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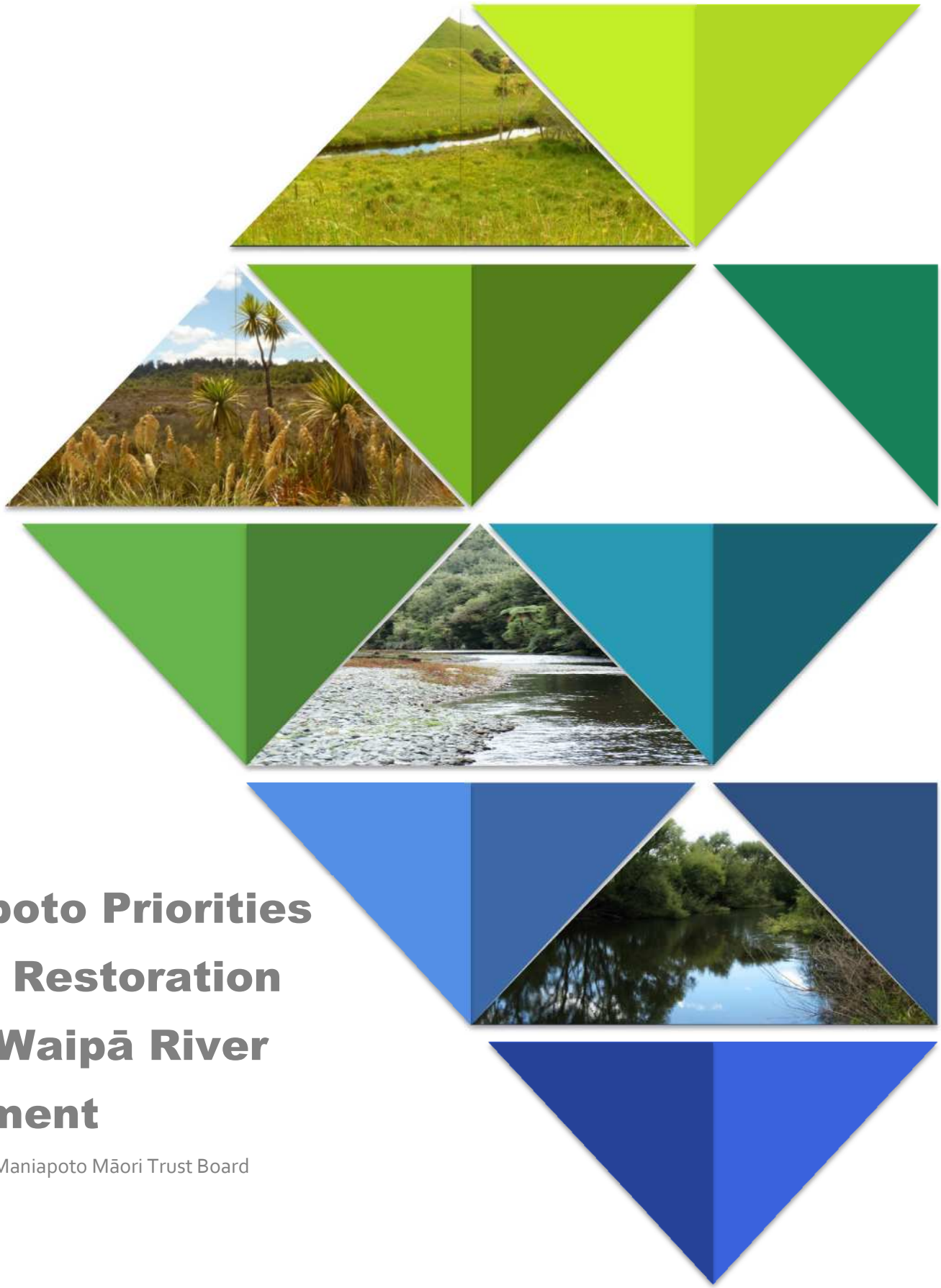

Maniapoto Priorities for the Restoration of the Waipā River Catchment

Prepared for the Maniapoto Māori Trust Board

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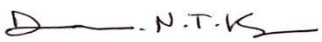

Darren-Ngaru King

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Mihi

E tau nei, ki runga i a tātou, me tō tātou Kīngi, a Tuheitia, te wairua atawhai o tō tātou Matua Nui i te Rangi me ō tātou mātua, tūpuna

Let the nurturing spirit of our Heavenly Father and our ancestors be upon us and King Tuheitia.

Na rātou te ara i whakatakoto, hei whikoinga ma tātou, ngā uri whakaheke nei.

It was they who set the pathway for us, their descendants, to traverse.

I whakatōngia o tātou ngākau ki ngā tikanga hei aratakina tōtika i a tātou kia ngākaunui ki te mahi i roto i te pono, i te tika me te māramatanga, me te aroha, anō, o tētehi ki tētehi.

(They) bonded our hearts to customary guidelines as a safe way forward for us thus fostering a passion for what we do and to do it with integrity, honesty and transparency, coupled with respect and compassion for one another.

Kia aro atu ki a koe, Waiwaiā! Ko koe tonu tēnā, te kaihaumaru o te awa o Waipā, ko ia ka takea mai i ngā pae maunga o Rangitoto me ngā wai kowharawhara o Maniapoto, o Rereahu. Ko koe hoki tērā te mauri me te waiora o Waipā.

(One's) attention turns to you, Waiwaiā! Aware that you are still the protector of the Waipā River, whose source is in the Rangitoto Ranges and the waters of the perching lillies of Maniapoto and Rereahu. You are indeed the essence and wellbeing of the Waipā River.

Kei te toto o te tangata, kei te toto o te whenua, kei te wai manawa whenua, koinei kē te mihi māhaki. E te kaitiaki, kua tīmata ki te whakahou tōtika i ngō wai i te mana o ngō wai, kua roa ōna mauri e ora kore ana; me ngō momo kararehe, momo tupuranga kua pāngia; kia ara mauriora, ara waiora, anō, te taonga kua ōhākingia mai ki a mātou, ngā uri whakaheke nei;

To the life blood of the people, to the lifeblood of the land, verily to the unfailing spring of the earth, we humbly acknowledge you. Oh revered guardian, remedial action has begun to restore your waters, your quality and integrity, which has had its life principle compromised; which in turn has badly affected the wellbeing of your marine and plant life; the intention being to restore the wellbeing of a treasure gifted to us, the present generation;

Kia ea, anō, te kōrero e kīa ana, "Tūturu whakamaua kia tina!"

Thus confirming the statement which says, "Fix it (the kaupapa), so it is immovable!

"Tina!"
Haumi e, hui eee!
"Taiki e!"

"It is fixed!"
Gather and join everything together!
"It is accomplished"!

It has been four years since the signing of the Deed for the Co-Governance and Co-Management of the Waipā River. This was a big step forward in a journey that began in 2008. Mana and the visibility of the Waipā River was then and continues to be of utmost importance. For too long the degradation and deterioration of the Waipā River has been a source of distress for our people.

The Ngā Wai o Maniapoto (Waipā River) Act was enacted in 2012 with our overarching purpose to restore and maintain te mana o te wai (the quality and integrity of the waters that flow into and form part of the Waipā River) for present and future generations, and the care

and protection of te mana tuku iho o Waiwaia (the ancestral authority and prestige handed down from generation to generation in respect of Waiwaia).

When this journey started we dared to visualise the pristine water quality of the Waipā and Waiwaia. The ripples of the water reflecting under the moonlight and the rainbows that appear in a waterfall. That remains the vision for Maniapoto.

The Maniapoto Priorities for the Restoration of the Waipā River Catchment Report is a direction setting document for the clean up of the Waipā River. This Report is not the last word in our journey to restore the Waipā River; it contributes information to shape, inform and guide future river clean up priorities and actions. The Report sits alongside other key documents such as the Maniapoto Environment Management Plan and Maniapoto Fisheries Plan. It is also well complemented by documents such as the Waipā Catchment Plan and the Healthy Rivers: Plan for Change/ Wai Ora: He Rautaki Whakapaipai.

The Report is a key direction setting document for the Waipā River and will require the efforts of many and collaboration with local authorities, the community, industry (including primary industry), and other stakeholders. Maniapoto look forward to working with you all to achieve our collective vision for the Waipā River.

Ngā manaakitanga me ngā mihi,

R. Tiwha Bell

Chairman

Maniapoto Māori Trust Board

Executive Summary

Maniapoto have a deep felt obligation to restore, maintain, and protect the quality and integrity of the waters of the Waipā River catchment for present and future generations. However, ongoing development pressures and associated degradation of the Waipā River have resulted in the decline of its once rich fisheries and other resources which had for generations sustained the people of Maniapoto.

In April 2012 the Ngā Wai o Maniapoto (Waipā River) Act 2012 was enacted. The purpose of the Act is to restore and maintain the quality and integrity of the waters that flow into and form part of the Waipā River for present and future generations, and the care and protection of the mana tuku iho o Waiwaia. The following report describes Maniapoto aspirations, values, issues and priorities for the restoration of the Waipā River. It is anticipated that the responses suggested in this report will inform and direct future restoration actions and efforts in the catchment for the benefit of the Waipā River.

