sustainable kaimoana resources to a Ngāti Whātua Ōrākei community who have strong daily presence in and on the bay as users and kaitiaki***

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Environmental performance indicators of Ōkahu Bay Community	<b>Page 31</b>
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**Document prepared for Ngati Whatua Orakei 2012**

**Compiled by: Richelle Kahui-McConnell**

## THE ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN

### PHASE I – PLANNING PROCESS

The Ōkahu Bay Ecological Restoration Plan (ŌCERP) has been developed in order to implement the Whenua Rangatira Reserves Management Plan and the Ngāti Whātua Ōrākei Heritage and Resource Management Kaupapa, Strategy and Policy 2010-2011. It looks to promote, develop and enhance Ōkahu Bay as the public face or gateway to the Whenua Rangatira while respecting its existing cultural and spiritual value to the Tangata Whenua and enhancing its relationship with the Waitematā.

The ŌCERP sits firmly within the Ngāti Whātua Iwi Management Plan and alongside the work conducted by the Heritage and Resource Management Unit of Ngāti Whātua Corporate. It is anticipated that the tasks required to implement the ŌCERP will work in conjunction with the Heritage and Resource Management Unit and will rely on complete integration of work streams to ensure a successful outcome.

**Visionary statement:** *Waters fit to swim in at all times, with thriving marine eco-systems that provide sustainable kaimoana resources to a Ngāti Whātua Ōrākei community who have strong daily presence in and on the bay as users and kaitiaki*

**Section one** defines a set of Ōkahu Bay Restoration Management Objectives identified to implement restoration outcomes as identified by Ngāti Whātua Ōrākei ecological health indicators

**Section two** outlines the historical perspective of the Ngāti Whātua Ōrākei and Ōkahu Bay legacy over the past 100 years

**Section three** identifies the current status of the Ōrākei Catchment drawing on trends and findings of the literature review, monitoring results and mātauranga of Ngāti Whātua Ōrākei

**Section four** offers a framework to implement restoration mechanisms

## ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN

### PHASE II - IMPLEMENTATION

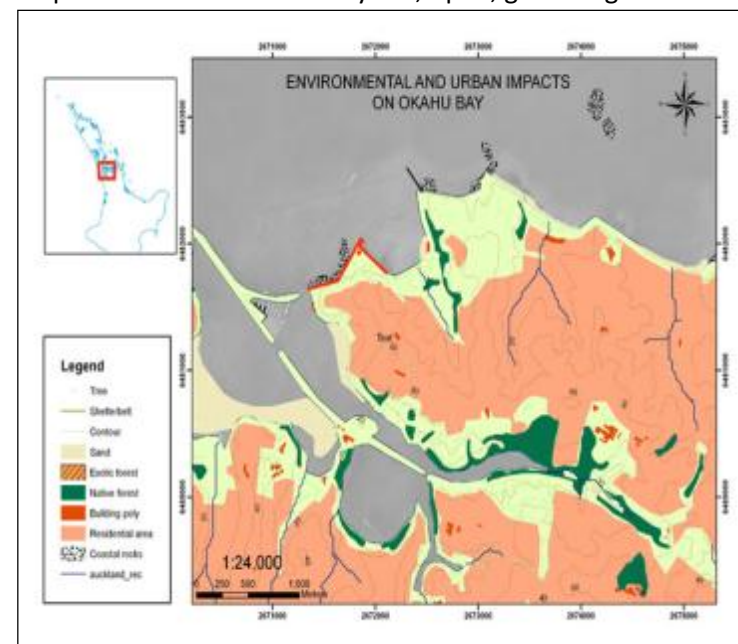
The Ōrākei Act, 1991, directed that The Whenua Rangatira Reserve Management Plan be prepared under the provisions of the Reserves Act. Part of the agreement determined that the land known as the Whenua Rangatira is set aside as a Māori Reservation for the common use and benefit of the Ōrākei Hapū and the citizens of the City of Auckland. This land is under joint administration of the Ngāti Whātua Ōrākei Māori Trust Board and the Auckland Council.

The Whenua Rangatira ('chiefly or noble land') of the Ōkahu Bay Catchment is a remnant of the Ōrākei Block which NWO campaigned vigorously over more than a century to retain in hapū ownership. The kāinga was located on the flat backing Ōkahu Bay until it was destroyed by deliberate government action in the early 1950s. The Whenua Rangatira is broken down into 6 activity areas which are determined by cultural, environmental and activity-related character: Takaparawhau, Tai Hara Paki, Kohimaramara, Papakāinga, Te Ngāhere and Ōkahu Bay. Takaparawhau is dominated by flat, open, grass ridged spaces, ringed by steep cliffs which are open to natural erosion processes with risk of slippage.

The spiritual significance of the land was recognised by Ngāti Whātua Ōrākei ancestors who sought to safeguard the Whenua Rangatira as a place which links water, land, forest and sky (Tangaroa, Papatūānuku, Tānemahuta and Ranginui) maintaining a strong link with surrounding cultural landmarks within the isthmus and beyond. The Ōkahu Bay Catchment lies within the Tāmaki Ecological District Boundary 09.03. It is bounded by the ridgeline roads of Kepa Road, Ngāpipi Road and Kupe Road but does not limit the inclusion of communities and land adjacent to these roads.

Ōkahu Bay is the primary receiving environment for stormwater runoff from this catchment. "Associated sediment and contaminants contribute over 70% of the pollutant load to Ōkahu Bay and the Ōrākei Basin and some 7% from the entire Auckland isthmus' stormwater runoff to the harbour" (Scoop, 2003). Myriad communities utilise Ōkahu bay, both land and water, and it is a major tourist location within the Auckland District.

Business	0%	Special Purpose	24%
Residential	40%	Roads	22%
Open Space	14%	Indicative catchment imperviousness	35%



Existing vegetation remnants of Takaparawhau and Ōkahu Bay show severely degraded ecological value (through human colonisation and past grazing practices). Current vegetation consists of a highly modified urban ecology, related to lengthy human occupation - both Māori and Pākehā.

Tāmaki Drive halts the natural coastal processes interacting between land and sea, and provides large amounts of pollution and contamination from the 21,000 cars which commute along the thoroughfare twice a day. Major disturbance to Ōkahu Bay hydrology has also occurred following the construction of Tāmaki Drive, creating frequent flooding episodes and concerns for Ngāti Whātua in regards to tidal influences on ground water - particular with regard to the Ōkahu Bay Urupā and the impact of groundwater levels on burials.

Prior to urban development and intensification from the 1950's, the substrate was predominantly sand with sand bars present throughout the bay. 10,000cm<sup>3</sup> of sediment enters Ōkahu Bay per annum. This has created a varying substrate, from sandy sediments at the eastern end of Ōkahu Bay to very muddy deposits at the western end and within the body of the bay.

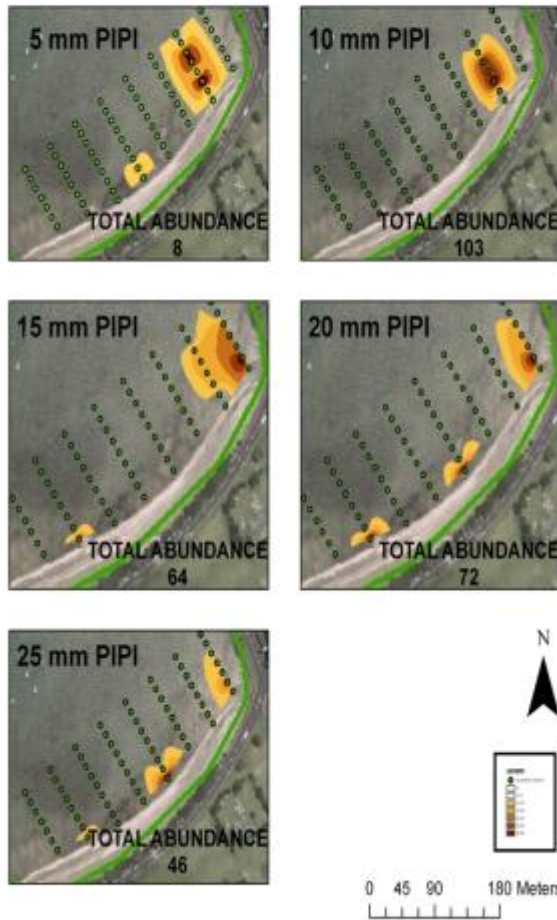
**Substrate and contours of Ōkahu Bay foreshore, December 2011**



**Sandbars and contours in foreshore 1938**



**PIPI ABUNDANCE AND DISTRIBUTION, OKAHU BAY  
SURVEY CONDUCTED SEPTEMBER, 2007  
Compiled by Richelle Kahui-McConnell  
October, 2007**



**Abundance of Pipi and Cockle 2007-2011**

Although the shellfish which are present in the bay are reaching sexual maturity, are well-nourished and generally in good condition, they do show elevated tissue content of heavy metals (chromium, mercury, copper and lead) and generally fail to reach full maturity.

Overall abundance is low and natural migration patterns are impaired. As shellfish mature they migrate further away from the High Tide Mark, travelling into the body of the bay to achieve maturity.

Shellfish are highly susceptible to the fine mud particles which are present in the body of the bay which clog their filter feeding systems, causing mortality. Maps provided indicate general trends of low abundance and maturity rates which dramatically decline with migration into the body of the bay.

