Waimatā River Restoration Project

Background Information

Table of Contents

1.0 Origins of the Waimata Catchment Restoration project

The Waimatā Catchment Restoration project was first conceived following detailed research undertaken by the Te Awaroa: Voice of the River research group from the University of Auckland and Ngā Pae o te Māramatanga Centre for Research Excellence. Five reports were prepared by the group – all of which are available online at https://www.waikereru.org/river/

- Research Report 1: Landscapes and Rivers of the Waimatā
- Research Report 2: Native Land Court Records of Blocks on the Waimatā
- Research Report 3: Settler History post 1880 on the Waimatā
- Research Report 4: Biodiversity in the Waimatā
- Research Report 5: A Place Belonging to the Heart: Waimatā

Following this in depth research, community report backs were held in the Waimatā community on Sunday 4 November 2018 – one in the upper catchment attended by 50 people, mainly local landowners, and one in the lower catchment attended by over 100 people.

These meetings strongly endorsed the need to take steps to create a Waimatā Project, and start work to improve water quality, land stability and biodiversity within the catchment. Farmers in the catchment expressed enthusiasm around the idea of starting farm environment plans and taking action on their own land.

Following this, a meeting was held with the Gisborne District Council and Department of Conservation and iwi representatives from Te Aitanga ā Māhaki. Minutes can be found here https://www.waikereru.org/river/ - Report-back on meeting with Gisborne District Council and DoC (November 5th, 2018).

There was considerable support from DOC, Te Aitanga a Mahaki and the Council around a community led project - with Laura Watson (nee Savage), as a then Council staff member and local farmer in the catchment initiating the project.

Council support for a community-led Waimatā Project has been formally committed by the CE and Deputy Mayor. Council has also supported research into riparian restoration on the river, looking at the health of the protected bush areas in the catchment, and researching the mud volcanoes.

In a first practical step to progress the project, members of the farming community have come together with the Longbush Ecological Trust to commence farm environment planning, fencing and the first stages of riverbank and wider eroding land planting.

As agreed in the community meetings, a steering group has been set up – with Dame Anne Salmond as the chair. This ECFP Community Projects application is the first stage in the wider restoration of the Waimatā Catchment.

2.0 Erosion in the Waimatā Catchment

Erosion in the Waimatā Catchment is so severe that scientists have concluded that 100% of the Waimatā catchment needs soil conservation measures. According to soil scientist Dr Doug Hicks of Landcare Research " In the Waimatā catchment right up in the headwaters, virtually nothing is stable."

The landscape of the Waimatā Catchment has been sculpted by landslides, gullies, sheetwash and bank erosion. Landslides range from shallow (<1m deep) to deep seated (several to tens of metres). They are present in both small and large sizes throughout the catchment.

In the GNS Report An inventory of deep seated landslides in the Waipaoa and Waimatā Catchments (Page and Lukovic 2011), it is noted that 18.5% of the combined Waipaoa and Waimatā catchments are affected by deep seated landsliding – or 21.4% of the hilly terrain. Over 100 different landslides have been identified within the Waimatā Catchment.

Erosion in this catchment causes drop outs and slips, aggradation of the river floor and flooding, with depositions of sediment and forestry slash. Because the Waimatā River runs from forestry and farmland through suburbs, a major city park, bridges, the heart of Gisborne city, the port and popular city beaches, and because its lower reaches are intensively used for leisure activities, erosion in this catchment has particularly severe and costly impacts on the local community.

City beach Gisborne. Flood September 2015

Gladstone Road bridge, Gisborne, forestry slash. Flood September 2015

2.1 Riverbank erosion in the Waimatā

Riverbank erosion is significant in the Waimatā, and is a substantial contributor to the high sediment levels found in the river. The contribution of riverbank erosion to sediment loads is higher than found in adjacent catchments such as the Waipaoa or the Uawa, because the river traverses particularly vulnerable sediments.

Figure 1 over, taken from Callum and Brierley 2015 *Landscapes and Rivers of the Waimatā and Taruheru. Te Awaroa Project Report* No. 1 shows the landscape traversed by the river – which rises in steep hill country and then passes through the upper earthflow region into medium then steeply dissected terrain. A second major earthflow is found in the lower part of the catchment before the river enters the lowlands and the Gisborne urban area.

Many steep headwater reaches of the Waimatā are currently in poor condition, with significant deposits of fine-grained sediments resulting from forest harvesting.

Sediment inputs from upstream reaches have infilled some valleys, creating streams that are now actively meandering across sediment deposition zones. The lack of vegetation means this sediment is then further eroded and transported downstream.

Overall there is much local bank erosion and slumps are re-draped with sediment during flood events, forming oblique accretion depositional features that build the banks up again and then are very easily eroded once more.

In the lower Waimatā the erosion is so severe that an area of riverbank is identified as the Waimatā Riverbank Hazard Zone and in the urban area much of the riverbank has been retained with revetments and retaining walls to prevent further slumping.

However, as Callum and Brierley (2015) have noted, there is substantial potential to address the riverbank erosion and reduce the sedimentation of the Waimatā River.

1958 Slip into the Waimatā River – this blocked the river (Photo Gisborne Herald)

Mud volcanoes in the Upper Catchment earthflow area

Slumping banks and heavy sedimentation are common in the tributary streams

Slumping riverbanks in steep hill country

2.2 Managing Riverbank Erosion and Riparian Restoration

A report commissioned by the Gisborne District Council (Forbes, 2018 – Waimatā River riparian zone description and guidance) identifies methods for riparian restoration and appropriate species for planting, taking into account the differing riparian environments in the river.

The Te Awaroa, Calum and Brierley 2015 report also provides good information to support the different types of riparian treatments needed in the catchment.

The Council has also undertaken riparian plantings in the Te Arai River as part of its inanga spawning area restoration, and discovered which species are suitable for lower bank environments where annual or greater flood events result in substantial sediment deposition.

The riparian treatments which will be included in the Waimatā Catchment project will be informed by all this work, as well as the expertise of DOC and the researchers in the Te Awaroa: Voice of the River programme.