A variety of qualitative methods were used to complete this project including wānanga, questionnaires, interviews and a review of selected literature. During wānanga and interviews Maniapoto whānau were asked to talk about their personal experiences of the Waipā River, their understanding of the catchment, and how earlier generations lived and interacted with the awa. The principal intention was to understand how the local river system is valued and used, and what resources it provides to the local and wider community. Whānau members who contributed to this project affiliated to Ngāti Apakura, Ngāti Hikairo, Ngāti Huiao, Ngāti Te Ihingārangi, Ngāti Kinohaku, Ngāti Te Maawe, Ngāti Mahuta, Ngāti Maniapoto, Ngāti Ngutu, Ngāti Paretekawa, Ngāti Parewaeono, Ngāti Peehi, Ngāti Rereahu, Ngāti Te Kanawa, Ngāti Uekaha, and Te Atiawa.

Concept mapping provided a visual representation of the mental models (i.e., representations of how whānau think the river system works) contributed by Maniapoto for the Waipā River catchment. This information and the subsequent analysis of key themes, supported by a literature review, were used as input data into pressure-state-response tables. These analyses showed considerable shared thinking among those Maniapoto whānau interviewed reflecting close and ongoing relationships between whānau and the Waipā River. Four “big picture” themes were identified: 1) The waters of the catchment need to be the subject of restoration efforts; 2) Management of significant sites; 3) Restoring the rivers for non-kai uses such as waka ama, rongoā, swimming, etc; and 4) The rights of whānau to use their lands and resources.

Next, the analysis identified three priority pressures impacting the health and wellbeing of the Waipā River catchment. These priority pressures include: 1) Vegetation clearance; 2) Farming; and 3) River control. Thereafter, the analysis identified five priority issues that, if addressed, would help to deliver the outcomes sought by Maniapoto whānau, hapū and iwi. The five priority issues include: 1) Water quality; 2) Erosion and high sediment inputs; 3) Loss of habitat; 4) Changing shape of the rivers; and 5) Declining populations of species.

In total, across all of these priorities, 53 responses or actions were identified. The report suggests an order of implementation that ranges from priority 1 to 4, and has identified how the suggested responses relate to the Waipā catchment plan (WCP) (Waikato Regional Council 2014). Priority 1 represents urgent actions/responses while Priority 2 comprises those initiatives that need to commence as soon as possible. Priority 3 is used to categorise

responses that can be initiated as corresponding opportunities arise or once the Maniapoto Māori Trust Board (MMTB) are confident that initiatives identified as priority 1 and 2 are in the process of being addressed. While by no means less important, Priority 4 currently comprises actions that promote communication and education initiatives across the wider community. These are considered important for contributing to behavioural change across multiple resource users and generations. The Priority 1 (i.e., urgent/immediate) responses raised by Maniapoto whānau are highlighted in the table below:

Response	Responsibility	How responses relate to the Waipā catchment plan
Protect the "remaining good stuff"	WRC, District Council (DC), Department of Conservation (DOC)	Section 4.2.3 refers to protecting / restoring indigenous biodiversity. For example, Action 6 in Section 4.2.3 refers to large ecologically intact indigenous terrestrial habitats and specifically lists Pirongia, Maungatautari, Kakepuku and Rangitoto ranges. Action 21 signals that the WRP (review due late 2015) is to include objectives, policies, methods that protect significant natural areas. Action 22 refers to working with Ngā Whenua Rāhui to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks. Section 4.2.2, Action 3 refers to the development and implementation of a programme of protection and restoration for Waipā wetlands
Prohibit any further clearance of indigenous vegetation	WRC, DC	This is considered out of scope for the WCP as it will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review. Section 4.2.3, Action 15 refers to the provision of advice to landowners on the protection and restoration of biodiversity throughout the catchment
Identify areas where development activities should be prohibited to protect water resource values	WRC, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
Review current regulations in statutory plans and policies	WRC, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
Identify wetland areas and puna within the rohe, at the strategic and landscape scales, where development activities should be prohibited to protect water resource values	WRC	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
Review current regulations and guidelines in place to protect riparian areas and freshwater resources	WRC	Section 4.2.3, Action 7 implements projects to protect and restore riparian habitat for taonga species. Action 19 refers to working with territorial authorities (TAs) during district plan reviews to ensure maintenance of indigenous biodiversity and protection of significant natural areas. Action 21 signals that the WRP (review due late 2015) is to include objectives/policies/methods that protect significant natural areas and other measures to maintain wetlands, puna, shallow lakes, karst systems and areas of indigenous vegetation and habitats of indigenous fauna. Section 4.2.4, Action 4 implements opportunities to retire and re-vegetate upper catchment areas
Require site level assessments prior to any development activity	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review and resource consent process
Prohibit development or disturbance in any area adjacent to or within fish habitats	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review

Overall, the realisation of priority actions 1-4 identified through this project will be shared across the multiple agencies who have responsibility for managing and restoring the Waipā River catchment. It is also expected that the Waipā catchment planning process that is currently underway will help to advance Maniapoto whānau objectives and aspirations.

1 Introduction

Ko te mauri, ko te waiora o te Waipā ko Waiwaia. Ko Waipā te toto o te tāngata! Ko Waipā te toto o te whenua, koia hoki he wai Manawa whenua! Ko Waipā tētehi o ngā taonga o Maniapoto whānui.

The essence and wellbeing of the Waipā is Waiwaia. Waipā she is the life blood of the people. Waipā she is the life blood of the land, verily she is! Indeed she is the unfailing spring of the earth. She is the water that anoints the thymos of man to bind to the tribe the waters of life that issues forth from the lineage of the atua. She is the water that blesses the umbilical cord to ensure the health of the descendants of Maniapoto.[1]

– Nga Wai o Maniapoto (Waipa River) Act 2012

The Waipā River is of deep, cultural significance to Maniapoto. To Maniapoto the Waipā River has mana and in turn represents the mana of Maniapoto – Te Mana o Te Awa o Waipā (Nga Wai o Maniapoto (Waipa River) Act 2012). Historically, Te Mana o Te Wai was such that it would provide all manner of sustenance to Maniapoto including physical and spiritual nourishment that has over generations maintained the quality and integrity of Maniapoto marae, whānau, hapū and iwi. To Maniapoto, their relationship with the Waipā River, and their respect for it, gives rise to their responsibilities to protect Te Mana o Te Wai and to exercise their kaitiakitanga in accordance with their long established tikanga (Nga Wai o Maniapoto (Waipa River) Act 2012).

Maniapoto have a deep felt obligation to restore, maintain, and protect the quality and integrity of the waters of the Waipā River catchment for present and future generations, as well as an obligation to care for and protect the mana tuku iho o Waiwaia. However, ongoing development pressures and associated degradation of the Waipā River catchment has resulted in the decline of its once rich fisheries and other food sources which had for generations sustained the people of Maniapoto and their ability to meet their obligations of manaakitanga (e.g., Cunningham 2014). This decline has been a significant source of distress to Maniapoto whānau. In April 2012 the Ngā Wai o Maniapoto (Waipā River) Act 2012 was enacted. The purpose of the Act is to restore and maintain the quality and integrity of the waters that flow into and form part of the Waipā River for present and future generations and the care and protection of te mana tuku iho o Waiwaia[2].

The headwaters of the Waipā River are located at Pekepeke in the Rangitoto Ranges east of Te Kūiti. The catchment has a basin area of 3,050 km^2 and flows north for 115 km, passing through the Waitomo, Ōtorohanga, Waipā and Waikato Districts, before entering the Waikato River at Ngāruawāhia (Figure 1). The Waipā is the largest tributary to the Waikato River (about 22% of the total Waikato River catchment area). To Maniapoto, the Waipā River is a single indivisible entity that flows from Pekepeke to its confluence with the Waikato River. This includes its waters, banks, bed (and all minerals under it) and its streams, waterways, tributaries, lakes, fisheries, vegetation, floodplains, wetlands, islands, springs, geothermal springs, water column, and airspace as well as its metaphysical elements with its own mauri (Nga Wai o Maniapoto (Waipa River) Act 2012).

[1] Nga Wai o Maniapoto (Waipa River) Act 2012 (http://www.legislation.govt.nz/act/public/2012/0029/latest/DLM3335204.html)
[2] http://www.maniapoto.iwi.nz/~maniap/images/PDF/Environment/waiwaia_accord_final_270910.pdf

Prior to the arrival of Europeans, the vegetation cover in the Waipā catchment was dominated almost entirely by native forest (both virgin and forest modified by fire), scrub and tussock (McGlone 1989). There were also significant wetland areas in the northern areas of the catchment. Since 1840, almost all of the native vegetation in the low-lying valleys has been converted to pasture. This includes almost all of the significant wetland areas, which have been drained, leaving behind only remnant pockets of wetlands and shallow peat lakes (WRC 2012).

The soft mudstone geology of the upper Waipā is prone to landslides and erosion and has added large amounts of sediment to the river[3]. Further, significant areas of karst geology (limestone) occur in the Waipā catchment, forming underground aquatic habitats (e.g., Waitomo Caves), and springs and seepages that have distinctive and high biodiversity values, and are sensitive to disturbance (Urlich 2002; Collier & Smith 2006; WRC 2008).