**Water quality 2011**

Following upgrades of stormwater systems to Ōkahu Bay there are still exceedences of Enterococci. From April-July 2011 3 “Red” alert exceedences of enterococci occurred following heavy rainfall, along with 5 “Amber” alert levels.

**Marina Surficial sediment for copper**

As reported in the Assessment of Environmental Affects prior to the development of the marina, sediment levels within the marina had a mean total copper concentration of 5.6mg/kg

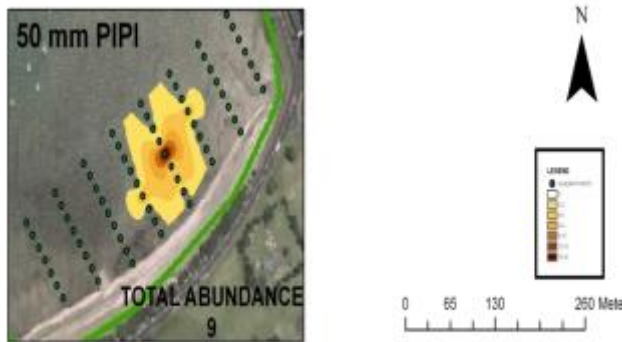
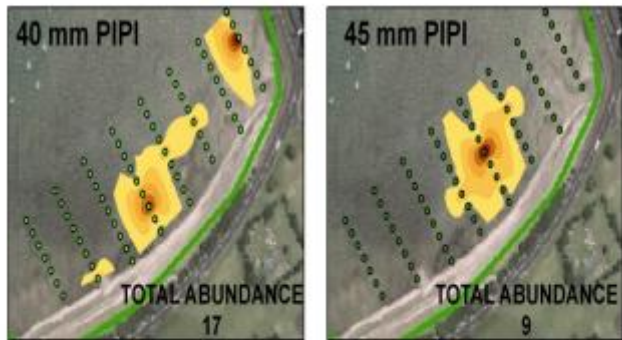
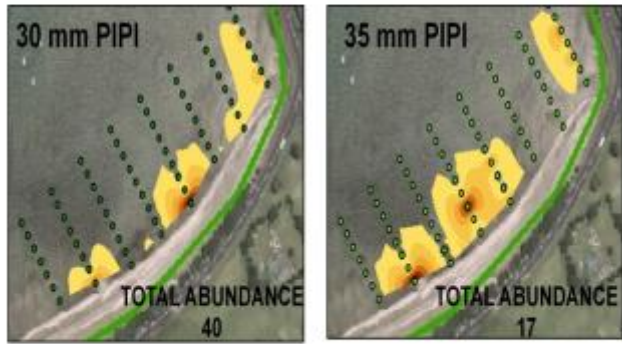
- In February 2009 tests indicated a total copper concentration of 35.5mg/kg
- In 2011 the total copper concentration mean was 24.7 mg/kg

**Results of sampling at location at point source drain from The Ōkahu Bay Landing**

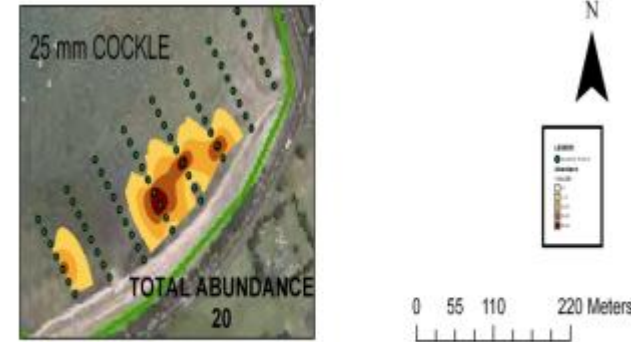
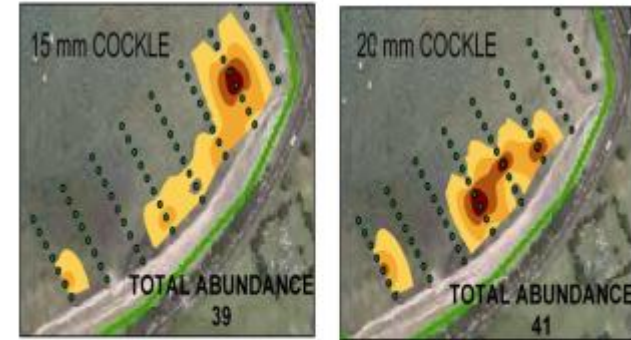
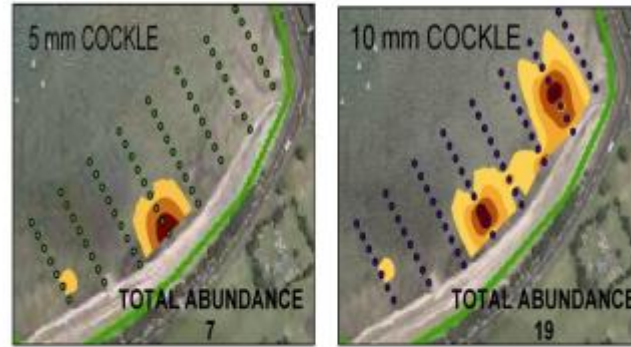
- Significant level of copper contamination 44.4 µg/g
- The red zone trigger level given by TP168 (2004) is >34µg/g/
- The reading outside the hardstand therefore is a red zone reading

Ecosystems with this level of contamination present are expected to be negatively impacted.

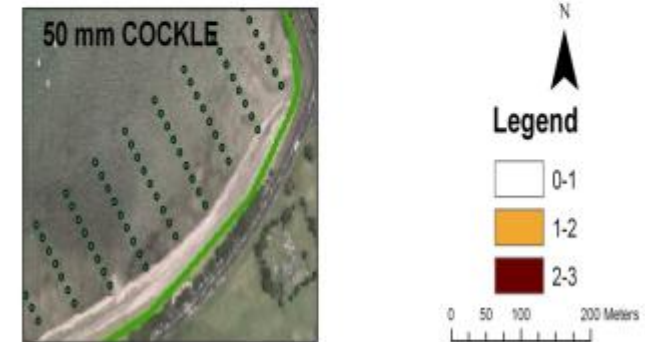
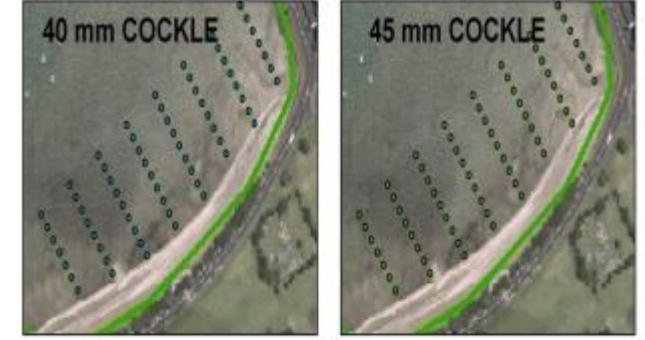
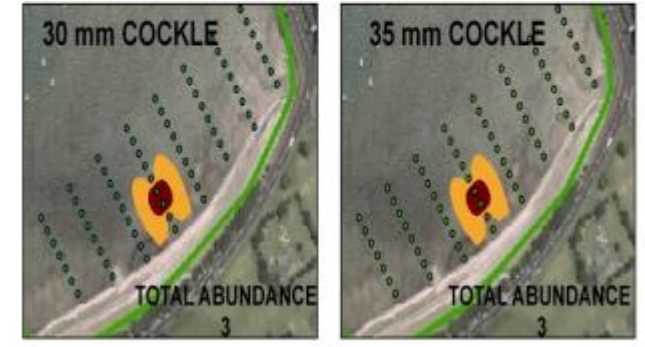
**PIPI ABUNDANCE, OKAHU BAY  
SURVEY CONDUCTED SEPTEMBER, 2007**  
Compiled by Richelle Kahui-McConnell  
October, 2007



**COCKLE ABUNDANCE AND DISTRIBUTION, OKAHU BAY  
SURVEY FROM SEPTEMBER 2007**  
Compiled by Richelle Kahui-McConnell  
October, 2007



**COCKLE ABUNDANCE AND DISTRIBUTION, OKAHU BAY  
SURVEY CONDUCTED SEPTEMBER, 2007**  
Compiled by Richelle Kahui-McConnell  
October, 2007





## THE ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN

### RESEARCH INFORMING PROCESS

In April 2012 further work was commissioned to identify management objectives and mechanisms to implement restoration strategies. Research into the anthropogenic impacts onto Ōkahu Bay and brokering community and stakeholder engagement has defined management options.

### COMMUNICATION STRATEGY

In order for implementation and maintenance of kaitiakitanga within management objectives, Ngāti Whātua Ōrākei identified their own ecological health indicators in Phase I of the Restoration Plan. (See Appendix A: Environmental Performance Indicators of Ōkahu Bay Community).

This process enabled strategies to support active participation of whānau within the restoration, monitoring and mitigation process. A series of hui were conducted to further inform key stakeholders of research outcomes and the restoration process. Frequent communication between all strata listed is required to ensure 'ownership' and engagement with the Ōkahu Catchment Ecological Restoration Plan.