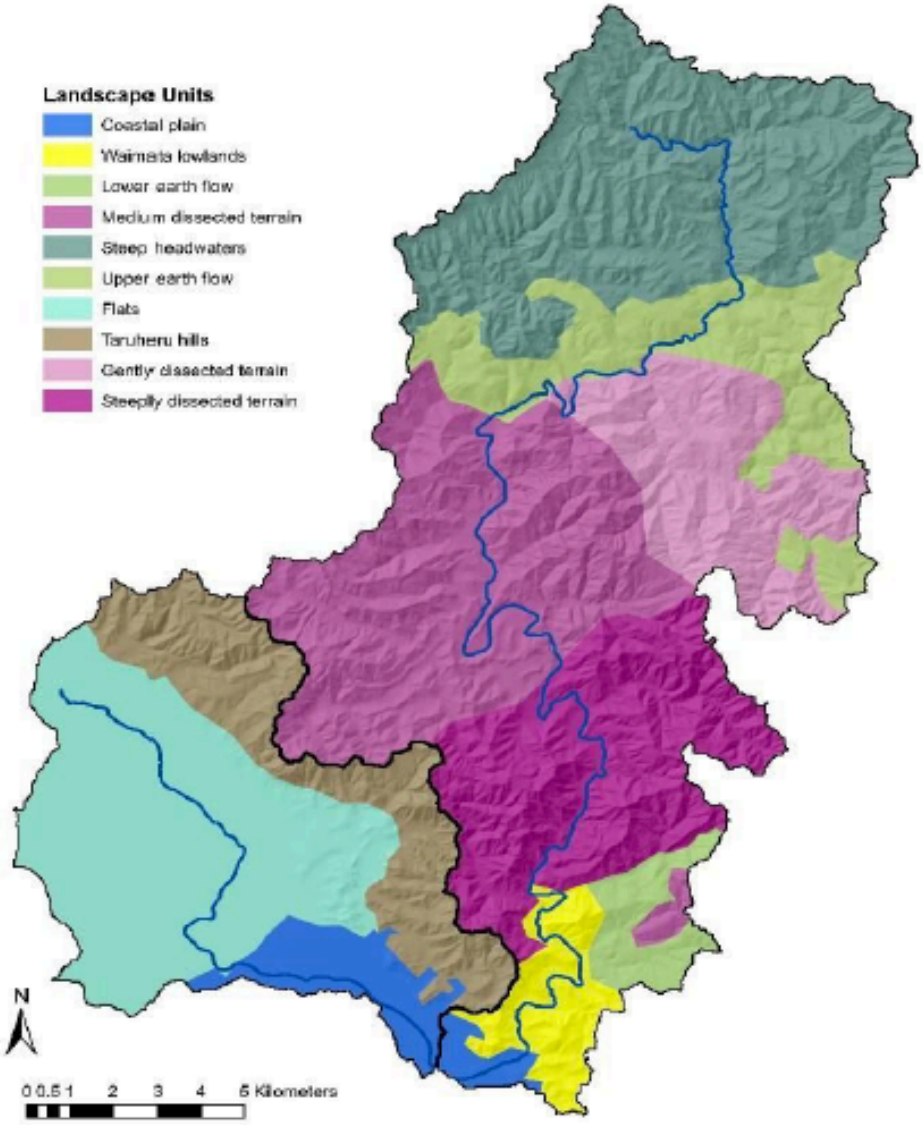


Figure 1 Landscape Units in the Waimatā Catchment. [After Callum and Brierley, 2015].

3.0 Waimatā River Setting and Geomorphology

Exerpts from Carola Cullum and Gary Brierley*: Landscapes and Rivers of the Waimatā and Taruheru*. Te Awaroa Project Report No.1, 2015.

3.1 Regional Setting

The regional climate has warm moist summers and cool wet winters (Marden, 2011). Rainfall is high all year round, with mean annual rainfall around 1,000 mm/year at the coast, rising to 1,300 mm/year in the headwaters (Hicks et al., 1996; Liébault et al., 2005). The area is subject to tropical cyclones from March to May, when intense rainstorms and frequent floods cause extensive landsliding and substantial damage to infrastructure such as roads, bridges and buildings.

The Waimatā catchment lies adjacent to a major tectonic boundary, so faults and earthquakes are common and uplift rates are high. Indeed, the combination of tectonic activity and soft rock makes the East Cape region has some of the highest sediment yields per unit area in the world (Hicks et al., 1996).

Against the backdrop of ongoing tectonic subduction, the Waimatā catchment bears the imprint of changes in sea level associated with long term climate changes in the Pleistocene era. At the Last Glacial Maximum (a glacial period 14,700 years ago), the sea level was some 120m lower than present. Since then, periods of relatively high fluvial incision have alternated with periods of relatively low incision during which floodplains formed. With each new incision event, floodplains have been abandoned and remain today as remnant terraces. During erosion periods, hillslopes were steepened and valleys filled with sediment. Subsequent sea level rise drowned lowland valleys.

The landscape now bears the imprint of multiple cycles of erosion and deposition associated with climate changes over millennia. Flights of terraces border banks along almost the entire river. These terraces resist erosion, effectively pinning the course of the river to a fixed position, within narrow valleys that have little space to store sediment (Fryirs et al., 2016; Fryirs and Brierley, 2010).

Like much of New Zealand, deforestation in the East Cape region occurred in two waves. Maori settlers arrived in the 14 th century and burned much of the lowland forest. More extensive and rapid land clearance came with European settlement. From 1880 to 1920, the hill country was extensively deforested, through logging and burning, to establish pasture for sheep and beef (Jones and Preston, 2012, Gundry, 2015).

During this period, native beech and podocarp-broadleaf forest cover in the East Cape region was reduced from an estimated 68% cover to some 23% (Ewers et al., 2006). Further clearance was encouraged by government-led incentives in the 1960s and 1970s that provided subsidies for land development, fertiliser grants, reduced loans, and guaranteed minimum livestock prices (Rhodes, 2001). The native podocarp-hardwood forest now accounts for only about 2.5% of cover in the East Cape region, and is limited to high or steep parts of the Raukūmara Range. Much of the region is now pasture or regenerating manukā and kanukā scrub (Gomez and Trustrum, 2005; Jones and Preston, 2012; Liébault et al., 2005).

Each period of deforestation was followed by extensive hillslope erosion across the region as soils were no longer stabilised by tree roots, and run-off increased as less water was intercepted and transpired by trees (Marden et al., 2012; SCION, 2012). Across the region, responses to deforestation were widespread and included floodplain sedimentation, widening of downstream channels due to sediment scouring, and aggradation (vertical increase in elevation) of channel beds (Allsop, 1973; Marden, 2011; SCION, 2012).

Following concerns over increased hillslope erosion and gullying, reforestation efforts using exotic species (mostly Pinus radiata) occurred from 1960 (Marden et al., 2012).

Planting in the Waimatā occurred a little later, mostly during the 1990s. Although many pine plantations were established as government-subsidised soil conservation initiatives, most plantations are now commercial forestry businesses, and many have been sold to overseas owners (including much of the forests in the headwaters of the Waimatā catchment). These plantations are now being harvested, prompting new concerns for soil erosion and increased sediment loads in the rivers.