The economy within the Waipā catchment is dominated by agriculture, which continues to intensify in the catchment (WRC 2012). Within the agricultural sector, dairy farming is the largest income earner, followed by drystock. Recent land figures indicate a trend towards bringing steeper land into dairy production, and intensification of stocking rates on existing dairy farms (WRC 2012). Over time, the nature of dairy farming has changed due to a number of economic drivers – including among others, an increase in average farm area and stocking rate per hectare, coupled with an increase in the use of off farm supplements (Waipā District Council 2013). The use of feed pads to facilitate supplementary feeding while reducing pasture damage has also been growing in the Waikato Region (Cameron et al. 2009). The changing nature of agricultural practices across the catchment has resulted in corresponding changes in the scale and nature of actual and potential effects on the environment (Waipā District Council 2013). Responding appropriately to these effects is a key issue for Maniapoto whānau as well as the multiple agencies who have responsibility for administering and managing the Waipā River catchment.

Other sectors that have a significant contribution to the economy within the Waipā catchment are retail and wholesale, manufacturing and tourism (WRC 2012). New statistics released in August 2014 have highlighted the value of tourism to the region, with 12.7 per cent of jobs in the Waipā district being in the tourism sector[4].

1.1 Te Ture Whaimana and the Waikato River Independent Scoping Study

Te Ture Whaimana o te Awa o Waikato (the Vision & Strategy)[5] is the primary direction setting document for the Waikato River and activities within its catchment affecting the river:

> "*Our vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come".*

Te Ture Whaimana generally prevails over any inconsistencies in other policies, plans, or processes affecting the Waikato River catchment. Relevant policies, plans, and processes

[3] http://www.waikatoregion.govt.nz/Environment/Natural-resources/Water/Rivers/Waipa-River/Trends-in-Waipa-River-water-quality/
[4] Waikato Times, 27/08/2014 http://www.stuff.co.nz/business/industries/10428815/Tourism-industry-a-boon-to-Waikato
[5] http://www.waikatoriver.org.nz/wp-content/uploads/2011/07/Vision-and-Strategy.pdf

(e.g., national policy statements issued under the Resource Management Act 1991 (RMA), Waikato Regional Policy Statement, district plans) cannot be amended so that they are inconsistent with Te Ture Whaimana and must be reviewed and amended, if required, to address any inconsistencies[6].

Figure 1: Aerial map of the Waipā River catchment (catchment boundary indicated by the yellow line). Courtesy of Richard Glass, Waikato Regional Council, December 2013.

[6] http://www.wrrt.co.nz/environmental-management-plan/c-11-the-vision-strategy-for-waikato-river/

In 2009-10 the Crown commissioned an independent scoping study (known as the Waikato River Independent Scoping Study (WRISS)) to identify rehabilitation priorities in relation to the Waikato River and the likely cost of those priority activities, to provide contextual information for the operation of the Waikato River Clean-Up Trust (NIWA 2010). The study was governed by the Guardians Establishment Committee (GEC), funded by the Ministry for the Environment (MfE) and led by the National Institute of Water and Atmospheric Research Ltd (NIWA).

The gathering of mātauranga Māori (Māori knowledge) held by Waikato River Iwi was an essential starting point for the WRISS because there was very little published information about knowledge, values, perceptions and aspirations pertaining to the Waikato River catchment. During the WRISS mātauranga Māori was collated from seven consultation hui held with Waikato River Iwi between July and August 2009, interviews and a literature review. Hui were held throughout the Waikato River catchment: Waikato-Tainui College for Research and Development, Hopuhopu; Mokai Marae, Mokai; Waahi Marae, Huntly; Te Wānanga o Aotearoa, Tokoroa; Ngaa Tai E Rua Marae, Tuakau; Mataarae Marae, Reporoa; and Pōhara Marae, Maungatautari. The timeframe for the WRISS was short and, although a longer period of engagement would have been preferable, one hui served to introduce the project team, describe the WRISS, and undertake the first stage of gathering mātauranga Māori. The purpose of these hui was to: (1) draw upon the mātauranga Māori that underpinned the WRISS, (2) explore the range of relationships that Waikato River Iwi have with the Waikato River catchment, and (3) identify the different ways that Waikato River Iwi relate to the health and wellbeing of the Waikato River catchment.

Although Maniapoto was represented as a member of the GEC, Maniapoto was unable to participate in the early phases of the WRISS because the Crown and Maniapoto were still finalising aspects of the co-management arrangements for this area. Later in the WRISS Maniapoto participated in the second round of hui and provided some valuable mātauranga Māori relevant to the upper Waipā River.

1.2 Maniapoto Special Project and Scope of This Report

The Maniapoto Special Project is a joint project between the Maniapoto Māori Trust Board (MMTB) and the Ministry for the Environment (MfE). The Maniapoto Special Project aims to identify and prioritise key issues and hot spot areas for the Waipā River catchment[7]. Other synergies include the Upper Waipā River Integrated Management Plan and the Waikato Regional Council's (WRC) Waipā Catchment Plan. This project expands upon, and complements, the mātauranga previously contributed by Maniapoto whānau during preparation of the WRISS (NIWA 2010). A project plan for the Maniapoto Special Project was supplied to NIWA by MMTB (Appendix A).

The following report describes Maniapoto whānau aspirations, values, issues and priorities for the restoration of the Waipā River. It is anticipated that the responses suggested in this report will inform and direct future restoration actions and efforts in the catchment for the benefit of the Waipā River.

[7] http://www.maniapoto.iwi.nz/index.php/projects/environment

The report is structured as follows:

- Section 2 describes the variety of approaches used to gather, collate, analyse and prioritise the aspirations, values, and issues described by Maniapoto whānau for the restoration of the Waipā River catchment. Site specific kōrero was summarised in a pressure-state-response framework (Appendix C) and digitised on spatial maps (Appendix D).
- Section 3 summarises the results of the analyses:
    1. Under the four principles of the Maniapoto Iwi Environmental Management Plan where whānau have described, in general terms, guidelines that should be followed in the implementation of the responses suggested in this report.
    2. Using concept mapping to identify the common themes and priority catchment pressures and issues that, if addressed, are likely to deliver the outcomes sought by Maniapoto whānau, hapū and iwi for the Waipā River catchment. The detailed results of each of the analyses (domain, centrality and cluster analysis) are provided in Appendix E.
- Section 4 lists the actions that could be implemented in response to each of the priority pressures and issues identified by Maniapoto whānau. An order of implementation (ranging from priority 1 to 4) has been assigned to each of the actions listed in this section. The types of implementation strategy that could be employed for each response are described in Appendix F.
- Finally, Section 5 summarises the responses suggested by Maniapoto whānau to inform and direct future restoration actions and efforts. Tables collating the list actions in terms of the suggested order of implementation (i.e., priority 1 to priority 4) are included in this section.

2 Methods

2.1 Data Gathering

Building on the mixed methods approach developed with Waikato River Iwi during the WRISS (NIWA 2010), a variety of qualitative methods were used to complete this project. These included wānanga, questionnaires, interviews and a review of selected literature. The project team focused on collating the knowledge provided by Maniapoto whānau at the sub-catchment level to inform the prioritisation process (see Section 2.3.2) (Figure 2). These methods are discussed in more detail below.

2.1.1 Ngā Wai o Waipā Wānanga

A series of three wānanga (lasting between about 1.5 and 2 hours) were held with Maniapoto whānau[8] to elicit free-ranging, informant-initiated responses about how the Waipā River catchment is valued and used, and the resources it provides the local and wider community. Some whānau, e.g., who no longer live in the catchment, came to these wānanga to support the kaupapa and listen to the kōrero as others shared their knowledge.

The first wānanga held at Te Keeti Marae (30 November 2013) served to introduce the project team and describe the Maniapoto Special Project. Maniapoto whānau were also invited to share their mātauranga of the catchment by filling out a short questionnaire (Appendix B). This wānanga also included presentations from WRC, NIWA and Landcare on water quality, biodiversity, soil conservation and the WRISS in respect to (specifically) the Waipā River.

The second wānanga was held at the Maniapoto Māori Trust Board offices in Te Kūiti (15 February 2014). At this wānanga participants were asked to talk about their personal experiences of the Waipā River, their interactions, and how earlier generations lived and interacted with the awa. A set of starter questions and maps that were used to stimulate and focus these discussions. Using these methods, the wānanga participants spatially located their uses/issues/priorities for action on maps of the catchment (Figure 3). Graphically representing the interests of Maniapoto whānau on maps and aerial photographs involved preparation of a base map upon which sites were identified by whānau, together with the values associated with each site. The reasons for selecting the site as culturally significant were also recorded. Data, at different levels of specificity, were derived through this mapping exercise. This technique has been used successfully in a number of environmental change studies (e.g., Puginier 1999; NIWA 2010; King et al. 2011).

The final wānanga was held at Te Korapatu Marae (12 April 2014) following the completion of the qualitative analysis. The results of the analysis were discussed, evaluated and amended at this wānanga with a small group of Maniapoto whānau. This wānanga also included a presentation from the WRC on the progress of the Waipā Catchment Plan.