The Visionary Statement for the Restoration Plan defined the kaupapa:

***“Waters fit to swim in at all times, with thriving eco-systems that provide sustainable kaimoana resources to a Ngāti Whātua Ōrākei community who have strong daily presence in, on and around the bay as users and kaitiaki”***

Communication strata:

- |   |                                 |
|---|---------------------------------|
| • Toki Taiao (NWO heritage and resource management unit)          | Kuia and Kaumātua               |
| • Ōrākei Marae hui  | The Ngāti Whātua Reserves Board |
| • Ngāti Whātua Ōrākei website and E Wawa Ra / Te Puru newsletters |                                 |

External communication strata:

- |                              |  |                            |
|------------------------------|--|----------------------------|
| • Auckland University        | Māori Television Project Mātauranga and Science Series | Department of Conservation |
| • Auckland Museum            | Ōrākei Local Board                                     |                            |
| • Auckland Council           | Hauraki Gulf Forum                                     |                            |
| • Ōrākei Primary School      | Waterfront Auckland                                    |                            |
| • Ōkahu Marina 'The Landing' | World Wildlife Fund                                    |                            |

## STAKEHOLDER ENGAGEMENT

Ōkahu Rākau Bush Care and Nursery implement the *ko te Pūkākī* broadleaf and Pōhutukawa coastal forest restoration project on Takaparawhau, which is committed to non-chemical mechanisms of weed control, alongside providing ecosourced “plants that Whakapapa to the land” within the ‘Whenua Rangatira Ecological District’. Its work takes the wider matrix of green spaces, patches and corridors of Tāmaki Mākaurau into consideration when discussing regional ecological restoration. Over 11 years Ōkahu Rākau have planted more than 160,000 plants and within the six month period of January to June, 2012, they worked with 328 volunteers from the Auckland City Mission, the community, week day groups and Corrections, having conducted 3,349 volunteer hours.

An engagement plan with Ōkahu Rākau has outlined key mechanisms for ecological restoration within the Ōrākei Catchment:

- Defining a relationship for Ōkahu Rākau to be the ecological restoration entity which external stakeholders engage with
- Defining a Whenua Rangatira Ecological District plan using an adaptive management process to deliver ecological restoration across the catchment with particular regard for marine restoration of Ōkahu Bay – research informing objectives which are evaluated and adapted according to further research findings
- Working in conjunction with the delivery of Mai Ora Mai Whānau to deliver the kaitiaki components of waste minimisation, edible gardens, fruit trees, native plants replacing weeds in a holistic manner.

A mapping process and engagement plan for the wider Ōrākei community and formal and informal agencies, identified mechanisms to integrate and collaborate with partners, stakeholders, interest groups and ecological enhancement and restoration programmes, alongside formal agencies. Formal agency engagement will further inform mitigation and restoration techniques, and assist with the implementation strategy of the restoration plan - which includes defining priorities and outlining an action plan.

With limited resourcing and expertise available to Ngāti Whātua Ōrākei, it is essential to collaborate with existing programmes that provide the ability to dovetail multiple deliverables. The engagement strategy facilitates a localised community engagement process between the Auckland Council and regional networks, which enable the sharing of information and ideas and provides opportunity for efficient working programmes that deliver objectives that enhance the environment.

Toki Taiao have engaged with the Auckland Council Sustainable Catchment Programme, which works with a targeted communities of the Whangateau, Hōteio and Kaipara Harbours to encourage and motivate environmental action in relation to areas of high cultural, commercial and tourism significance. The programme builds the capacities of communities who are already engaged in kaitiakitanga, to work as a collective towards enhancing environmental outcomes. Its principles are to provide an integrated planning and implementation framework for catchments to address the long term health of priority habitats.

This mechanism will co-ordinate engagement processes between key Auckland Council officers within Biosecurity, Natural, Cultural and Built Heritage, Stormwater, Community Development, Environmental Education and other departments / CCOs such as the Coastal Team and Waterfront Auckland. It is designed to meet the needs of people and science by scaling issues, priorities and urgencies determined by knowledge gaps and providing a structure for potential priority actions, further research and an implementation programme that measures success.

- Whole catchment planning
- The use of science, planning and community processes
- Framework to draw together stakeholders
- Integrating objectives and interventions
- Tailoring the response to the catchment
- Identifying priority actions to inform the Long Term Planning Process
- Engaging multiple roles in council

Toki Taiao also propose the development and dovetailing of two programmes to deliver social, cultural, environmental and economic outcomes:

- Ngāti Whātua Ōrākei already delivers the Mai Ora Mai Whānau sponsored programme of Whānau Ora. This programme works alongside 150 households within the Ōrākei Catchment providing health, education and vocational guidance and advocacy services. *ko te Pūkākī* propose to deliver additional kaitiaki components which include support setting up waste minimisation systems, edible gardens, fruit trees, chickens and native regeneration and weeding on private properties.
- The Sustainable Neighbourhoods Programme which works with community to achieve environmental outcomes through landscape restoration activities; both individually in people's own time or collectively – and on both private and public land. The approach engages communities on a neighbourhood scale using a community development model within a Council-neighbourhood partnership. The programme was piloted in January 2008 in two neighbourhoods within the Waitākere Ranges Heritage Area - Piha and Henderson Valley. By May 2011, there were 55 participating neighbourhoods, approximately 340 households and community stewardship over 300 hectares of land.

Neighbourhood projects typically start with an environmental restoration focus, for example;

- Eradicating weeds
- Planting native plants
- Improving stream health
- Encouraging birds and wildlife
- Developing eco-friendly landscaping

## ANTHROPOGENIC IMPACT

Like the larger Auckland Harbours, Ōkahu Bay is a sink for the disposal of urban stormwater and associated contaminants. Kaimoana species show low total abundance and population changes in community structure which are characteristic of a disturbed environment. Pipi and tūangi seeding and recruitment appear to be occurring but with very few reaching full maturity. Mātauranga informs our science that kaimoana abundance dropped off around the 1980s, which was around the same time that sandbars started to disappear and mud started to appear, alongside a surge in seagrass abundance.

## SEDIMENT

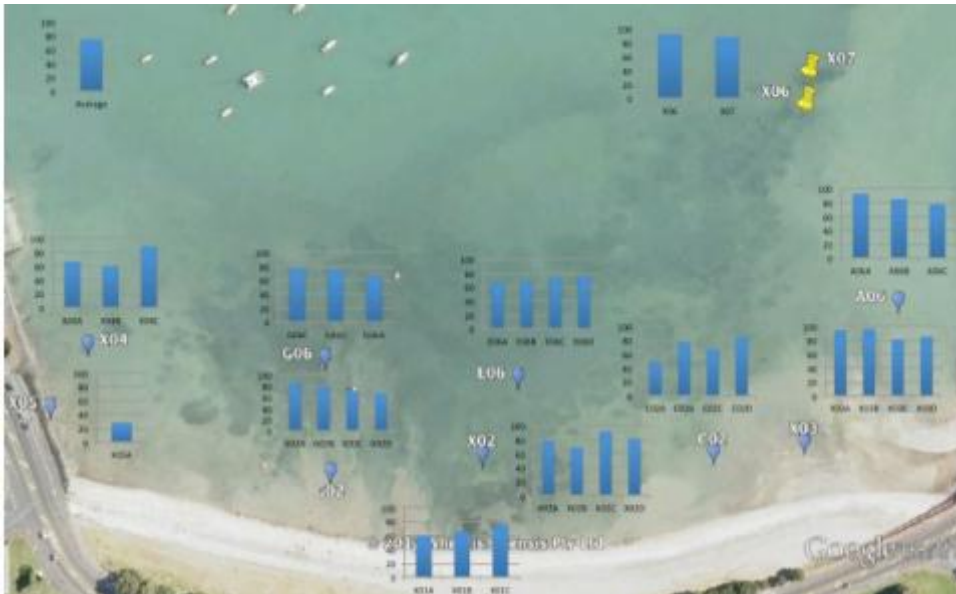


Figure 1: Sediment Composition against Depth in Ōkahu bay

As of 2003 no detailed surveys of sediment movement in the Waitematā Harbour and Hauraki Gulf or Ōkahu Bay had been carried out. 2012 summer sediment research indicates that sediment deposits in Ōkahu Bay vary widely from sandy sediments at the eastern end of Ōkahu Bay to very muddy deposits at the western end and the variability in sediments appears to be increasing, as deeper sediments were less variable. This concurs with mātauranga which confirms the earlier presence of a sandy bay, having recently filled in with mud. The trend is very likely to be linked to changes in flow patterns in Ōkahu Bay, and changes in catchment characteristics.

A baseline level of  $20\mu\text{g/g}$  for zinc appears to be present in Ōkahu Bay which is reflective of urban environment. Zinc results indicate that there is a link between metal content of sediments and the particle size distribution. Smaller mud particles have a larger surface area; they have more area to hold onto Zinc than larger particles like sand. Because there is a higher mud content within the body and around the Western end of the Bay, this could explain why we have high metal content in those areas in comparison to sandier areas. Core samples showed a general trend of increasing zinc although the same trend was not present with copper within the Bay.

Results of sampling at location at a point source drain from the marina hardstand indicate significant levels of copper contamination at 44.4 µg/g. The Red zone trigger level given by TP168 (2004) is >34µg/g/. The reading outside the hardstand therefore is a red zone reading. Ecosystems with this level of contamination present are expected to be negatively impacted (Hurst, E. 2012, Ngā Pae o te Māramatanga summer studentship project).

Further testing of this 'plume' of high zinc loads is being conducted to understand extent and perhaps map its source. It is further suggested that continued monitoring of sediment loads, heavy metal loads and particle distribution should be conducted to re-enforce the knowledge gained to date.