3.2 River Styles

The character and behaviour of the Waimatā River and its tributaries are largely determined by geology, landscape

history and position within the catchment. The various geologies found in the catchment produce very different landscapes and rivers. For example, the fragile smectites of the earth flow areas are associated with low relief, hummocky landscapes that offer space for sediment storage and lateral movement of streams.

In contrast, the resistant lithology of the steep headwaters and the finely dissected steep terrain of the mid catchment produce narrow valleys that concentrate flow and limit the space available to store sediment. The history of rising and falling sea levels has left many old terraces that confine the contemporary floodplain to narrow pockets adjacent to the river.

Position within the catchment largely determines stream power, which in turn determines the capacity of the river to transport sediment downstream. Stream power generally decreases downstream as channel slope decreases and valley width increases, dissipating flow energy. The more easily transported fine-grained sediments are generally transported further downstream than are coarse-grained sediments, which tend to be stored further upstream. In areas with relatively high stream power (e.g. steep headwaters), fine-grained sediment is easily flushed downstream.

By contrast, in areas of relatively low stream power (e.g. low-relief earth flow areas), sediment is generally stored locally before being washed downstream in flood events. However, if the sediment load exceeds the transport capacity of the stream, even fine-grained sediment may be deposited high in the catchment, leading to degraded, muddy streams with little geomorphic or biological diversity.

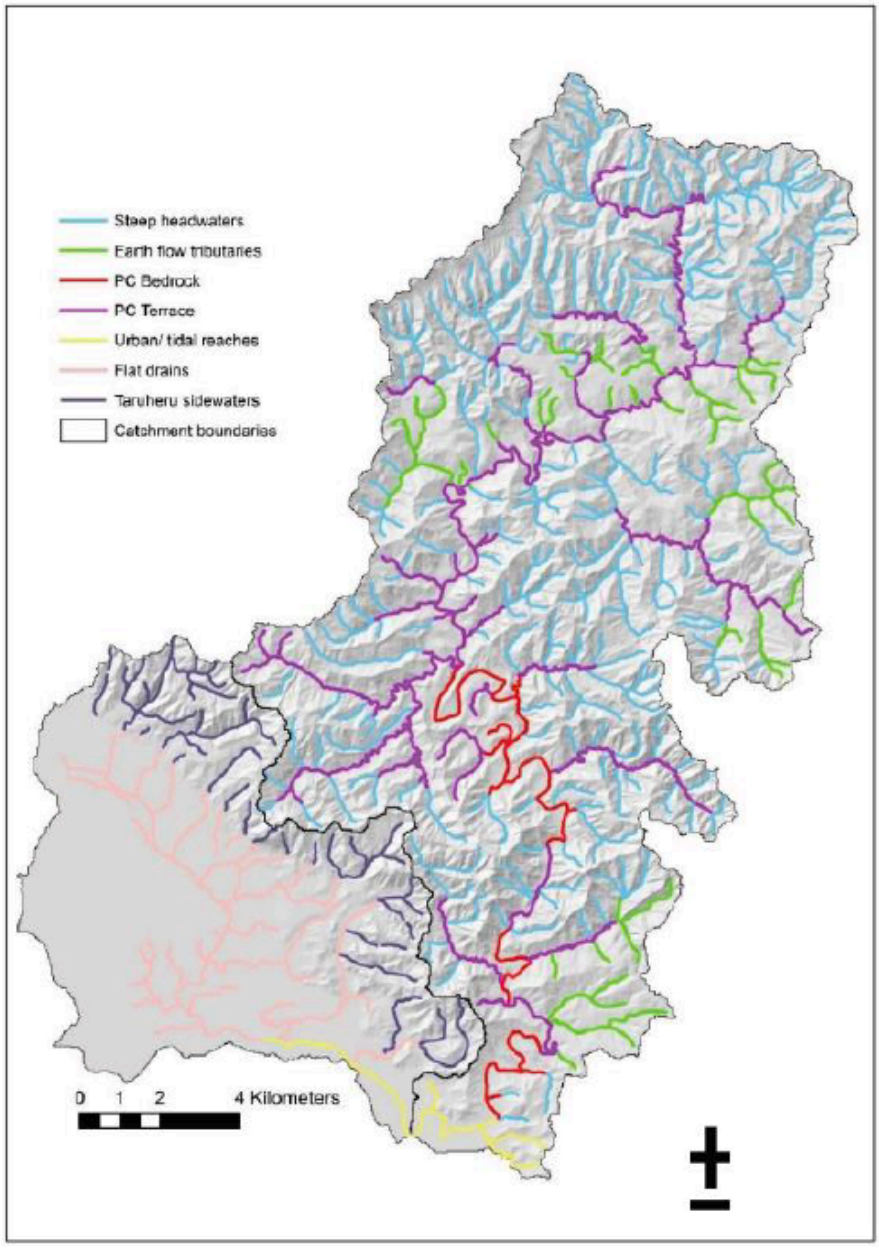


Figure 2 River styles in the Waimatā Catchment

3.3 River Condition

Many steep headwater reaches of the Waimatā are currently in poor condition, being prone to overloading by fine-grained sediments resulting from forest harvesting. Enhanced sediment loads also reduce local biodiversity and create a burden for downstream reaches. Sediment inputs from upstream reaches have infilled some valleys, creating streams that are now actively meandering across contemporary floodplains. Because of the lack of vegetation, these floodplains are frequently reworked and are therefore considered as being in poor condition.

Many earth flow tributaries are trapped, and are separated from the main river stem by local swampy areas that store sediment at source and provide habitat diversity. Channels in partly confined reaches are relatively narrow, showing little signs of the widening associated with such reaches in poor condition. Although there is much local bank erosion, slumps are re-draped with alluvial deposits, forming oblique accretion depositional features that build the banks up again.

Given limited capacity for geomorphic adjustment across the Waimatā catchment, where contemporary river activity is constrained by imposed valley confinement (by bedrock and low terraces), disturbance responses associated with deforestation and land use change have been relatively limited in this system.

There is no indication that inputs of sediment from hillslopes has altered process relationships on valley floors. In contrast to other parts of the East Cape (such as the Waiapu and Waipāoa catchments), there are remarkably few landslides and gully networks, so inputs of bedload calibre materials and associated bed aggradation are limited.

However, forest management practices in headwater reaches, and earthflow activities in numerous tributaries have resulted in pulsed inputs of fine-grained material (wash and suspended load). These materials overload the system on a temporary basis, but given the relative confinement of the river, materials are flushed downstream relatively easily. As a result, the recovery potential of the rivers is high.