[8] Attendance was recorded by the Maniapoto Māori Trust Board

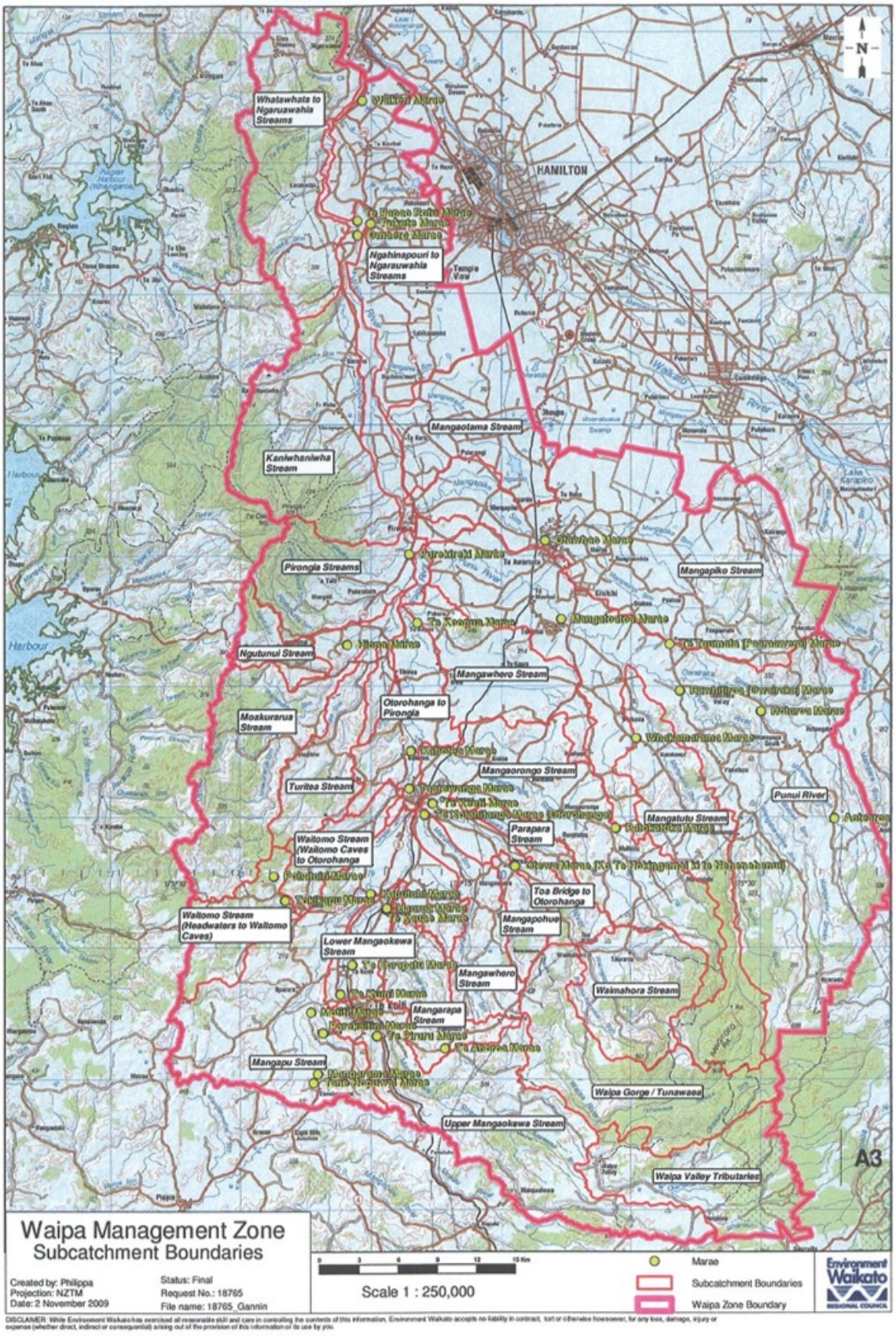


Figure 2: Sub-catchments of major tributaries and locations of marae within the Waipā River catchment. Courtesy of the Waikato Regional Council.

2.1.2 One-on-One Interviews

One-on-one interviews were held with 13 individuals identified by the MMTB between March and May 2014. The whānau members who were interviewed affiliated to Ngāti Apakura, Ngāti Hikairo, Ngāti Huiao, Ngāti Te Ihingārangi, Ngāti Kinohaku, Ngāti Te Maawe, Ngāti Mahuta, Ngāti Maniapoto, Ngāti Ngutu, Ngāti Paretekawa, Ngāti Parewaeono, Ngāti Peehi, Ngāti Rereahu, Ngāti Te Kanawa, Ngāti Uekaha, and Te Atiawa. Semi-structured, open-ended interviews were completed with these whānau members. Two of these interviews were conducted during hīkoi to areas of interest in the catchment. The interviews were conducted by MMTB and/or NIWA staff, and typically lasted between 1 and 2 hours.

2.1.3 Transcripts and Participatory Spatial Maps

The breakout groups from the wānanga and one-on-one interviews were generally audio-taped. A small proportion of the interviews were not audio-taped, but in these cases extensive notes were taken during the interviews. The recordings were subsequently transcribed, the content of which was then analysed. A primary goal of the analysis was to identify elements of shared thinking among Maniapoto whānau from throughout the catchment. The limited number of questions were intended to elicit free-ranging, informant-initiated responses.

Unfortunately despite the best efforts of the project team there are some sections of the transcripts where some of the kōrero was inaudible, either due to a quiet voice or many people talking at the same time. These inaudible recordings are clearly marked in the transcripts. All recorded information from the wānanga and one-on-one interviews was transcribed and analysed alongside the participatory spatial maps to identify sites and catchment uses of significance to Maniapoto whānau.

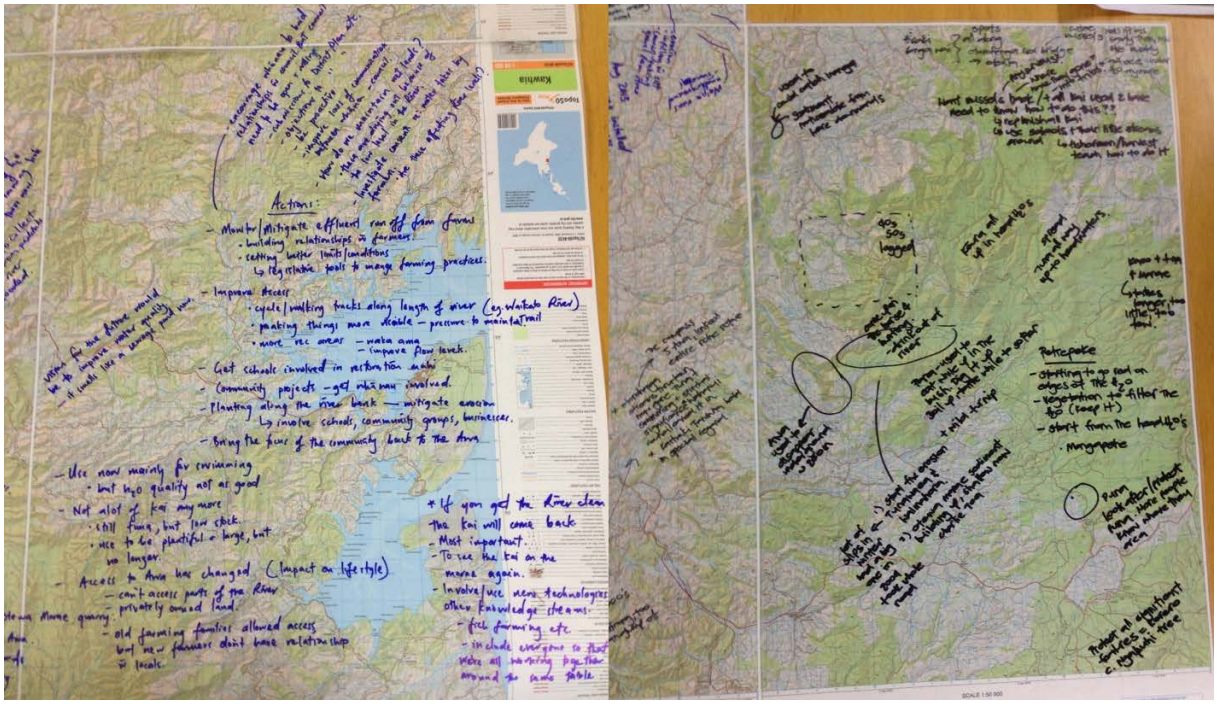


Figure 3: Example of a participatory spatial map produced by Maniapoto whānau during the wānanga and interviews.

2.1.4 Literature Review

Published and unpublished information sources such as Environment Waikato/Waikato Regional Council and Waitangi Tribunal reports (e.g., Cunningham 2014), MMTB documents such as the Maniapoto Iwi Plan (2007), Maniapoto State of Environment Report (Kowhai Consulting Ltd 2002) and the WRISS (NIWA 2010) were also used to inform the analysis completed in this study.

Data from the WRISS has been used to complement the knowledge contributed by Maniapoto whānau and inform this report. For example, the WRISS identified that there are just under 200 places in the area, including pā (traditional settlements), middens, pits and terraces which are publicly listed on the New Zealand Historic Places Trust (NZHPT) Register. Of these, the largest (66) are in the Waipā district, with sizeable numbers also registered in the Waikato district (41) and Hamilton City (40). We did not access the NZHPT records as these remain available in Appendix 26[9] of the WRISS report. Other examples of the information available in the WRISS that specifically refers to the Waipā catchment includes (in no particular order):

- Water quality varies systematically across the catchment. In general, water quality is poor in the lower Waipā.
- Some parts of the lower Waipā do not meet bathing water guidelines.
- Colour and clarity are degraded, especially in the lower Waipā.
- A remnant piharau (lamprey) fishery exists in the Waipā River.
- Kōura (freshwater crayfish) and kūtae/kāeo (freshwater mussels) are no longer common in the Waipā.
- The Waipā has particularly high loads of sediment, nutrients and pathogens.