## **COASTAL ENGINEERING**

The Ōkahu Bay Landing comply with ANZECC anti-foul and in-water cleaning guidelines, having recently re-designed their maintenance area drainage collection pit for residues, solid coatings, liquid and other form of waste. This ensures diversion of stormwater drainage away from the marina to avoid potential sediment contamination from passive antifoulant leaching.

The Landing management are committed to not only implementing International 'Blue Flag' standards but to also conduct management practices that exceed 'best practise'. In response to elevated copper levels the Landing management have gone further to replace the sand filter system to a sphagnum moss and peat system to ensure more effective diversion of antifoulant leaching. Toki Taiao are working with The Landing management to discuss further improvements in order to decrease the anthropogenic impacts of the hardstand maintenance area, the moorings and the marina on the ecological health of Ōkahu Bay.

The Ngāti Whātua Ōrākei submission on the MAF Discussion Paper Draft Anti-fouling and In-water Cleaning Guidelines 2012 formally stated:

The balance sought after by the ANZECC Code's Guidelines to offset managing environmental risks with operational realities is not achieved. Ōkahu Bay Marina provides an example of a set of practices that sit outside of the jurisdiction of the Guidelines; the Marina contains only recreational vessels and allows for non-professional maintenance of vessels.

Empirical proof of negative extrinsic environmental effects highlights changes that have occurred in relation to the vessel maintenance practices of the Marina.

The ANZECC Code is not strong enough to ensure shore-based maintenance or provide guidance for facilities to contain waste produced and minimise the release of contaminants.

Furthermore we submit that the ANZECC guidelines are required to:

- Provide guidance on biosecurity and contamination risks posed by in-water cleaning and maintenance that must apply to recreational and commercial vessels, including all vessel types and other movable structures, in all aquatic (marine, estuarine and freshwater) environments
- Application, maintenance, removal and disposal only be carried out at maintenance facilities that adopt measures to ensure that all bio-fouling, coatings and other physical contaminants removed from vessels and structures are retained and treated in a manner that is compliant with relevant local regulations
- Outline what alternative management is required to avoid potential sediment contamination from passive antifoulant leaching which is a necessary consequence of marina activity where all residues, solid coatings, liquid or any other form of waste, including removed biological material and used product containers should be collected and stored for disposal in-line
- Inform compliance concentrations required to be met in relation to stormwater outflows; the source and quality of which is therefore required to be part of marina facility accountability measures
- Limit application, maintenance and removal of antifouling coatings to approved, licensed facilities and include non-professional with professional guidelines
- Inform procedures to outline uniform licensing of such facilities
- Require restrictions on use of Tributyltin-based antifoulant on craft >25m in length, where these operate in confined waters
- Ensure through accountability guidelines to marina facilities and Regional/District/Coastal Plans that new facilities include design and management provisions to capture and retain all waste and to enable eventual disposal to sewer of treated waste waters
- Ensure through accountability guidelines to the marina facilities and Regional/District/Coastal Plans, that existing facilities plan for upgrading to eventual sewer disposal of waste waters

## BATHYMETRY



The only Bathymetry available for Ōkahu Bay was over 20 years old with no specific readings for Ōkahu Bay. The 2012 bathymetry results illustrated a gradient in depth with an increase seaward, with shallower areas at the high tidal zone (beach) and outer areas of the bay. This study illustrated the general bathymetry of Ōkahu Bay that could be used to model the hydrology in order to further analyse the associated activities in the environment, such as the sedimentation, the friction, the tidal flushing and contaminant load. Mātauranga indicates that 'the bay is filling in' and so it is further suggested that continued monitoring bathymetry readings should be conducted to re-enforce the knowledge gained to date.

In addition to the level of contaminants that come with the stormwater outflow into the sea, another important factor is the amount of freshwater input. The measurement of salinity levels could assess whether the bay maintains a natural level of salinity that is tolerated by marine species. Especially if there is little tidal flushing, there could be a lower level of salinity, higher concentration of bacteria, or other factors that may contribute to ecosystem health (Kaināmū, A., 2012, Ngā Pae o te Māramatanga summer studentship project).

Further research into salinity levels, freshwater input and independent bacteria load testing from the Auckland Council Beach Bathing Survey, prompting beach closures from alert levels of E.coli, should occur to inform management objectives.

Depth in metres (in brackets) across Ōkahu Bay

## HYDRODYNAMIC MODELLING

The Auckland University Department of Engineering Science conducted a modified version of the Hauraki Gulf numerical hydrodynamic model in conjunction with a particle tracking model for simulating the dispersal of contaminants. This model estimates long-term build-up of sediment and heavy metals from stormwater and wastewater overflows around the Auckland City coastline.

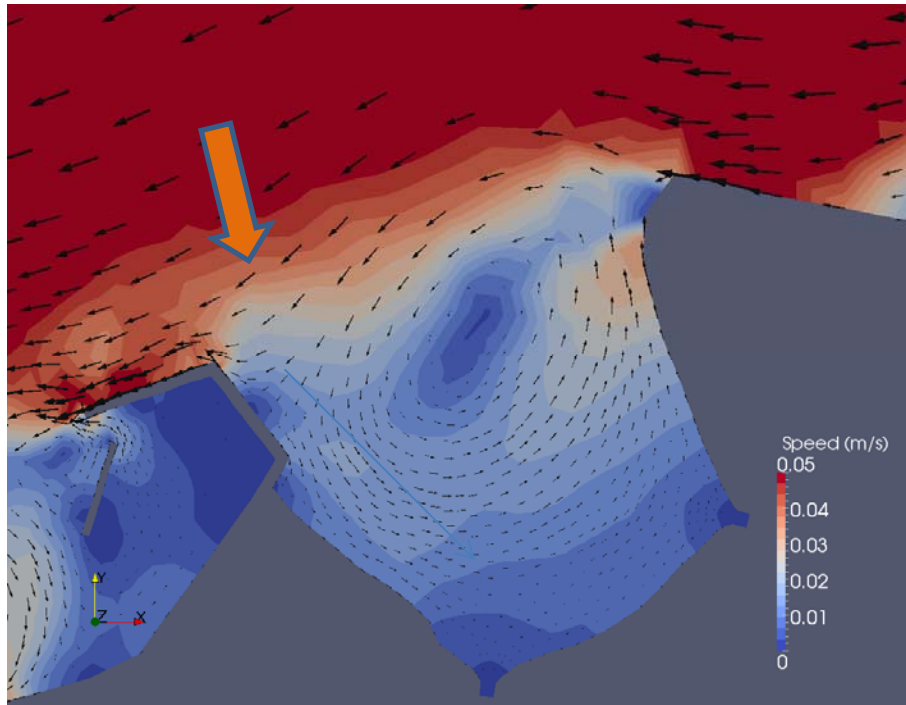
The hydrodynamic model indicates that the presence of the marina will have had some impact on the currents in Ōkahu Bay, particularly at the western end. Without the marina, the long-term sedimentation rates in the Ōkahu Bay zone were 0.135mm/year, with the marina they are 0.156 mm/year - increasing the probability of contaminants from the east entering the bay and the sedimentation rate overall. This has likely caused sedimentation and heavy metal deposition rates in the bay to increase, because the hydraulics of the bay provide conditions in which particles settle in the middle of the bay. The mātauranga of Ngāti Whātua Ōrākei tells us that the historical migration routes and harvesting of tūangi occurred into the same area of high deposition, which could give a reason for the decline of kaimoana in Ōkahu Bay.

The hydrodynamic model also shows an increase of zinc loading by 6% based on the deposition rates. Based on the fact that our background zinc levels are 20mg/kg as of 2012 (which is indicative of an urban setting), this means that even without the marina Ōkahu Bay would have reached alert levels of 240mg/kg by 2070. With the marina it will reach this level by 2050.

Modelling was based on stormwater inputs from 2005 but do not include updated stormwater inputs from the Landing following the construction of their filtration system.

In order for this model to clearly indicate anthropogenic impacts of stormwater into Ōkahu Bay, further modelling is required to outline if sediment particles are being trapped with current stormwater inputs and also the impacts of any proposed further coastal development.





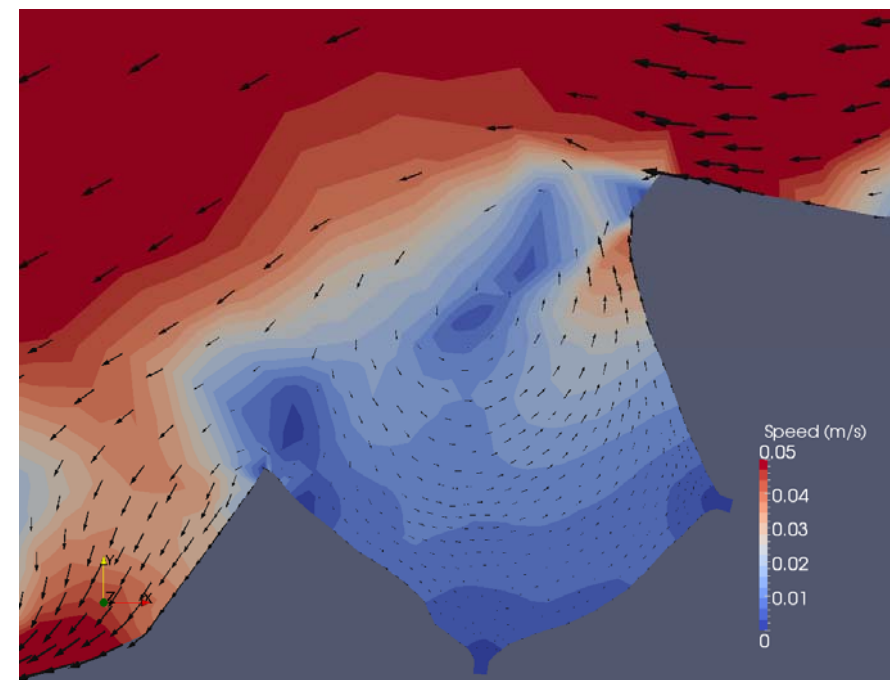
### Model of residual currents with marina