Table 1 Condition and recovery potential for river styles in the Waimatā and Taruheru catchments

River Style	*Recovery Potential*
Steep headwaters	Low: Condition depends largely on land use. Tree coverage reduces lateral fine-grained sediment. However, after harvesting, fine-grained sediment inputs increase rapidly. After replanting, 8-10 years are needed before sediment production is significantly reduced (Marden, Pers. Commn.) Short term initiatives to improve condition could include limiting forestry harvesting along riparian stream edges.
Actively meandering streams	Low: This river style can adjust easily - but their condition depends largely on upstream condition and a reduction in the amount of sediment delivered to these reaches.
Earth flow tributaries	Tributaries that are already trapped/ or starting to be trapped have good recovery potential. The development of wetlands can be encouraged by appropriate planting and existing wetlands can be given a high priority for conservation. However, incised tributaries have low recovery potential.
Partly confined by terraces or bedrock	These reaches are in good condition, having changed little, despite high throughputs of fine-grained sediment. There is little or no room for lateral movement of the channel, except in the low relief, wider valleys of the earth flow zone. Bank erosion is local and tends to self-repair, with no overall widening of the channel. Judicious planting on floodplain pockets that are well defended from slumping would improve local condition and enhance downstream prospects.
Taruheru sidewaters	The deep legacy sediments in these valleys mean that many tributaries are trapped and that few are incising. Trapping can be encouraged through careful planting of incipient wetlands.
Tidal /Urban reaches	These reaches are highly modified, so the only recovery interventions possible are the use of 'softer' engineering options that give the river more freedom to move and the introduction of artificial niches that provide habitat heterogeneity.
Flat drains	These highly modified reaches provide a valuable service to horticulture. Local patches of wetland would enhance biodiversity in this area.

In many other parts of the East Cape deforestation and landslides have generated large 'slugs' of sediment stored in

river floodplains and channels, degrading rivers to a poor condition. However, the Waimatā is quite different, retaining a remarkably good condition from a geomorphic point of view. This is largely because the river is fixed in position by bedrock and terraces, such that there is no accommodation space for large volumes of sediment down much of its length. The river acts as a chute, efficiently flushing sediment through the system to the sea, with little effect on channel morphology, but contributing to sediment accumulations at the river mouth. Thus efforts to improve the condition of the river should focus on reducing the sediment load at source, increasing the capacity to trap sediments at source, in the headwater regions and in the sluggish tributaries of the earth flow zones and the Taruheru hills.

4.0 Waimatā River – Gisborne's River of Gold

The following text is extracts from: Michelle Reeve 2015: *A place belonging to the heart: Spatially and temporally changing social connections to the Waimatā River and its tributaries.* Te Awaroa Report 5.

4.1 Iwi Values

The Waimatā River is special to local Māori as it is an entity to be valued, treasured, and respected, and is inseparable from themselves and their ancestors (Nga Iwi o Tūranga, 2014). This makes the river part of the identity of Māori who have lived near the Waimatā River and the phrase "ko au te awa, ko te awa te au" (I am the river and the river is me) is very applicable (Gisborne District Council, N.Aa). This includes the Ngāti Porou, Rongowhakaata, Te Aitanga-ā-Māhaki and Te Aitanga-ā-Hauiti tribes who have occupied and utilised the land on the banks of the Waimatā River for many generations (Gisborne District Council, N.Aa; Spedding, 2006).

For Rongowhakaata, the Waimatā River is significant because it represents the relationship between gods and present generations, it strengthens identity, and whakapapa, waiata, kōrero, and mahi toi can be upheld. The mauri, mana (custodian or kaitiakitanga responsibilities), and tapu (sacredness of the relationship between people and water) of the Waimatā River signify the spirit which connects the physical and spiritual elements of all things and produces and sustains all life forms. Every natural entity also has its own life force and all life forms are interrelated (Rongowhakaata Iwi, N.Aa).

The Waimatā River was so named because its waters were obsidian in colour and dark in character and mood (Rongowhakaata Iwi, N.Aa). People from the Rongowhakaata tipuna tribe had (and still have) an immense understanding of traditional tracks, good sites for collecting kai, rongoa māori, and other taonga, ways of using goods from the river, the association between people and the land and their reliance on it, and Tikanga for the most appropriate and sustainable use of goods (Rongowhakaata, Iwi, N.Aa). Growing up, the river was also a playground for children who would run away from their families and spend the day hiding in the bush which together with the river provided a self-sustaining source of water and food, including fish (mullet), tuna (eels), inanga (whitebait), freshwater shellfish, birds and berries (Gisborne Hui, pers. comm., 2015; Gundry, 2015). It was so enjoyable that children would submit to the consequences when they returned home (Gisborne Hui, pers. comm., 2015).

Since then, land and waterways have degraded relatively quickly and settlement patterns have changed to the detriment of Māori households. Māori are connected to this river and their health is dependent on the health of their environment. This is significant even though few Māori families today live on the banks of the river as they instead live on the banks of the Taruheru (Anne Salmond, pers. comm., 2015; NgāIwi o Tūranga, 2014). Māori are in a sense disconnected from the Waimatā River as they are no longer able to collect kai and good quality water is scarce (Ngā Iwi o Tūranga, 2014). Generations of Māori are therefore changing; people cannot manaaki and tiaki their taonga and only memories and stories can be passed onto children as they cannot experience for themselves the restoration of kai beds, the collection of kai, or learn their whakapapa, karakia, histories, and waiata (Ngā Iwi o Tūranga, 2014).

4.2 Historical Values

Upon European settlement, it was the land blocks in the lower reaches of the Waimatā River which were the first to be sold, presumably because they were easier to access, had a good water supply, and had fertile soils (Gundry, 2015). Settlers constructed Māori whare (made of nikau fronds, mud, and timber) on many newly acquired properties and these provided reasonably quick shelter (Figure 4). In many cases these were pulled down when grander European style houses were built, to keep land clear for gardens, trees, or agriculture, but they told a story of settlers who came to live in and love this region (Tombleson, 1997).

Today, many European houses or buildings along the Waimatā River are considered to be historically significant. These are all located in the lower portion of the Waimatā and are historically significant because of their age or the activities that have taken place there.