2.2 Data Collation

2.2.1 Pressure-State-Response Framework

The multiple methods of data collection resulted in a considerable quantity of knowledge being gathered, which had to be systematically analysed. After the questionnaires, wānanga and interviews were transcribed the information was collated using a pressure-state-response framework (other examples of use include OECD 1999 and Rapport & Singh 2006).

The pressure-state-response model has proven useful as a way to help Waikato River Iwi communicate and describe the changes they have seen in the Waipā and Waikato catchments (as was done during the WRISS) in a framework that is familiar to many of their catchment management and research colleagues. This framework is also useful to help group the diverse and in-depth knowledge contributed by Maniapoto whānau in a manner that is searchable for other purposes (e.g., Maniapoto Fisheries Management Plan). The pressure-state-response model (Table 2) should be seen as a cause-and-effect chain which describes how changes come about in any given environment or ecosystem where:

[9] http://www.mfe.govt.nz/publications/treaty/waikato-river-scoping-study/appendix-26-significantsites.pdf

- **Pressures** are the activities or practices which cause changes to the state of the system. They may also be referred to as threats. The pressures identified by Maniapoto whānau include land use change leading to habitat loss, over-exploitation of biological resources by commercial interests, invasive pest species (like koi carp), pollution (particularly from farming), and flood control. Drivers are factors that give rise to pressures. In some modifications of the pressure-state-response framework the term "pressure" has been replaced by "driver" or "driving force" to more clearly accommodate the addition of social, economic, and institutional indicators (e.g., international markets are a driver for dairy conversion which result in associated local pressures) (OECD 1996 and 1999). As Maniapoto whānau often talked about pressures and drivers interchangeably, we have not specifically differentiated between the two categories during data collation.
- **State** refers to some quality or qualities of the Waipā river catchment with which Maniapoto whānau are concerned. For example, state could refer to the size/shape, water quality or productivity of the river, and/or the diversity and abundance of species it supports.
- **Response** refers to the suggested mitigation or solution identified by Maniapoto whānau to restore the state of the site and reduce the impact of the known pressure.

Ideally the impacts or effects identified by Maniapoto whānau would be addressed by the formulation and implementation of appropriate responses or actions which are designed to reverse undesirable change in state by reducing pressures (or drivers). For example, the retirement and re-vegetation of lands is a response to increased erosion caused by a reduction in forest cover (state) due to increased demands for lands for dairying (pressure) resulting from population growth and demand for high economic returns (driver).

Table 2: Example of the pressure-state-response framework used to systematically collate the knowledge and priorities of Maniapoto whānau for the restoration of the Waipā catchment. (See Appendices C and D for more detail).

Location	Theme (Maniapoto values, uses and practises)	State (Past and present)	Pressure (Issues and impacts threatening values / uses / practices)	Response (Actions recommended by Maniapoto whānau to address issues and impacts identified)
Mangapū River	WAI	(Source 1) There are 8 puna in our rohe	(Source 1) Changed due to farming practices… the Kaitiaki that was placed in the puna was moved to another area because of the pollution	(Source 1) We must identify where all of our puna are in the catchment and make sure that more people know where they are so we can look after and protect them

2.2.2 Spatial Maps

The spatially mapped data derived from each wānanga and interview was uplifted from the raw maps and digitally imported into the MapToaster Topo New Zealand[10] programme while simultaneously being coded under a Value, Use or Practice heading within the pressure-state-response framework (Table 3). The headings or themes used in the framework (Kai, Wai, Swimming, Sites of Significance, and Taonga species and materials) were derived to help collate and synthesise the considerable quantity of knowledge contributed by Maniapoto whānau. The map data was supplemented by transcripts of the digital recordings providing additional information, increasing our understanding and depth of knowledge. They also provided the project team with the opportunity to cross check and validate the spatial information.

The key themes were used to help label (e.g., KAI 1) the site specific kōrero summarised on digitised spatial maps so that these locations can be traced back to the more detailed information contributed by whānau in the pressure-state-response framework. Where whānau identified specific pressures impacting the health and wellbeing of the Waipā River these were also labelled (e.g., PRESSURE 1) on the digital map.

Table 3: The types of data groupings or themes that were used to help collate and digitise the knowledge contributed by Maniapoto whānau (also see Appendices B and C).

Value/Use/Practice themes	Explanation and examples of sub-categories from Maniapoto literature[1]
Kai	Species (fish, plant, shellfish) harvested for kai, e.g., piharau, tuna, kōura, kāeo, kōaro, whitebait, īnanga, kōkopu, mullet, kāeo/kūtae/mussels, kānga wai
Wai	Specific features identified by whānau relating to the physical character of the catchment, water sources, water quality and water security, e.g., puna, soda springs (Hariru, Heretu and Pikiake)
Swimming	Swimming and whānau recreation (also provides information about access to the waterways)
Sites of Significance	Where whānau directly connected the site of significance with the health and wellbeing of Maniapoto whānau and/or the Waipā River and/or had a response/action directly pertinent to that site, e.g., taniwha, caves and urupā
Taonga Species and Materials	"Non-kai species" and materials identified by whānau as being important to the cultural landscape and ecological integrity of the Waipā catchment, including cultural materials, e.g., harakeke and paru for weaving, whio, kaka, bats, native frogs, moa bones, long tail bats, king ferns, miro

[1] For example, Kahotea Marae (2007); Kowhai Consulting Ltd. (2002); Maniapoto Māori Trust Board (2010).

2.3 Data Analysis and Prioritisation

2.3.1 Concept Mapping

Visualisation Tool

Concept mapping (Decision Explorer®)[11] was used to visually represent the mental models contributed by Maniapoto whānau for the Waipā River catchment. A concept map is essentially an individual's internal picture of how they see the world, which is shaped by their experiences. It is this internal picture that whānau draw upon to interpret different contexts

[10] http://www.maptoaster.com/maptoaster-topo-nz/index.html
[11] Information describing Decision Explorer can be found on www.banxia.com

and inform individual decision-making and action (Piaget 1952; Craik 1983) (Figure 4). Mental models can therefore vary from person to person as they reflect an individual's assumptions, images, and stories. They are "*active - they shape how we act…they affect what we see*" (Senge 1990). Accordingly, mental models of the Waipā River are formed through personal experiences with the catchment, including early life learning in whānau, hapū and iwi contexts, exposure to the river environs, and other dimensions of Maniapoto culture directly associated with the awa.

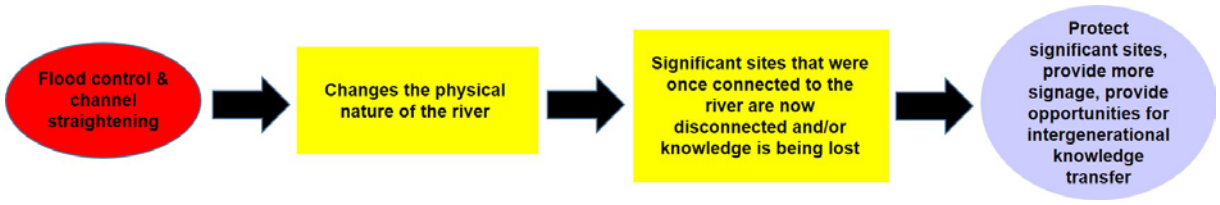
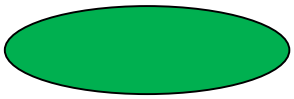


Figure 4: Example of a simple "mental map" contributed by Maniapoto whānau. Where kōrero in the red circle = perceived pressure; yellow boxes = resulting state of a value or use; and purple circle = proposed responses or actions.

The knowledge from the Maniapoto spatial maps and thematic analysis, literature review and the pressure-state-response tables was used as the input data for the concept maps. The concept maps assume that the behaviours of whānau and hapū, and the nature of their interaction with the river, are driven by their perception of the health and wellbeing of the river environment as a whole. These subjective perceptions are the reality that the MMTB, WRC, and other decision-makers will confront. However, one of the strengths of the concept mapping methodology is that it collates the knowledge of many participants, contributed via a variety of methods, and uses objective mathematical procedures to extract common themes and priorities.

Qualitative Analysis Tool

The concept maps were developed by starting with a description of the outcomes sought by Maniapoto whānau and progressing through all of the data sources gathered to identify the variety of factors that may prevent these outcomes from being realised. The concepts are colour coded in Section 3.2 as follows -

	Cultural outcomes that are sought by Maniapoto whānau
	Perceived causes of changes to the Waipā catchment as identified by whānau. They represent a mix of **drivers** that result in **pressures,** which change the state of the river
	These are the perceived impacts of the changes observed by whānau
	These are the attributes of the catchment that whānau value and perceive have been impacted by human activities

Once the concept map was developed, different types of analyses were undertaken using Decision Explorer®[12] to identify common themes and priorities (i.e., across all knowledge sources). Three analytical tools (domain analysis, centrality analysis and cluster analysis, Table 4) enabled the identification of the priority catchment pressures and issues captured in the concept maps. Some examples where these techniques have been used to better understand the visions, perspectives and priorities of different communities with the purpose of creating mutual comprehension and a common background include Albino et al. (2003), Giordano et al. (2007) and von Medling et al. (2012).