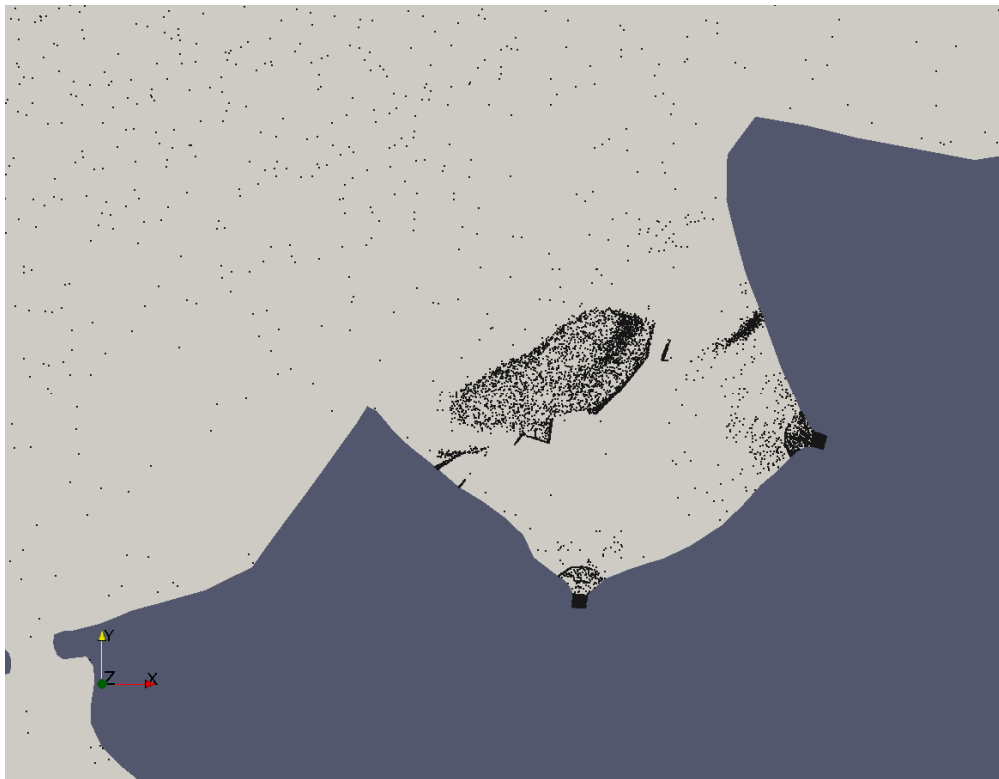
Just outside of Ōkahu Bay the flood-tide currents are slightly stronger than the ebb-tide currents, so the residual currents point west, up the Waitematā Harbour.

The currents inside and around the marina itself have been obviously altered by the marina's presence. The presence of the marina extends the western end of the headland out to sea, catching flood-tide currents. Within Ōkahu Bay, the overall current pattern is not very much changed. An anticlockwise circulation of about the same size and similar shape can be seen in both cases.

The main differences, as would be expected, are towards the western side of the bay, where the residual currents pointing south (into the bay) are of slightly greater magnitude - ***indicating an increased probability of contaminants from sources to the east being diverted by the marina into the bay and becoming trapped there.***

### Model of residual currents without marina





**Final particle positions from medium storm, no marina**

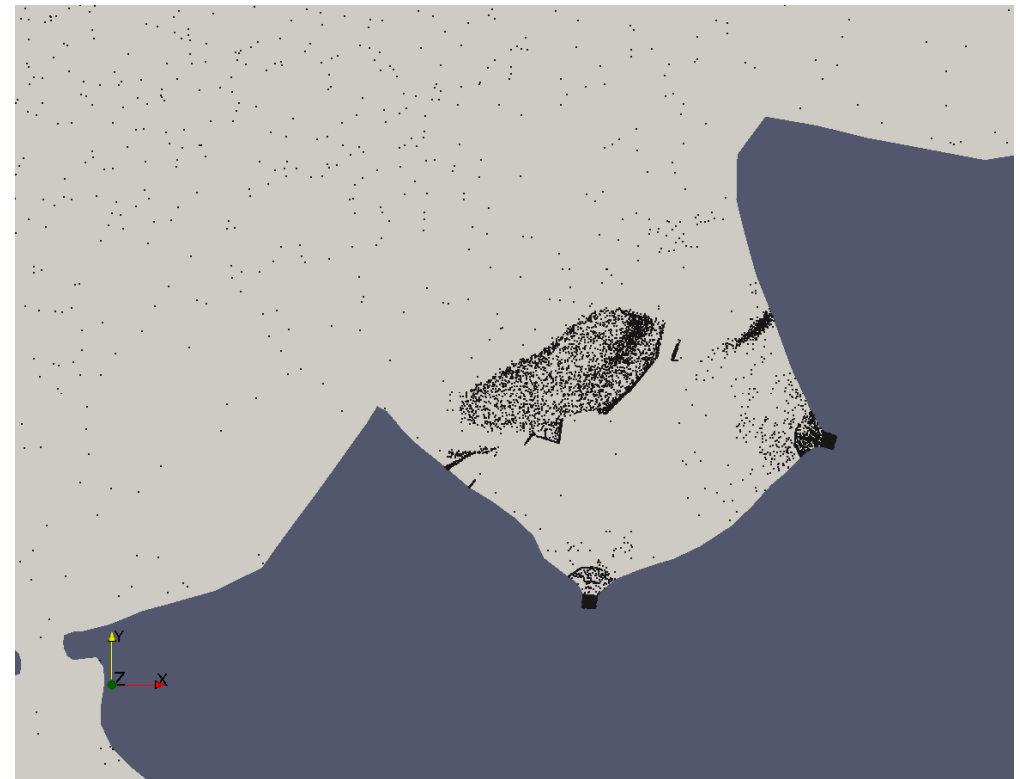
Figures show example final sediment particle positions from one of the storm events (of medium intensity), without and with the marina respectively. In both cases there are high concentrations of particles around the outfalls in the bay (these are the larger, heavier particles which drop out into the mud before travelling far).

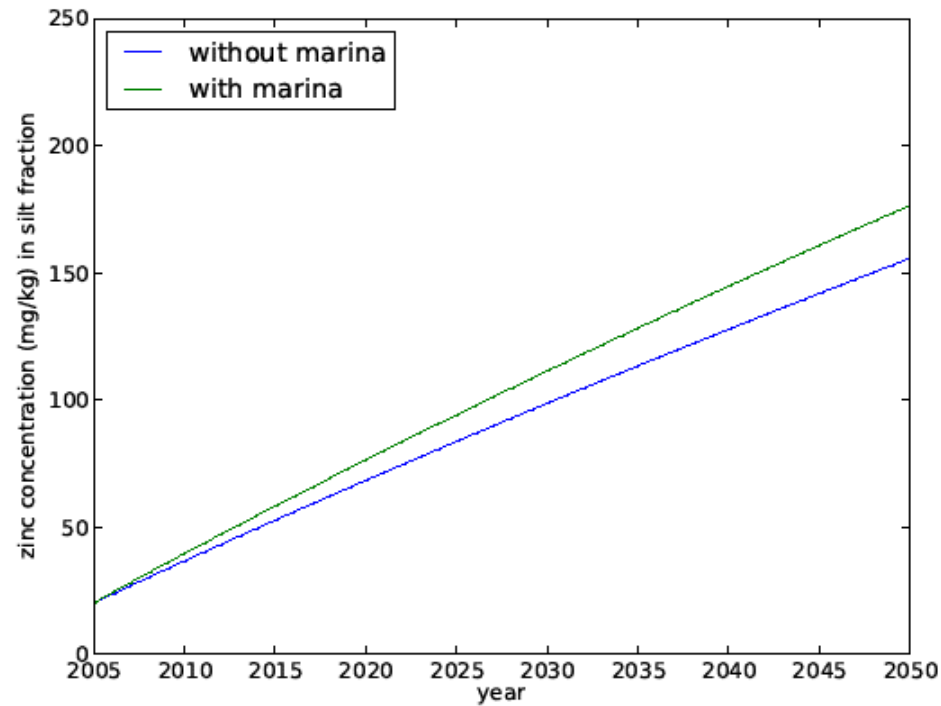
With the marina in place, a higher concentration of particles inside the marina can be seen, indicating that the marina will probably silt up over time unless repeated dredging is carried out.

**Within Ōkahu Bay itself the main central area over which particles accumulate is slightly larger with the marina present, although it is not quite as densely covered.**

*This data substantiates claims from Ngāti Whātua Ōrākei kuia and kaumātua who inform that the bay 'is filling up' and goes to explain why there are no mature kaimoana within Ōkahu Bay - because this is where they would migrate to mature.*

**Final particle positions from medium storm, with marina**





This figure shows modelled benthic zinc concentrations in Ōkahu Bay from 2005 to 2050, both without and with the marina.