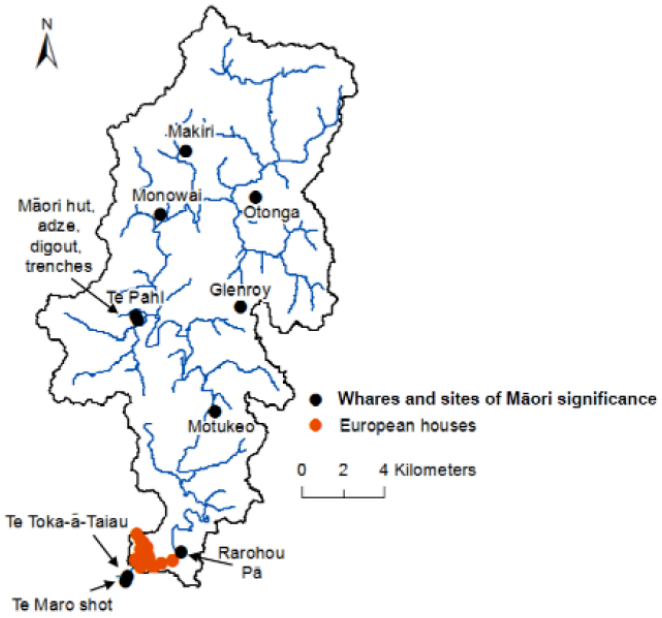


Figure 4. Places in the Waimatā which are significant to both Māori and Pākehā. Locations of sites obtained from Gisborne District Council (2006), Spedding (2006), and Tombleson (1997).

Gisborne Club swimmers grouped together under the William Pettie Bridge in 1961 in anticipation of their 183 metre race which finished at the Gladstone Road Bridge (Gisborne Photo News, 23rd March 1961).

Jumping from the Gisborne city bridges is a "rite of passage" for many young Gisbornites

4.3 Urban Values and Infrastructure

The Waimatā River runs through Gisborne City in its lower reaches. For 4km the river flows through the city until its confluence with the Taruheru River to form the Tūranganui River. There are 240 urban residential properties alongside the river as well as 5 parks and multiple esplanade reserves. In the urban area the river is crossed by two main bridges – at Rutene Road and at Gladstone Road. The Gladstone Road bridge is the main route for all trunk infrastructure – telecommunications, water, wastewater as well as being State Highway 35. These residential properties are threatened by flooding, erosion and sediment deposition during heavy rain. Now with forestry harvest underway in the catchment, forestry slash and debris from riparian vegetation destroyed from post harvest landsliding are a major threat.

At the bottom of the catchment is Gisborne Port at the mouth of the Tūranganui River. Around from the river mouth is Gisborne's highest use beach – the Waikanae. Both the port (through sediment deposition) and the beach (from forestry slash) are heavily impacted by the land uses in the catchment.

Gladstone Road Bridge blocked by forestry slash – September 2015 storm. The blockage caused flood waters to back up behind the bridge, exacerbating flooding in the Taruheru and Waimatā River upstream.

4.4 Current Uses

Teenagers make their own fun in 2014, on a waterslide erected on the river bank close to the intersection of Whitaker Street and Stafford Street (Gisborne Herald, 28th November 2014).

The Waimatā River has always held a special place in people's hearts. Foremost, the river is a way of uniting and connecting (but sometimes disconnecting) people who meet together on the river. Individual and collective activities along the river are very important, and shared experiences and memories have brought the tight-knit community together.

The Waimatā River is much loved by the local community, and is used by many different individuals, families, and clubs for both one-off and annual recreational activities and events (Figures 8 and 9). Fun events bring about community engagement and enjoyment, and enable people to connect positively to the river. Comradeship and friendly competition is also evoked in contestants through a variety of races.

4.3.1 Swimming and Fishing

Two areas of the Waimatā River are particularly enjoyed for swimming and recreation and were named as significant in Gisborne Region's 2014 Draft Freshwater Plan. This was the river reach between The Island and the Waimatā/Taruheru confluence, and the area surrounding the Tainui Sea Scout Camp, located in Anzac Park (Gisborne District Council, 2014a).

The whole of the Waimatā River has high recreational values, however, as the lower Waimatā River is heavily utilised by fishers, kayakers, rowers, and waka ama paddlers, and upper Riverside Road is used by cyclists, runners, and walkers (Longbush Reserve, 2013b). Many people are also competing for space on the river; traditional fishing or swimming users are now competing for space with people who have more technologically advanced interests such as users of jet boats. This tests and refashions the community's traditional connections to the Waimatā River (Hillman *et al.*, 2008).

The Hole-in-the-wall and The Island are recreational spots along the Waimatā River that have been enjoyed over many generations. As soon as the Hole-in-the-wall was naturally created by erosion in a Gowerville cliff, people have been taken with the picturesque rock formation which was created in an upstream riverbank. This popular picnic and swimming spot was historically reached by boat or by Darwin Road, on the right bank of the Waimatā River (Gundry, 2015). Photos from as early as 1882, 1888, and 1906 show groups of people sitting on the riverside or in row boats

who have stopped in quiet appreciation and awe of the remarkable formation.

Fishing is also a great recreational activity in the Waimatā River which enables relaxation or triggers rivalry between fishers. The Waimatā is still an attractive fishing spot today, with the Gisborne Harbour and Waimatā River named New Zealand's 67th best fishing spot in 1998 (and later revised in 2013). The area around the Esplanade is particularly lovely as there are available fish and there is fun to be had by the whole family (The Fishing Website, 2015).

Swimming and wading have also always been a cherished activity in the Waimatā River, and perhaps one of the most meaningful to people as time has progressed since no equipment is needed to have glorious fun and make splendid memories. Numerous young children and families enjoy a relaxing swim in the river, and many people today dreamily reminisce about the swimming holes on the Waimatā River (Anzac Park, Hole-in-the-wall, Longbush, Apple Tree Bend) where many an enjoyable hour was spent, splashing their companions and relishing in their surroundings.

4.3.2 Boating, Rowing, Canoeing and Kayaking

Cubs, Keas, and Scouts also all work out of the Gisborne District Sea Scouts Association facilities on the Waimatā River and these facilities are used at least 3-4 days per week. Groups use the boat ramp and nearby steps from Anzac Park to reach the river and launch their boats, and there is close collaboration between these groups and the rowing club and general public as they all use the same access point (Gisborne District Council, 2007). Sea Scouts are aged 10- 14 and they complete badges for typical scout activities, as well as rowing, sailing, seamanship skills, and swimming (Scouts Waiapu Zone, 2013). They are not a new collaboration and have been around since the 1880's.

The Waimatā River is also readily used for rowing, canoeing, and kayaking, three of Gisborne's most competitive water sports. The Gisborne Girls Rowing Club was established in August 1874 and since then members have trained several days a week on the river from the Anzac Park clubrooms up to The Island. This 2 km distance has prepared rowers for races such as the New Zealand Rowing Nationals and National School Regattas (Gisborne Rowing Club, 2015).

The Poverty Bay Kayak Club was established in 1978 with just single kayaks on offer. Since then, kayaking has developed into an adventure sport and recreational activity and regular kayak training has taken place on the Waimatā River. Membership is currently around 70, of which 50 actively participate, and training occurs almost all year round (Poverty Bay Kayak Club, 2015). Training conditions, however, do prove challenging and relatively inefficient compared to other rivers as the river is tidal, windy, and movement is stop-start and involves turning several corners as kayakers can only paddle in a straight direction for 400 metres and in one direction for 3 km before turning around (Whanganui Chronicle, 24th November 2004).