Table 4: Description of the types of analyses conducted with the kōrero contributed by Maniapoto whānau (also see Appendix E).

Type of analysis	Description
Domain analysis	Domain measures the importance of concepts by assessing their potency, i.e. the number of direct links (both as input and output), and analyses each concept and calculates how many concepts are immediately related to it. This enables us to identify which concepts are the best elaborated or have a high density of links around them. This provides an idea of the concepts that are key issues and warrant further investigation.
Centrality analysis	Centrality measures the importance of concepts by considering both direct and indirect links. This analysis is similar to the domain analysis, but it calculates the results using more than one "level" (i.e. not just the concepts immediately linked to a specific concept) to include also those which link through them. This provides guidance in discovering the centrality of the concept to the whole concept map rather than just its immediate vicinity. By considering both direct and indirect links, the centrality provides information about relationships that are not necessarily consciously known to the respondents.
Cluster analysis	Clusters represent groups of concepts closely connected among each other, but weakly linked to the rest of the map. In the case of large concept maps (i.e., greater than 100 concepts) a cluster analysis can be used to create more manageable sets of concepts. Cluster analysis attempts to define mutually exclusive sets within the concept map.

2.3.2 Prioritisation Rationale

It is anticipated that the responses suggested in this report will inform and direct future restoration actions and efforts in the catchment for the benefit of the Waipā River. A diagram summarising the process followed in this project to derive and then prioritise the responses is provided in Figure 5. This prioritisation relied heavily on the qualitative analysis to objectively pull out overarching themes/issues/catchments of importance to whānau.

The concept mapping process (and qualitative analyses) was used to identify the priority outcomes, the key pressures to be reshaped, and the issues to be addressed. This analysis was then discussed, evaluated and amended with a small group of Maniapoto whānau who attended the last wānanga at Te Korapatu Marae.

When the transcripts were reviewed not all of the concerns/issues of priority to whānau were accompanied by a suggested response or action. In these instances the project team identified options based on similar resource management studies and the work experience of the project team. For example, a number of concerns centred around farming and whānau suggested a number of responses, all of which are included in Section 4. However, 'property

[12] http://www.banxia.com/dexplore/

/ farm plans' and 'sustainable milk plans' are mechanisms that are currently being promoted by the WRC (see the Waipā catchment plan, WRC 2014) and other agencies throughout New Zealand. In this case, given that farm management plans are likely to be the primary management (and accountability) mechanism for landowners once nutrient limits[13] are set, the project team identified a further option surrounding the role of the MMTB in farm management planning processes.

In total, across all priorities, approximately 50 responses were suggested (see Section 4). This is regarded as a manageable number as only a limited number of these can be addressed immediately, mainly by utilising the Waipā catchment planning process that is currently underway. When reviewing the other priorities, the project team assessed that some could start as soon as possible, while a number could wait. Consequently, at the request of the MMTB an order of implementation for the 50 responses is outlined in this report.

The order of implementation includes actions/responses that should occur immediately (Priority 1) and those that should occur as soon as possible (Priority 2). Once MMTB are confident that initiatives identified as priority 1 and 2 are in the process of being adopted, priority 3 actions are to be addressed as corresponding opportunities arise. Priority 4 actions promote communication and education initiatives across the wider community and are considered crucial for securing long term behavioural change (see Section 4).

[13] The National Policy Statement for Freshwater Management 2011 requires councils to set freshwater objectives and limits in their regional plans. 'Freshwater objectives' are the intended environmental outcomes for a water body that will provide for the values the community considers important. Freshwater objectives need to be set for each water body, taking into account local and national values and aspirations and its existing condition. 'Limits' to use are derived from the specified freshwater objectives for each catchment and refer to the total amount of water that can be taken out of a freshwater body, or of contaminants that can be discharged into it without jeopardising the desired outcomes. (https://www.mfe.govt.nz/publications/water/freshwater-reform-2013/html/page6.html)

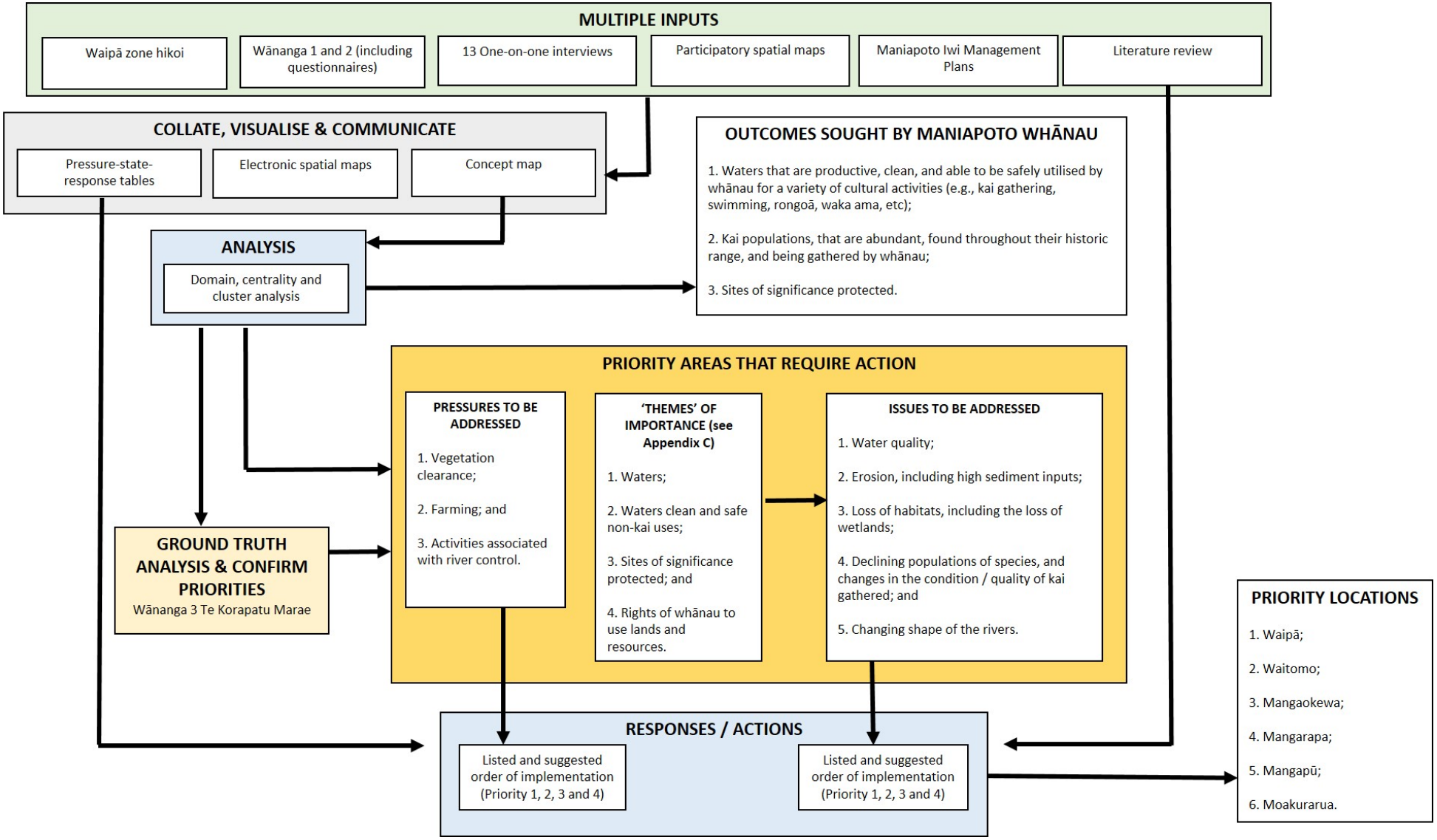


Figure 5: Summary of the data gathering, collation and prioritisation approaches used in this project.

2.3.3 The Waipā Catchment Plan

In December 2014 the WRC released the Waipā Catchment Plan (WCP)[14], which details goals and strategies for managing the catchment over the next twenty years (Figure 6).

The WCP will assist WRC to implement their responsibilities under the Resource Management Act 1991 (RMA), Soil Conservation and River Controls Act 1941, Local Government Act 2002 and the Civil Defence and Emergency Management Act 2002. The WCP implements Te Ture Whaimana and WRCs Proposed Regional Policy Statement (RPS) and the Waikato Regional Plan (WRP). The WCP will complement any future changes to the WRP, including Healthy Rivers Plan Change 1[15] (WRC 2014).

The key objectives of the Waipā catchment plan project are to:

- Better understand the catchment - in particular issues / opportunities related to land and water resources.
- Provide guidance on how the protection and restoration of the health and wellbeing of the Waipā River could be undertaken.
- Work in partnership with Waipā River Iwi and other stakeholders/agencies.