These are average concentrations over the Ōkahu Bay deposition zone, and assume an arbitrary starting value of 20 mg/kg in 2005. They can be used to evaluate the effect of the marina on overall trends.

It can be seen that the presence of the marina is predicted to increase deposition of zinc.

By 2050 the increase in zinc concentration over the assumed starting value of 20 mg/kg is around 6% greater with the marina present than it would be without the marina.

## MAURI MODEL

The Ecological Health indicators which set the management objectives of the restoration plan were detailed by Ngāti Whātua Ōrākei whānau in three consecutive hui. These indicators set the vision “Waters fit to swim in at all times, with thriving eco-systems that provide sustainable kaimoana resources to a Ngāti Whātua Ōrākei community who have strong daily presence in, on and around the bay as users and kaitiaki”.

When deciding what the priorities and strategies were for the Restoration Plan, it was imperative that the pure intention of Ngāti Whātua was not lost in interpretation, did not lose the wairua of the hapū and did not get swayed unduly by cost benefit analysis and the perceived economic benefits of the status quo.

Through the relationship that has been brokered with Auckland University, Dr Kepa Morgan was invited to apply his Mauri Model to the Restoration Plan. The Mauri Model is a decision making framework that integrates the social, economic, environmental, and cultural well-being dimensions of sustainability assessment. The Mauri Model Decision Making Framework adopts mauri ('integrity' or the binding force between the physical and the spiritual elements or capacity to support life) as the measure of environmental, economic, social, and cultural well-being, in place of the monetary basis used conventionally for cost-benefit assessment.

Mauri is the bonding force between the spiritual and the physical. When this bond is extinguished the result is death in a living organism or alternatively the loss of capacity to support life in a material such as air, water or soil. The decision making framework incorporates this concept into a series of steps to determine whether the mauri of each dimension is being fully restored, enhanced, maintained, diminished, or totally destroyed.

The Mauriometer assessment allows determination of the long term environmental, economic, social, and cultural sustainability of different courses of action. The use of mauri rather than money as the measure of sustainability avoids the disadvantage of making decisions based solely on economic or pseudo-economic considerations, which is more in line with Māori thinking – therefore well suited for this application.

Stakeholders engaged were Ngāti Whātua Ōrākei, Ōrākei residents, Auckland City Council representatives and marina users. These groups were asked to indicate the changes to mauri and the overall environmental, economic, cultural and social well-being of the bay when they considered the following four options:

- No marina built - allowing us to see the effects on the Bay, had the marina not been put into place.
- Marina present
- Implementing Low Impact Development into stormwater run-off management, decreasing the amount of heavy metals / hydrocarbons being deposited into Ōkahu Bay during rain fall events from impervious concrete or asphalt surfaces by utilising bio-retention areas to detain stormwater
- Marina extension

The model uses the four dimensions of wellbeing, adapted from Daly’s triangle of sustainability. Wellbeing and sustainability are expressed in terms of the mauri of the four dimensions:

- Mauri of the environment (ecosystem wellbeing)
- Mauri of the hapū (cultural wellbeing)
- Mauri of the community (social wellbeing)
- Mauri of the whānau (economic wellbeing)

Stakeholder/Mauri dimensions	Environmental	Hapū	Community	Whānau
Ngāti Whātua Ōrākei	32	35	18	15
Ōrākei residents	35	18	29	18
Marina users	26	6	43	26
Local council	27	15	24	33

- Ngāti Whātua holds the mauri of the hapū as being most important, followed closely by the mauri of the environment.
- The Ōrākei residents rank the mauri of the environment as being most important.
- The marina users value the mauri of the community most highly.
- The local council rank the mauri of the whānau (economic wellbeing) as being most important.

**CONSIDERING THE STAKEHOLDER VIEWPOINTS CUMULATIVELY, THE MOST IMPORTANT WELLBEING DIMENSION IS THE MAURI OF THE ENVIRONMENT.**

Applying the 'mauriometer', where anything less than zero has a negative impact and values above will be most beneficial for the mauri of Ōkahu Bay:

Stakeholder	Marina built	Marina not built	Low impact development	Marina extension
Ngāti Whātua Ōrākei	-0.89	0.67	0.47	-0.84
Ōrākei residents	-0.71	0.57	0.46	-0.61
Marina users	-0.50	0.46	0.38	-0.10
Local council	-0.72	0.54	0.24	-0.64
<b>Total</b>	<b>-2.82</b>	<b>2.24</b>	<b>1.55</b>	<b>-2.19</b>
<b>Average</b>	<b>-0.71</b>	<b>0.56</b>	<b>0.39</b>	<b>-0.55</b>

- The option that would be most beneficial for the mauri of Ōkahu Bay would have been to not have built the marina (+ 0.56).
- Implementing low impact development to reduce the wastewater runoff into the Bay is also mauri positive (+ 0.39), indicating that is beneficial to the wellbeing of Ōkahu Bay
- Having the marina (- 0.71) and an extension of the current marina (-0.55) are detrimental on the mauri of Ōkahu Bay.

**Thus, the results indicate that in accordance with the four stakeholder groups, the best option would be to advocate for Low Impact Development to reduce wastewater runoff and that a marina extension would be detrimental to the mauri of Ōkahu Bay.**

## THE ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN

Kaupapa	Management Objectives	Strategies	Priorities	Action Plan	Timing
Tino Rangatiratanga	<p>Ngāti Whātua maintenance and implementation of kaitiakitanga within management objectives through the Iwi Management Plan, Coastal Strategy, Auckland Spatial Plan and the Long Term Council Community Plan</p> <p>Iwi Management Plan to direct Council responses e.g. regional cultural and heritage authorities and memorandum of understanding with Watercare</p> <p>Joint consenting authority with Auckland Council and Ngāti Whātua commissioners used at hearings</p> <p>Develop a 'formal and informal agency' engagement plan</p> <p>Hapū defined and active participation in definition of restoration/monitoring/mitigation outcomes</p>	<p>Define an ŌCERP Communication strategy for Ngāti Whātua Ōrākei and wider community/stakeholder in regards to</p> <ul style="list-style-type: none"> <li>• Restoration plan</li> <li>• Mitigation techniques</li> <li>• Social enterprise and training</li> </ul> <p>Define a community, formal and informal agency stakeholder mapping and engagement process that highlights inclusion in decision making, thus enabling a 'sense of ownership' and further definition of a Restoration Plan</p> <p>Define a response system for Toki Taiao to inform agency relationships e.g. Auckland Council, Ōrākei Local Board,</p>	<p>Continue with Communication Strategy with stakeholders that is committed to;</p> <ul style="list-style-type: none"> <li>• Restoration Vision</li> <li>• Ngāti Whātua Ōrākei and Ōkahu Rākau are the key agents which will broker strategic relationship with agencies that will inform and implement the restoration plan</li> <li>• Whānau identified ecological health indicators that have informed management objectives</li> <li>• Adaptive management – research informing management and evaluating success</li> <li>• Current findings that are informed by research that has been brokered by Ngāti Whātua</li> <li>• Information sharing that empowers and encourages commitment to the kaupapa</li> </ul>	<p>Formalise commitment and funding from Ngāti Whātua Ōrākei and external parties to continue co-ordinator position</p> <p>Broker planning hui with Sustainable Catchment Programme team of Auckland Council</p> <p>Communicate programme information through Wawa Ra and Te Puru newsletters, the <i>ko te Pūkākī</i> Facebook site and the Ngāti Whātua Ōrākei website</p> <p>Define calendar of strategic meetings to present findings to; whānau, marae hui, Reserves Board, Marina Board, Hauraki Gulf Forum, Local</p>	<p>September 2012</p> <p>September 2012</p> <p>September 2012</p> <p>September 2012</p>

			<p>from Ngāti Whātua Ōrākei</p> <ul style="list-style-type: none"> <li>Identify and actively broker opportunities to inform Tāmaki Mākaaurau of work conducted within restoration plan</li> <li>Promote Ngāti Whātua Ōrākei mana moana in the inner Waitematā , the northern shores of the North Shore and Manukau</li> <li>Promote the Mauri Model outcomes that identify stakeholder priorities of coastal development and restoration planning in relation to retention and promotion of mauri</li> </ul>	<p>Board, Auckland Council</p> <p>Institute communication strategy with wider Ōrākei community; community centre, schools, clubs, local newspaper</p> <p>Facilitate further research on marine and terrestrial ecology of Ōrākei Catchment with Auckland University</p>	<p>October 2012</p> <p>September 2012 – on-going</p>
<b>Kaupapa</b>	<b>Management Objectives</b>	<b>Strategies</b>	<b>Priorities</b>	<b>Action Plan</b>	<b>Timing</b>
Tino Rangatiratanga	Developed opportunities for community economic development and training	Define an entrepreneurial and business engagement plan for Ōkahu Rākau Bush Care and Nursery to implement a community economic development strategy that provides opportunities for training and business engagement	<p>Ōkahu Rākau Bush Care and Nursery and NWO are the key agents that will broker strategic relationship with agencies that will inform and implement the restoration plan</p> <p>Extend Ōkahu Rākau's work throughout the catchment so that Ngāti Whātua are the major</p>	<p>Implement communication strategy and relationship plan that centres NOW and Ōkahu Rākau as the agents responsible for all restoration work in the catchment</p> <p>Implement a booking and management system that supports</p>	<p>September 2012</p> <p>November 2012</p> <p>November</p>