This sport is, however, one that installs great pride in the Gisborne District as kayakers have trained and competed in races for the club, and then later left to compete in and win World Championship and Olympic events. Athletes on the Olympian honours roll include coach John Grant (1980), Alan Thompson (1980, 1984, and 1988), Robert Jenkinson (1984), Liz Thompson (1984), coach Brian Wilson (1984), Grant Bramwell (1984, and 1988), coach Benny Hutchings (1984 and 1988), and Darryl Fitzgerald (2012). World Championship Finalists have also included Peter Duncan (1981-1983), Alan Thompson (1981-1987), Grant Bramwell (1983-1987), Paul Green (1998), and Gavin Elmiger (1998) (Poverty Bay Kayak Club, 2015).

4.3.4 Waka Ama

A sport which only came to Gisborne in the mid 1980's is waka ama. The voyage of the waka *Hawaikinui* from Tahiti to New Zealand in 1985 brought about a wave of increased interest in this sport (Barclay-Kerr, 2013). That same year one of the builders of *Hawaikinui*, Matahi Whakataka-Brightwell, created a waka ama club in his home town of Gisborne (Sport Waikato, 2013). This club, the Mareikura Canoe Club, was created at Anzac Park on the banks of the Waimatā River. Since 1985, three more waka ama clubs have been created in Gisborne: Te Uranga O Te Ra, Tūranga Waka Ama, and *Horouta* Waka Hoe which is located near the Esplanade and operates from Marina Park, at the Waimatā/Taruheru confluence (Sportsground, 2015; Waka Ama NZ, 2015).

Waka ama is hugely significant, and is more than just a recreational activity. Waka is of importance to the people of Tūranganui-ā-Kiwi as it reflects their cultural and historical heritage, with their first people arriving in New Zealand on the waka *Horouta* and *Tākitimu* (Spedding, 2006). In 2009, as part of the Waiapu Catchment's 150th celebrations, 200 young people were gathered from throughout the Waiapu Anglican Diocese for a weekend of fun, comradeship,

races, and competitions.

4.3.5 Multisport Events

Furthermore, the Waimatā River is part of a multisport event. In August each year, the Waimatā Multisport Traverse is held in the Waimatā Catchment. This event began in 2000 and includes road and mountain biking (18-25 km), running (8 km), and kayaking (8 km) (Gisborne Cycling, 2004; Gisborne Herald, 2014d; Sport Gisborne Tairāwhiti, 2012; 2014).Running and biking is completed along Gray's Hill and Cave Road although the exact route varies slightly between years depending on the timing of forestry activities in Waimanu Forest, which forms part of the route. The kayaking stint is completed on the Tūranganui, Taruheru, and Waimatā rivers (Gisborne Cycling, 2004; Sport Gisborne Tairāwhiti, 2012; 2014). In 2014 entrants began at The Island on the Waimatā River and headed downstream to the railway bridge on the Tūranganui River. Contestants turned around the bridge, kayaked back up the Tūranganui River, and took the channel into the Taruheru River, where they turned at the buoy and headed back down to the finish line at the main launching ramp (Sport Gisborne Tairāwhiti, 2014).

4.3.6 Education

The Waimatā River is also the ideal place to educate youngsters about water safety since it provides an open environment to do so and is the place where many children swim or play with their families and friends. In December 2013, Tairāwhiti Water Survival instructor Rama Robertson and several Midway Surf Lifesaving Club lifeguards led at least 60 nine and ten-year-old Te Wharau Primary School students in a two day water safety program on the river aimed at teaching river survival practices (Gisborne Herald, 12th December 2013). This provided children with skills to protect them when they are found out of their depth in the water, and was particularly favourable with families of the young ones. The students learnt a lot and it was remarked by teacher Kim Perano that "it has been great, making it safer for the kids to do the things they are going to do anyway, like swim in the rivers and at the beach" (Gisborne Herald, 12th December 2013). Student Michael Huhu said that "it's exciting" and his father remarked that "it's awesome, can't be beat" (Gisborne Herald, 12th December 2013).

5.0 Biodiversity in the Waimatā Catchment

The following text is extracts from: Abigail Salmond 2015: *Biodiversity in the Waimatā River Catchment, Gisborne.* Te Awaroa Report 4.

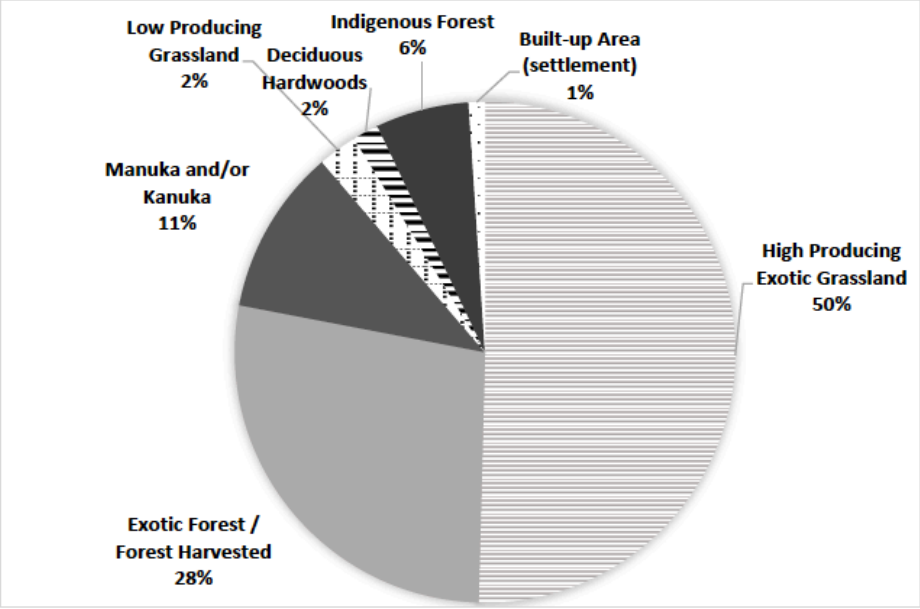
The Waimatā river and its catchment run across two ecological districts, with the headwaters and 80% of the catchment lying in the Waiapu ecological district, and the southern 20%, where the river meets the sea, lying in the Tūranga ecological district. Both of these districts lie within the Gisborne Botanical Province (Wardle, 1991).

5.1 Current Vegetation Cover

The current catchment is dominated by pasture and exotic pine plantations. High-producing exotic grassland makes up around 50% of the catchment area, higher that the regional cover of 40%.