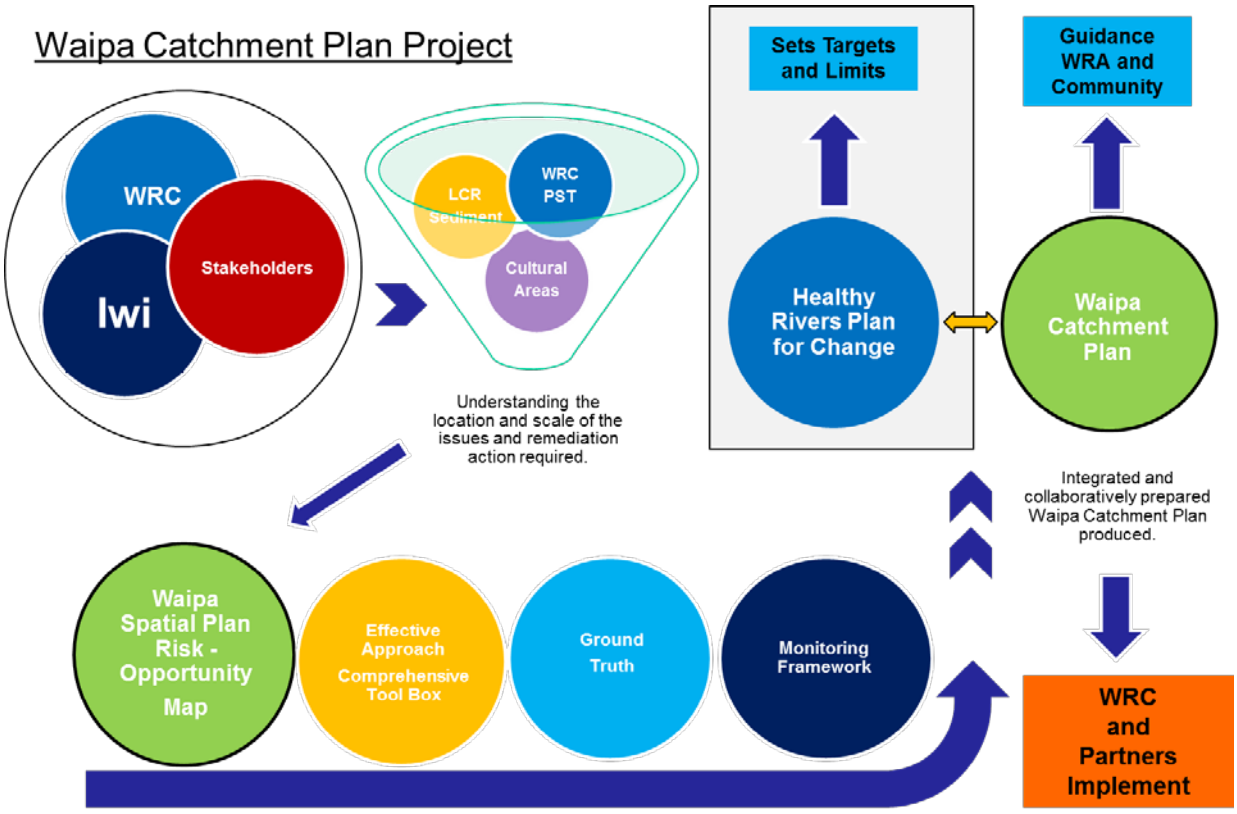


Figure 6: Overview of the Waipā Catchment Plan project. (Courtesy of Waikato Regional Council).

[14] http://www.waikatoregion.govt.nz/Council/Policy-and-plans/Waipa-Catchment-Plan/
[15] http://www.waikatoregion.govt.nz/Council/Policy-and-plans/Plans-under-development/Healthy-Rivers---Plan-for-Change/

The Waipā catchment plan lists seven 20-year goals:

1. Land use in the Waipā catchment matches capability, and soils are stable and productive, with erosion and associated sedimentation reduced in priority areas in a way that gives effect to Te Ture Whaimana o te Awa o Waikato (the Vision and Strategy for the Waikato River).
2. Water is a swimmable quality throughout the catchment and visibly clearer at the confluence with the Waikato River at Ngāruawāhia.
3. Ecological health is measured, maintained and enhanced throughout the catchment and comprehensive ecological networks are established.
4. People, property and services (infrastructure) are protected from floods, through scheme and river management and enhanced natural retention capability in the catchment.
5. Co-management partners and stakeholders are working collaboratively towards the sustainable use and health of the Waipā catchment's land and water, and to give effect to Te Ture Whaimana o te Awa o Waikato (the Vision and Strategy for the Waikato River).
6. Catchment management acknowledges tāngata whenua and the wider community's economic, environmental and social aspirations and historical, cultural, spiritual and customary connections with the river and its catchment.
7. People and communities are active in the restoration of the Waipā catchment as a place to work, live and play.

In this report we have identified how the suggested responses relate to the Waipā catchment plan (see Sections 4.1.2 and 4.1.3). These sections have also been reviewed by WRC staff.

3 Results

"If we do not plan for a sustainable environment and value the life sustaining resources that are provided by Papatūānuku and Ranginui, we will potentially leave our mokopuna with an environmental disaster that will require many generations to rectify"

– Maniapoto Iwi Management Plan 2007

The key themes, catchment priorities and suggested actions to address the issues raised by Maniapoto whānau in relation to the health and wellbeing of the Waipā River catchment are described in the following section. In the first instance (Section 3.1) the results are summarised under the four principles of the Maniapoto Iwi Environmental Management Plan where whānau have described, in general terms, guidelines that should be followed in the implementation of the responses suggested. In Section 3.2 the common themes, priority catchment pressures, and issues derived from the concept map analyses are presented.

3.1 Key Principles of the Maniapoto Iwi Environmental Management Plan

The Maniapoto Iwi Environmental Management Plan describes the aspirations, intent and priorities for achieving a safe and healthy environment. The key objectives of the plan are to provide a Maniapoto-wide strategy to enhance and sustain the exercise of kaitiakitanga over the natural environment within Maniapoto, and to support the leadership of marae, hapū and regional management committees at the forefront of exercising kaitiakitanga in the Waipā River catchment (Maniapoto Māori Trust Board 2007)[16].

The knowledge provided by Maniapoto whānau during this project has been summarised in the following section under the four principles of the 2007 Maniapoto Iwi Environmental Management Plan, namely:

- Rangatiratanga – The principle that Maniapoto will facilitate informed and effective decision making on matters within the Maniapoto rohe;
- Kaitiakitanga – The principle of responsible guardianship to maintain and enhance a safe and healthy environment for the present and for generations to come;
- Kotahitanga – The principle that Maniapoto will work constructively with others to achieve a safe and healthy environment for future generations; and
- Tūmanako – The principle that Maniapoto will strive for a safe and healthy environment and a sustainable environmental future for future generations.

[16] http://www.maniapoto.iwi.nz/~maniap/images/PDF/Environment/iwi_emp_final.pdf

3.1.1 Rangatiratanga

"Māori have a unique culture and an identity protected by a treaty arrangement, conferring a set of rights that come about as a result of our tribal identities and our identities as treaty partners. The treaty preserved the authority of iwi in terms of the environment"

– WRC (2006)

"…decisions and actions are to make clear that interests in resource development are not driven simply by economics, but by sustainability for all people that choose to make this rohe their home"

"Cleaner water should be the common bottom line (not only economic). To be able to move forward together we need to help educate the community at large"

"How can we learn from the models developed by other iwi…?"

– Wānanga, Te Kūiti, February 2014

Maniapoto whānau made it clear that informed and effective decision making should not be driven by economic interests alone and should always consider social, cultural and environmental benefits as being equally important. In relation to rangatiratanga, the principle that Maniapoto will facilitate informed and effective decision making on matters within the Maniapoto rohe, aspects that were specifically identified as important included:

- Decision making needs to continue to reflect the Maniapoto connection to all things, and their commitment to sustainability for the benefit of current and future generations. Decisions and actions are to make clear that Maniapoto's interest in resource development is not only driven by economics, but by sustainability for all people that choose to make the Maniapoto rohe their home.
- Whānau need to be active throughout the rohe, and continue to access all areas for their economic, cultural and other needs. In this way, they will maintain their connection to the land and waters of their rohe, and all that it symbolises for whānau. Planning, use and management activities need to ensure that access is maintained for whānau so that their cultural practices can continue unimpeded throughout their rohe.
- MMTB through co-governance and co-management need to secure greater authority over the management of land, water and resources within their rohe. Some whānau were keen to pilot new innovative approaches to land management. The expectation is that destructive resource use will cease over time.
- A number of participants spoke about the long term management of Māori land blocks and that whānau should benefit fairly from development and use of land and resources within their rohe. Whānau want to sustain themselves so that they can thrive within their rohe and reduce their dependency on others for their wellbeing. Their use and management of land and resources should seek to increase the self-reliance of whānau, so that they can support their own communities and others that have chosen to make their rohe their home over the long term.

- Sites of Maniapoto whānau past and current use and occupation need to be respected and preserved.
- Planning and management approaches for land and resources need to incorporate both Maniapoto cultural and local knowledge as well as other science-based understandings.