			<p>landscaping/weeding/planting contractor</p> <p>Develop a funding plan that will resource the extra positions required to deliver the restoration plan</p>	<p>the increase in work that Ōkahu Rākau will incur</p> <p>Implement a volunteer co-ordinator position to manage the increase in work response that Ōkahu Rākau will incur</p> <p>Broker relationship with Ōrākei Primary that enables ownership and commitment to the restoration plan and sets the school up as a 'restoration hub'</p> <p>Foster an active link to Ngāti Whātua tamariki that attend schools within the area to offer vocational pathways that offer the ability to become kaitiaki (with the added support of the Ngāti Whātua Ōrākei scholarship</p>	<p>2012 – on-going</p> <p>August 2012 – on-going</p> <p>August 2012 – on-going</p>
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				programme)  Link catchment primary schools into the programme  Development of a training plan for Ngāti Whātua Ōrākei ; restoration co-ordinators, permaculture principles, ethnobotany, marine sciences  Engagement with masters/doctorate internships from tertiary institutions and the New Zealand Social Innovation and Entrepreneurship Research Centre to identify community economic development, social innovation and entrepreneurship opportunities	November 2012 – on-going  November 2012 – On-going  November 2012 – On-going
<b>Kaupapa</b>	<b>Management Objectives</b>	<b>Strategies</b>	<b>Priorities</b>	<b>Action Plan</b>	
Ecological functioning of	To enhance the ability to exercise mana whenua and implement	Utilise research available on anthropogenic impacts	Broker relationships with key tertiary institutions to conduct	Formalise commitment and	August 2012

<p>ngā awa, te takutai, ngā moana and Te Whenua Rangatira</p>	<p>manaakitanga and kaitiakitanga as a hapū</p> <p>Increase in the volume of customary take of kaimoana (measured by records of marae and kaumātua)</p> <p>Increase in the presence, abundance and success rate of maturation of customary/traditional target species (and associated species) observed by whānau members, hapū, iwi and marae</p> <p>Increase in water quality (clarity and contamination) with positive effects on the mauri of the marine environment and community health</p> <p>Increase the ecological and cultural sustainability of land</p> <p>Restore the native bio-diversity across Tāmaki (including that of a broadleaf/Pōhutukawa coastal forest across the “Whenua Rangatira Ecological District” which takes in the Ōkahu</p>	<p>on Ōkahu Bay to set baseline of inputs/identify mitigation/restoration techniques for loss of ecological functioning and health</p> <p>Promote effective riparian planting and actively protect the ecological and cultural sustainability of waterways where it is good and enhance it where it is not</p> <p>Promote installation of ‘Heritage planting’ e.g. Te Uru Karaka – Te Uru Houhi and pā harakeke and other stands of vegetation for cultural use at appropriate locations across the catchment and wider Tāmaki</p> <p>Promote innovative stormwater management including treatment and detention, water re-use and waste minimisation</p> <p>Protect wāhi tapu and wāhi hira</p>	<p>research strategy that identifies catchment influences on Ōkahu Bay</p> <p>Define clear and measurable goals for the restoration project to determine appropriate monitoring and evaluation processes</p> <p>Define and have input into catchment based stormwater maintenance system e.g. inflow and infiltration survey</p> <p>Increase in the quality of outfall from the stormwater (reducing contamination and debris)</p> <p>Extension of <i>ko te Pūkākī</i> throughout the catchment – mapping; connecting corridors and reserves and day lighting of streams using heritage, “eco-sourced” planting</p> <p>Define strategies to implement mitigation / restoration techniques</p> <p>Development and implementation of a process of</p>	<p>funding from Ngāti Whātua Ōrākei and external parties to employ a volunteer co-ordinator and to continue co-ordinator position</p> <p>Following brokerage of strategic relationships with agencies, define framework of priorities, mitigation techniques and implement projects that support a successful outcome of the Restoration Plan</p> <p>Broker student intern programme with tertiary institutions to identify</p> <ul style="list-style-type: none"> <li>• Total annual sediment input</li> <li>• Core samples indicating changes of sediment over time</li> <li>• Stormwater and wastewater flow</li> </ul>	<p>November 2012</p> <p>August 2012</p>
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	<p>catchment)</p> <p>Increase in the number of Tangata tiaki/kaitiaki appointed under the customary fishing regulations to approve customary take</p>	<p>Increase the mauri of Ōkahu Bay by advocating for Low Impact Development principles to be used within the catchment</p>	<p>communication between the Ministry of Health and Ministry of Fisheries and Ngāti Whātua Ōrākei via a Police operational protocol, enabling timely notification to iwi organisations following drowning deaths in order to facilitate the possible placement of rāhui</p> <p>Develop a process of communication between the Ministry of Fisheries to enable Tangata tiaki/kaitiaki coastal officers</p>	<p>volumes</p> <ul style="list-style-type: none"> <li>• Salinity and bacterial content of water</li> <li>• Further define hydraulic modelling with new marina dimensions and new information about inputs from The Landing</li> </ul> <p>Conduct studies and broker relationships to define and implement</p> <ul style="list-style-type: none"> <li>• Stormwater treatment e.g. wetland treatment systems</li> <li>• Mapping and implementation of Sustainable Catchment Programme and Low Impact Urban Design Principles with particular regard to community</li> </ul>	<p>November 2012</p>
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				<p>engagement, provision of fish passage and day lighting streams</p> <ul style="list-style-type: none"> <li>• Pest management Strategy developed and delivered by Ōkahu Rākau</li> <li>• Map fruit trees and increase potential for a local food network within the catchment with a view to increase community based food production</li> <li>• Investigation into catchment modelling (stormwater, impervious surfaces, green space matrix and corridor mapping) to identify issues impacting the ecological functioning of the Bay including riparian margins</li> </ul>	
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				<p>and coastal erosion impacts within the catchment</p> <ul style="list-style-type: none"> <li>Monitoring and evaluation programme aligned with ecological indicators of Ngāti Whātua Ōrākei.</li> </ul>	
				<p>Implement kaitiaki component to be delivered by Ōkahu Rākau into the Mai Ora Mai Whānau, Whānau Ora programme</p>	February 2013
				<p>Implement the Sustainable Living Programme to be delivered Ōkahu Rākau within the Ōrākei area</p>	February 2013
				<p>Work with key government agencies that regulate discharges to water</p>	February 2013
				<p>Define and implement</p>	February

				<p>an information relay process and stakeholder relationship outcomes</p> <p>Define and implement a funding plan and social enterprise plan for restoration project</p> <p>Host hui for local, regional and national expert information transfer</p>	<p>2013</p> <p>March 2013</p> <p>February 2013</p>
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## APPENDIX A

ENVIRONMENTAL PERFORMANCE INDICATORS OF ŌKAHU BAY COMMUNITY			
TOPIC	NGĀTI WHĀTUA HEALTH INDICATORS	ŌRĀKEI COMMUNITY HEALTH INDICATORS	SCIENTIFIC INDICATORS
3.2.1 KAIMOANA	<ul style="list-style-type: none"> <li>Return of fishing and diving</li> <li>Harvesting and eating kaimoana from the beach</li> <li>The return of bbq's on the beach</li> </ul>	<ul style="list-style-type: none"> <li>Seeing people collect shellfish and more people fishing</li> </ul>	<ul style="list-style-type: none"> <li>Shellfish contaminant monitoring sampling complying with international standards; DDT, chlordane, lindane, dieldrin, PCB's, Copper, Zinc and Lead</li> <li>Presence/absence and overall abundance counts of indicator species within MfE guidelines</li> <li>Changes in abundance, distribution, maturation rates of kaimoana customary take by measurements record of marae, whānau and hapū</li> </ul>
3.2.2 WATER QUALITY	<ul style="list-style-type: none"> <li>No hesitation to go into the water, feeling comfortable to swim after any weather</li> <li>Let the dogs swim with no hesitation</li> <li>No more warning signs against swimming in contaminated waters</li> <li>Clear water, not brown, that you can see your feet through</li> </ul>	<ul style="list-style-type: none"> <li>No foam like a thick bubble bath</li> <li>Swimming freely whilst recognising the closeness of the metropolitan area</li> </ul>	<ul style="list-style-type: none"> <li>Identify water physio-chemistry values and targets for the receiving environment</li> <li>Water quality levels consistent with the environmental response criteria of Auckland Council; dissolved and particle metals; dissolved oxygen, dissolved copper, particulate zinc, dissolved zinc, lead, fluoride, nitrate-nitrogen, total dissolved nitrogen, dissolved reactive phosphorous, total dissolved phosphorous, ammonia and total suspended solids (See table for trigger values of dissolved oxygen, copper, zinc)</li> <li>Water testing complying with Auckland Council microbial guidelines: enterococci (&gt;32-40 enterococci/100ml as a threshold where there is an increased risk of gastrointestinal illness)</li> <li>Positive community perception survey of water quality</li> </ul>