The second highest land cover unit, exotic pine (*Pinus radiata*) plantation forest, sits at around 28% cover, nearly 10% higher than the exotic forest cover across the Gisborne region as a whole (19.3%).

Indigenous scrubland/secondary forest of mānuka and/or kānuka covers 11% of the catchment, similar to the estimated regional cover of 9.1%. Pockets of indigenous forest are scattered throughout the catchment, with larger areas towards to the west and north. Together these cover 6% of the catchment, compared with an 23% of indigenous forest cover for the region. The remaining 5% landcover in the Waimatā catchment is a mix of exotic vegetation, open water/river, horticulture and built-up areas.



Percentage cover of different landclasses in the Waimatā Catchment (LCDB, 2014)

In total, the remaining indigenous land cover in the catchment is approximately 17% (including mānuka/kānuka). The largest of these areas is at the head of the catchment and is made up of public land (Whakaroa Reserve) and private land. Here, remnant forest of tawa and black beech are mixed with regenerating mānuka-kahikatea forest with emergent rewarewa and an understorey of five-finger, kāmahi and tree ferns. Tawa forest is the most common type of

indigenous forest remaining (with the exception of mānuka/kānuka), often growing with kohekohe, kānuka, titoki, and/or kahikatea on the flats. Black beech occurs occasionally (GDC, 2006).

5.2 Forest Condition

Much of the additional remaining indigenous forest in the Waimatā catchment (2.7% of the total catchment area) has been identified as Protected Management Areas (PMA) under the Gisborne District Council's District Planning process.

A recent survey of PMAs by Gisborne District Council (McLean, 2018) in the catchment area found that those in the lower part of the catchment tend to be smaller and contain more weeds. There were however some exceptions including Riverside road (WR63 - Longbush) which is relatively weed free, and Cave Road (WR62) which is relatively large (>100 hectares).

The survey found that in the upper part of the catchment, PMAs tend to contain a lower diversity of weeds. A number of PMAs in and around the Utting road area of the Waimatā catchment have been fenced by landowners to exclude stock.

Where fenced, understorey regeneration tends to be rapid due to favourable natural factors including mild temperatures (few frosts), reasonable rainfall (over 1500mm) and good natural soil fertility. In addition to fencing, some landowners have been pro-active in managing plant and animal pests. One landowner who owns a large PMA dominated by secondary forest has been controlling wilding pines by ground and aerial means for several years. In the lower part of the catchment several PMA's have been managed intensively for a wide range of animal and plant pests over the past decade (e.g. Gaddums Hill and Longbush).

5.3 Riparian Vegetation

In a recent survey of lower Waimatā riparian vegetation (Forbes *et al*, 2018) a total of 457 ha of the Waimatā River riparian zone approximately 14km upriver was surveyed. 67% (308 ha) of this section of the riparian zone was forested, with exotic forest making up 78% (239.3ha) of the total forested area, the remaining 22% (68.9 ha) of forests being predominantly native (Table 3). More than half (63%) of the forested area was grazed. Treelands (canopy cover of 20-50%) covered 62.5 ha and shrublands, with rushlands and grasslands each forming relatively minor components of the riparian zone vegetation structure. Riparian vegetation varied spatially along the river, although this was generally scarce below Goodwins bridge.

Fresh goat sign was detected at 42% of native sites and the abundance of goat sign was positively associated with understorey browse severity. The co-occurrence of these variables indicated that goats are retarding the regeneration of some native forest areas. A quarter of all sites had common fresh sign of stock with occasional stock being seen or heard at those sites. In most sites (61%) stock sign was uncommon and often old or only occurred near forest edges. Forty percent of old growth sites showed no sign of stock presence.

5.4 Biodiversity in Production Forests

Areas of indigenous forest within exotic forest plantations are reasonably common in the catchment, and much of this forest is in relatively good condition. Steeper areas, often near

stream sides, usually contain a broad range of mixed broadleaf species, most likely as a result of being inaccessible to browsing mammals such as goats and deer.

As in much of the catchment, kohekohe in the forest canopy is often heavily browsed by possums, and the understory seems to be favoured by deer and goats, areas which are more easily accessible are often quite bare. Where possum control is being undertaken understorey vegetation is more common.

The recent survey of PMAs in the catchment found that remnant indigenous bush patches within pine plantations are often in better condition than those in farmland, probably because of a combination of the lack of stock; goat and possum control being undertaken by the forestry company; and the shelter provided by the pine trees. However this condition is often dramatically reduced when and after the surrounding plantation forest is harvested.

5.6 The impact of pest plants and animals

The primary threat to Gisborne Region's remaining biodiversity is from introduced pest plants and animals. The most common pest animals, and those most readily detectable in the catchment, are the browsing herbivores, goats and deer (along with wandering stock); and the omnivorous possum. These animals do the most damage to native forest vegetation and ecosystems. Ship rats (*Rattus rattus*), stoats (*Mustela erminea*) and possums (*Trichosurus vulpecula*) are the most significant predators of native species in the mainland forests of New Zealand (Brown *et al,* 2015). They prey on birds, eggs, bats and invertebrates directly, while rats also eat seed. Presence of these pest animals can lead to almost complete removal of the forest understorey, including the future seed source, and drastically reduce birds, bat and invertebrate numbers.

In the Waimatā catchment, there are limited areas where pest plant and animal control is being carried out. This includes several areas in the lower Waimatā where landowners, the Department of Conservation, Eastern Institute of Technology (EIT) and Gisborne District Council are working collaboratively to restore areas of native bush on private (including Waikereru Ecosanctuary) and public land (Donners Bush Reserve).

There is also some goat and possum control carried out in forestry blocks in the catchment, and additional sites of possum control on a smaller scale throughout the catchment.

5.7 Freshwater Biodiversity

Many steep headwater reaches of the Waimatā are currently in poor condition, being prone to overloading by fine-grained sediments resulting from forest harvesting and land erosion. Enhanced sediment loads also reduce local biodiversity and create a burden for downstream reaches. The debilitating effect in ecosystems of large loads of fine grained sediment in rivers is well documented. Water quality decreases and both fish and invertebrates tend to be less abundant and less diverse in turbid river carrying heavy sediment loads (Cullum *et al* 2015).

Turbidity and bed sediment cover decrease food resources for aquatic creatures and the diversity of available habitat also decreases. Forest management practices and in headwater reaches and earthflow activities in numerous tributaries have resulted in pulsed inputs of fine grained material in to the Waimatā river.

Monitoring of the stream ecology by the Gisborne District Council has occurred since 2015-2016 summer period and knowledge previous to this is sparse. There are four sites monitored in the Waimatā catchment. For the purposes of comparison, results are compared to those for the Waihirere stream reference site which is fed by a fully forested (native) catchment

Information provided by Gisborne District Council shows that all four sites in the Waimatā catchment have a lower %EPT and MCI score than the reference site at Waihirere stream in the Waihirere Domain.

This indicates that the change in land use from indigenous forest and development within the catchment has had a negative effect on water quality and a decrease in species richness and abundance from the pre-human state. The Makahakaha Stream is an exception, with results being in the "Good" category (prior to forestry harvest). It is known that stable, mature exotic forest can provide similar freshwater habitat to that of an indigenous catchment (while trees are in situ) Pawson *et al,* 2010).

At the four monitored sites in the Waimatā catchment, the MCI index is in the "Fair" – "Poor" range which indicates a degrading freshwater system that supports a less diverse composition of EPT species. The decrease in MCI and EPT taxa also has an impact on fish populations. Since New Zealand fish species feed on macroinvertebrates in the water, as the species richness and abundance decreases, so do the fish populations. There are currently 12 known freshwater fish species in the Waimatā river and these include the At Risk longfin eel, koaro, torrentfish, inanga, bluegill bully. Other fish species include common bully, Crans bully, shortfin eel, black flounder, mullet, goldfish and smelt.

Kakahi *(*freshwater mussels) are also found in the Waimatā catchment. Kakahi are well known for their filter feeding techniques and use native fish to assist in their life cycle and improve their distribution tactics. Mussels release their larvae which attach to native fish gills, especially koaro and grow before detaching and finding a place to grow into maturity. Mussels can live for many years and the decline in habitat and their freshwater fish life history stage may be having an impact on their populations (GDC, 2018).

In 2014, scientist Dr Chris Ward said that while it was good to see freshwater mussels inhabiting sections of the Waimatā River, their occurrence was unlikely to be a reliable indicator of ecosystem health or water quality. The kakahi are pipi-like in that they live unattached at shallow depths within the bottom sediment, and are similar in size and shape. He expected them to live mainly in scattered patches where irregular bedrock shelters pockets of stable sediment (Gundry, 2015).

In contrast to the main Waimatā river itself, some of its tributaries are in comparatively good condition, particularly those that are in indigenous forest catchments. Freshwater surveys of two tributary streams at Longbush Eco-sanctuary (Palmer and Hardy, 2015) exhibit high levels of biological values determined by macroinvertebrate, periphyton and physical habitat evaluations.

After a week of heavy rain, while the Waimatā river reached very high levels of turbidity, whereas the contribution of sediment from the Longbush catchments was hardly any greater than the small amount transported by the streams during stable low flows Palmer and Hardy, 2015). The bush around these streams has been allowed to regenerate over the past 20 years.

6.0 Project Collaborators and Supporters

The Longbush Ecological Trust – 910 Riverside Road, Gisborne

The Longbush Trust has an impressive track record of success of implementing community projects as part of the Waikereru Ecosanctuary development.

The 1769 Garden at Waikereru, based on meticulous research into the rare and endangered plant species from Te Tairāwhiti that were collected, pressed and sketched by Joseph Banks and Daniel Solander and other Endeavour scientists in 1769, is being developed in close collaboration with Ewen Cameron, senior botanist at Auckland Museum, DOC ranger Graeme Atkins, QEII rep Malcolm Rutherford (who trained at Oxford Botanic Gardens) and Philip Smith, native plant expert and landscape designer. The 1769 garden provides a seed bank for other regional restoration projects.

Waikereru also hosts the Rene Orchiston harakeke collection of 60+ varieties, a national taonga cared for and used by local weavers, and established in collaboration with Rene Orchiston herself, Sue Scheele and her team at Landcare Research, and tangata whenua.

The Waikereru Restoration Project is working to re-establish valuable ecological corridors along the Waimatā River, including matai-miro-kohekohe-puriri-nikau-kahikatea forest, and freshwater wetlands and streams. This in turn will improve water quality and habitat for macro-invertebrate and native fish species in the river, which then benefits species such as long-tailed bat feeding along the Waimatā on hatching stream invertebrates, eg. stonefly. Matuku, grey duck and many other threatened species in this region also benefit.

The Wild Lab at Waikereru holds a series of science and matauranga-based workshops each year for hundreds of local school children, inspiring them with knowledge and appreciation of the local environment, its species and ecosystems. These innovative workshops, supported by local schools and the Air NZ Environment Trust, will have a powerful, long-term impact on enhancing biodiversity values in the region.

The Waimatā River project has also become a case study for the Te Awaroa: 1000 Rivers research programme, headed by Dame Anne Salmond, Professor Gary Brierley and Dr. Dan Hikuroa, and funded by Tindall Foundation, NEXT Foundation, University of Auckland and Nga Pae o Te Maramatanga Centre for Research Excellence.

Te Awaroa, which brings together Maori understandings of ecosystems with the insights of some of the world's leading river scientists, has produced a series of 6 technical reports on the Waimatā River, as well as articles and a book on rivers restoration for a global audience. Key contact for the Longbush Ecological Trust is Distinguished Professor Dame Anne Salmond, Chairperson Longbush Ecological Trust.

Department of Conservation Gisborne

DoC has been working in close collaboration with Eastland Institute of Technology, the community and the Longbush Trust to restore Donner's bush – a series of small reserves adjacent to the Waimatā River. DOC have also been involved in the education programmes run out of the Wildlab/Tiaki Taiao at Waikereru and have developed a botanical inventory of the Waikereru site.

Alongside the riparian planting, DoC will be working with the Waimatā Community Landowner Group around ways to enhance biodiversity – including bat surveys and wetland restoration. The key contact for the project is Charles Barrie, DOC Gisborne.

Beef and Lamb New Zealand

Beef and Lamb New Zealand are the industry body for the sheep and beef farming community. They have worked closely with the Gisborne District Council on development of a Farm Environment Plan template for local farmers. They will collaborate with the project team to host the Farm Environment Plan workshops and field days to help put in place good practice farming solutions to the environmental issues in the catchment. The key contact for the project is Mark Harris, Extension Leader.

Gisborne District Council

Gisborne District Council as the regulatory authority for land and water has been keen to engage with Waimatā community landowners and farmers to improve water quality and enhance biodiversity. They have identified that the Waimatā Catchment is one of 6 priority "At Risk" Catchments in the region, and Waimatā Catchment planning is scheduled to commence in the next 2-3 years. The Council have also been engaged in research in the catchment –

commissioning the University of Canterbury to assess the riparian restoration options within the catchment, undertaking a detailed assessment of the ecological health of protected native vegetation in the catchment, and undertaking detailed studies of the mud volcanoes on the Hall and Watson-Savage properties – both of which are included in this stage of the project. The key contact for the project is Don McLean, Team Leader Land Management and Biodiversity.