TOPIC	NGĀTI WHĀTUA HEALTH INDICATORS	ŌRĀKEI COMMUNITY HEALTH INDICATORS	SCIENTIFIC INDICATORS
3.2.3 STORMWATER	<ul style="list-style-type: none"> <li>• A slower force of water onto the beach</li> <li>• No rubbish after storms, broken bottles on the beach</li> <li>• Decrease in pipes</li> </ul>	<ul style="list-style-type: none"> <li>• No contamination or debris in the bay through the pipes</li> <li>• A reduction in the contamination of mud lines that fill the bay after a heavy downpour</li> <li>• An increase in the quality of the outfall from the stormwater that the shape of Ōkahu can handle</li> </ul>	<ul style="list-style-type: none"> <li>• Whole effluent toxicity testing indicating no effluent discharge to water</li> <li>• Stormwater and wastewater flow volume to inform response level from local agencies</li> <li>• Presence/absence and overall abundance counts of indicator species within MfE guidelines</li> <li>• Number of toxic contaminants in shellfish</li> <li>• Decreased stormwater debris within the receiving environment</li> </ul>
TOPIC	NGĀTI WHĀTUA HEALTH INDICATORS	ŌRĀKEI COMMUNITY HEALTH INDICATORS	SCIENTIFIC INDICATORS
3.2.4 SUBSTRATE QUALITY	<ul style="list-style-type: none"> <li>• Return of original seabed with sandbar</li> <li>• Decrease in rocks from seawalls which cut feet</li> <li>• No muck instead of sand</li> <li>• Decrease in beach sterilisation; no taking of sand or seaweed from the beach</li> <li>• Rock pools or reefs on the seawalls instead of just their structure</li> </ul>	<ul style="list-style-type: none"> <li>• Nice smooth sand with no broken shells so that beach shoes don't have to be worn</li> <li>• A building up of the beach, getting wider</li> <li>• Ripple forming sand that is not squidgy</li> <li>• Ability to access the whole beach, especially the western end, without having to walk on rocks because the beach has been denuded of sand</li> <li>• No rocks breaking down from the rock wall</li> </ul>	<ul style="list-style-type: none"> <li>• % of beach, dune land</li> <li>• Sediment physio-chemistry: texture, dynamics, concentrations of contaminants or other physical characteristics that may affect the ecological community</li> <li>• Sampling of mud-sand transition zones in order to predict probability of occurrence of diversity relative to sediment mud content</li> <li>• Identify substrate values and targets for the receiving environment</li> </ul>

TOPIC	NGĀTI WHĀTUA HEALTH INDICATORS	ŌRĀKEI COMMUNITY HEALTH INDICATORS	SCIENTIFIC INDICATORS
3.2.5 LAND	<ul style="list-style-type: none"> <li>• Streams which meander and provide natural input into the beach instead of stormwater pipes</li> <li>• Bush from the ridgeline, which provides shade and a visual barrier of the road from the beach</li> <li>• The bay being more than a little bit of grass and a beach</li> <li>• Not to have to look hard to find anything in the beach, more pipi, seaweed, crabs scuttling around, less oysters</li> </ul>		<ul style="list-style-type: none"> <li>• Length of mean high water springs adjoined by 'natural' vegetation more than 10m wide in estuaries and 20m wide on the open coast</li> <li>• % area of different habitat types/ecological classes</li> <li>• Changes in extent of indigenous vegetation compared to historic and baselines</li> <li>• The condition of selected ecosystem types compared to historic and current baselines</li> <li>• Change in the distribution of selected alien predators and herbivores</li> <li>• Change in the distribution of selected invasive weed species</li> <li>• Spatial distribution and relative abundance of key habitat forming species within the terrestrial and marine environment compared to historic and current baselines</li> <li>• Spatial extent of selected terrestrial and marine habitats. The evolutionary diversity remaining in selected taxonomic groups compared to historic and current baselines</li> </ul>

## ENVIRONMENTAL RESPONSE CRITERIA FOR SEDIMENT CONTAMINANTS

PRIMARY CONTAMINANTS (MG/KG)			
Parameter	Red	Amber	Green
Zinc	>150	124-150	<124
Copper	>34	19-34	<19
Lead	>50	30-50	<30
HMW-PAH	>1.7	0.66-1.7	<0.66
SECONDARY CONTAMINANTS (µG/KG)			
Parameter	Red	Amber	Green
Chlordane			
DDT total			
Dieldrin			
Lindane			
Total PCB			

\* Green concentrations present a low risk to the biology so the site is unlikely to be impacted

\* Amber concentrations indicate contaminant levels that are elevated and the biology of the site is possibly impacted

\* Red concentrations indicate that contaminant levels are high and the biology of the site is probably impacted

(ARC Blueprint for monitoring urban receiving environments, TP 168 (2004:11))

## TRIGGER VALUES FOR DISSOLVED OXYGEN, COPPER AND ZINC VALUES

	Red	Upper Threshold	Amber	Upper Threshold	Green	Upper Threshold
Dissolved Oxygen	<65%		65-80%	>110%	>80%	<110%
Copper (µg/l)	>3.0		1.3-3.0		<1.3	
Zinc	>23		15-23		<15	
Enterococci	Two consecutive single samples >277/100ml		Single sample >136 enterococci/100ml		No single sample >137 enterococci/100ml	

(ARC, Blueprint for monitoring urban receiving environments, TP 168: 2004:11-39)

## **JOB DESCRIPTION – ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN - CO-ORDINATOR ROLE**

Toki Taiao are a small team that have built considerable momentum and support for the Restoration Plan. Continued momentum and facilitation of the Action Plan requires on-going co-ordination which Toki Taiao cannot commit sufficient time to.

Formalise the co-ordination role of the restoration plan and use initiative to respond to opportunities for its successful implementation.

### **STAKEHOLDER ENGAGEMENT**

- Broker planning hui with Sustainable Catchment Programme team of Auckland Council
- Define calendar of strategic meetings to present findings to; whānau, marae hui, Reserves Board, Marina Board, Hauraki Gulf Forum, Local Board, Auckland Council
- Work with key government agencies that regulate discharges to water
- Define and implement an information relay process and stakeholder relationship outcomes
- Broker a working relationship with local and central agencies that are associated with the Ōkahu Bay Marina in order to have input into management practices and to decrease environmental impact of the marina/hardstand on the ecology of the bay
- Host hui for Local, regional and national expert information transfer
- Define and implement a funding and social enterprise plan for restoration project

### **RESEARCH**

- Following brokerage of strategic relationships with agencies, define mitigation techniques and implement projects that support a successful outcome of the Restoration Plan
- Broker student intern programme with tertiary institutions
- Conduct studies and broker relationships to define and implement
  - Stormwater treatment e.g. wetland treatment systems
  - Mapping and implementation of Sustainable Catchment Programme and Low Impact Urban Design Principles with particular regard to community engagement, provision of fish passage and day lighting streams
  - Map fruit trees and increase potential for a local food network within the catchment with a view to increase community based food production

- Investigate catchment modelling (stormwater, impervious surfaces, green space matrix and corridor mapping) to identify issues impacting the ecological functioning of the Bay, including riparian margins and coastal erosion impacts within the catchment
- Facilitate further research on marine and terrestrial ecology of the Ōkahu catchment with Auckland University

## COMMUNICATION

- Institute communication strategy with wider Ōrākei community; community centre, schools, clubs, local newspaper
- Communicate programme information through E Wawa Ra and Te Puru newsletters, the *ko te Pūkākī* Facebook site and the NWO website
- Implement communication strategy and relationship plan that centres *ko te Pūkākī* and Ōkahu Rākau as the agent responsible for all restoration work in the catchment

## SOCIAL CAPITAL BROKER

- Development of Ōkahu Rākau to deliver a programme for local pest control
- Broker relationship with Ōrākei Primary that enables ownership and commitment to the restoration plan and sets the school up as a 'restoration hub'
- Broker relationships with other schools within the Ōrākei area as a restoration syndicate
- Link catchment primary schools into the Ngāti Whātua Ōrākei scholarship programme
- Development of a training plan for Ngāti Whātua Ōrākei ; restoration co-ordinators, permaculture principles, ethnobotany, marine sciences
- Engagement with masters/doctorate internships from tertiary institutions and the New Zealand Social Innovation and Entrepreneurship Research Centre to identify Community Economic Development, social innovation and entrepreneurship opportunities
- Implement the Sustainable Living Programme to be delivered by *ko te Pūkākī* within the Ōrākei area

## **JOB DESCRIPTION – ŌKAHU CATCHMENT ECOLOGICAL RESTORATION PLAN - VOLUNTEER CO-ORDINATOR**

Formalise a volunteer co-ordination role to respond to the increase in volunteers, to respond efficiently and effectively to the higher demand for contracts to deliver restoration projects throughout the catchment and to use initiative to respond to opportunities for success of the Ōkahu Catchment Ecological Restoration Plan.

### **STAKEHOLDER ENGAGEMENT**

- Implement a volunteer co-ordinator position to manage the increase in work response that Ōkahu Rākau will incur
- Development of Ōkahu Rākau to deliver a programme for local pest control
- Broker relationship with Ōrākei Primary that enables ownership and commitment to the restoration plan and sets the school up as a 'restoration hub'
- Broker relationship with other schools within the Ōrākei area as a restoration syndicate
- Implement the Sustainable Living Programme to be delivered by *ko te Pūkākī* within the Catchment
- Implement kaitiaki component to be delivered by *ko te Pūkākī* into the Mai Ora Mai Whānau, Whānau Ora programme

### **COMMUNICATION**

- Communicate programme information through E Wawa Ra and Te Puru newsletters, the *ko te Pūkākī* Facebook site and the NWO website
- Implement a booking and management system that supports the increase in work that Ōkahu Rākau will incur
- Institute communication strategy with wider Ōrākei community; community centre, schools, clubs, local newspaper
- Define and implement a funding plan and social enterprise plan for restoration project
- Implement communication strategy and relationship plan that centres *ko te Pūkākī* and Ōkahu Rākau as the agent responsible for all restoration work in the catchment