3.1.2 Kaitaikitanga

> ***"We need to make the river the centre of our lives again."***
>
> ***"Let's have events focused on the river."***
>
> ***"…but what do people know about what is going on in the river here? ...it's that sharing forum that's missing. Where do I get to share my knowledge? ...nothing is getting passed on..."***
>
> **– One-on-one interview, May 2014**

Maniapoto whānau discussed how they are connected with, and by, the river – it makes them whole. By respecting and connecting with the river, they are fulfilling their responsibility as kaitiaki to protect Te Mana o Te Wai and Te Mana o Te Awa o Waipā. Ensuring that Maniapoto can continue to interact with the river will help whānau and other communities in the catchment experience 'connections' and provide opportunities to teach younger generations how to recognise and carry out their responsibilities. In relation to kaitiakitanga, the principle of responsible guardianship to maintain and enhance a safe and healthy environment for the present and for generations to come, aspects that were identified as important included:

- Tikanga and kawa should be revered and continued to be handed down from tūpuna to kaumātua and on to rangatahi. Continuing to promote the use of appropriate tikanga and kawa and the "cultural ways" of Maniapoto remains important.
- In relation to capacity building Maniapoto whānau stressed that restoration of the Waipā needs to provide opportunities for whānau, particularly rangatahi, to build their skills and experience in management of lands and resources, so that future generations can continue to act as kaitiaki of their rohe.
- The restoration approaches implemented across the catchment need to take into account multiple spatial scales and time frames, and seek to maintain or increase resilience in the face of critical and long-term issues.
- Not only do whānau want the condition (or state) of the land and resources across the Waipā catchment to be monitored, they want to know what monitoring is being undertaken (and where), gain access to this information, and be empowered to participate in the implementation of future monitoring programmes.

3.1.3 Kotahitanga

"We need to be inclusive so that we are all working together around the same table."

"Improve lines of communication between council and whānau."

"Improve access [to the river] and make more things visible to the public, so there is peer pressure to improve."

– Wānanga, Te Kūiti, February 2014

Maniapoto whānau confirmed the importance and need to create relationships and work constructively both within themselves as whānau and hapū, and with other communities in the catchment to achieve the long term outcomes they are seeking. In relation to kotahitanga, the principle that Maniapoto will work constructively with others to achieve a safe and healthy environment for future generations, the aspects that were identified as important included:

- Whānau are likely to welcome opportunities to implement new ideas and innovations that assist them to manage their lands and resources in a sustainable way. Assistance may be needed to develop pilots that monitor and demonstrate the effectiveness of alternative practices to be used on lands in sensitive areas.
- MMTB and whānau establishing cooperative relationships with a range of commercial and industrial interests that operate within their rohe.
- To achieve significant change in land management practices, time will need to be invested in developing and maintaining relationships that educate and secure “buy-in” from other land owners in the catchment.

3.1.4 Tūmanako

"The Waipā River is an important resource for future generations so that they are able to drink the water, fish from the rivers… So that they can have a strong sense of pride and identity. Knowing where you are from…”

“More needs to be done to enhance the association of the community with the river, including putting in cycle tracks along the stop banks and much better acknowledgement of sites of significance"

– One-on-one interview, April 2014

Regarding the creation of a safe, healthy and sustainable environmental future for upcoming generations, aspects that were identified as important under the theme tūmanako, included:

- Key areas of the catchment (such as springs, remnant vegetation, and wetlands) should be protected from development, to save these areas of cultural importance so that these lands and waters can continue to support healthy populations of taonga (kai

and non-kai) species as well as the whānau who depend on them, both now and in the future, for their way of life.

- Adopt ecosystem-based management approaches that reflect Maniapoto's understanding of the connection between all things, and the need for planning over extended timeframes and at multiple scales.
- Sustainable industry and commerce can thrive in the Maniapoto rohe, providing they operate in a manner that assures the long term health of the lands, waters and resources. It is preferable that land owners / business operators invest in the future, and recognise that the Waipā River is critical to the health and wellbeing of all whānau (including themselves) in the catchment and thus strive to be (at a minimum) compliant and endeavour to apply best practises in the first instance, rather than only changing from poor practises if they are "discovered".
- Land use and management needs to always reflect the deepest respect for the land and the interconnectedness of all things.
- Land use and management of resources needs to be guided by a commitment to sustainability, both in the present and for the generations to come, which means maintaining diverse and abundant ecosystems in perpetuity while providing for diverse cultural, social and economic activities that support a balanced, healthy, secure and sustainable quality of life.
- Planning and management approaches for land, water and resources need to incorporate both Maniapoto cultural and local knowledge as well as science-based understandings.
- A precautionary approach shall be adopted for planning and management, so that decisions err on the side of caution when the information is limited.
- Development of lands, waters and resources shall only proceed when the risks of impacts on the Maniapoto rohe are well understood, communicated and accepted by Maniapoto whānau.

3.2 Analysis from Concept Maps

Using the program Decision Explorer®[17] the concept map was subjected to the following analyses: (1) Domain analysis; (2) Centrality analysis; and (3) Cluster analysis. The resulting priority concepts from these analyses are summarised in Table 5. For more detail about these individual analyses please refer to Appendix E.

[17] Information describing Decision Explorer can be found on www.banxia.com

Table 5: Summary of the priority concepts that emerged from the cluster, centrality and domain analyses. For more details please see Appendix E.

Priority outcomes	Pressures that need to be addressed	Issues that need to be addressed	Clusters	Priority catchments
1. Waters that are productive, clean, and able to be safely utilised by whānau for a variety of cultural activities (e.g., kai gathering, swimming, rongoā, waka ama etc); 2. Kai populations, that are abundant, found throughout their historic range, and being gathered by whānau; and 3. Sites of significance protected.	1. Vegetation clearance; 2. Farming; and 3. Activities associated with river control.	1. Water quality; 2. Erosion, including high sediment inputs; 3. Loss of habitats, including the loss of wetlands; 4. Declining populations of species, and changes in the condition / quality of kai gathered; and 5. Changing shape of the rivers.	1. Waters; 2. Non-kai uses; 3. Sites of significance protected; and 4. Rights of whānau to use lands and resources.	1. Waipā; 2. Waitomo; 3. Mangaokewa; 4. Mangarapa; 5. Mangapū; 6. Moakurarua.

Having identified the priority outcomes, clusters and catchments the project team then focused on the issues that whānau identified individually. Using the concept map, the project team was able to identify what "causes" the issue, and explain the "consequences" that a particular issue has on the overall health and wellbeing of Waipā catchment (Figure 7). The concept map demonstrates the flow on effects of each issue and helps to reinforce the areas where strategies need to be developed, for example:

Issue 1: Water quality

Impacted by: Industrial and urban discharges (e.g., meat works, sewage, mills); dairying; high sediment loads; rubbish dumps too close to streams and waterways; riparian condition; and forestry operations.

Consequences for tāngata whenua and influences on the health and wellbeing of the Waipā include: Populations of taonga species in the catchment, including their condition and quality; opportunities for Maniapoto to use their lands and resources; whānau and marae drinking water supplies; protection of cultural landscapes, especially sites of significance; and use of water resources that are highly valued because of their particular properties, e.g., used for healing or rongoā.

Issue 2: Erosion and high sediment loads

Impacted by: Vegetation clearance; riparian condition; past river control activities and changing patterns of water movement; and changed river flows changing sediment movement.

Consequences for tāngata whenua and influences on the health and wellbeing of the Waipā include: Water quality; habitats of taonga species in the catchment; and opportunity for Maniapoto to use their lands and resources.

Issue 3: Loss of habitat (including wetlands)

Impacted by: Loss of wetlands; vegetation clearance; erosion and high sediment loads; poor water quality; riparian condition; shingle / gravel extraction; water extraction; past river control activities; changing patterns of erosion; and deposition and the loss of connections.

Consequences for tāngata whenua and influences on the health and wellbeing of the Waipā include: Populations of taonga species in the catchment; opportunity for Maniapoto to use their lands and resources; risk of flooding of whānau lands and marae; break connections needed by taonga species; and loss of habitats and features of a river system valued and used by whānau.

Issue 4: Declining populations in species

Impacted by: Water quality parameters; flows being too low; loss of habitat; life cycle interruptions and key stages not being triggered etc; loss of corridors; excessive harvest by commercial interests; sediment movement in the system; loss of connections with wetlands and floodplains etc; and competition with pest species.

Consequences for tāngata whenua and influences on the health and wellbeing of the Waipā include: Whānau aspirations to use their lands and resources; the ability of whānau to sustain their kai gathering practices, which could lead to the loss of practices, skills and mātauranga; and loss of economic development opportunities.

Issue 5: Changing shape of the river

Impacted by: Past river control activities; changing patterns of erosion; loss of wetlands; vegetation clearance; erosion and high sediment loads; and shingle / gravel extraction.

Consequences for tāngata whenua and influences on the health and wellbeing of the Waipā include: Inundated wāhi tapu and whānau land; opportunity for Maniapoto to use their lands and resources; risk of flooding of whānau lands and marae; break connections needed by taonga species; and loss of habitats and features of a river system that are valued.

Note that whānau “having the right to use lands and resources” emerged as a priority and so associated issues impacting the rights and interests of Maniapoto whānau were also explored. These considerations included: The use of contaminants (such as DDT) on farm lands in the past and whānau being unaware of legacy contamination issues; whānau feeling that they are being targeted for improved land management without getting a similar buy in from others in the catchment; and the management of land blocks may be divorced from the governance structures in place, which may complicate the ability to implement changes to management practices.

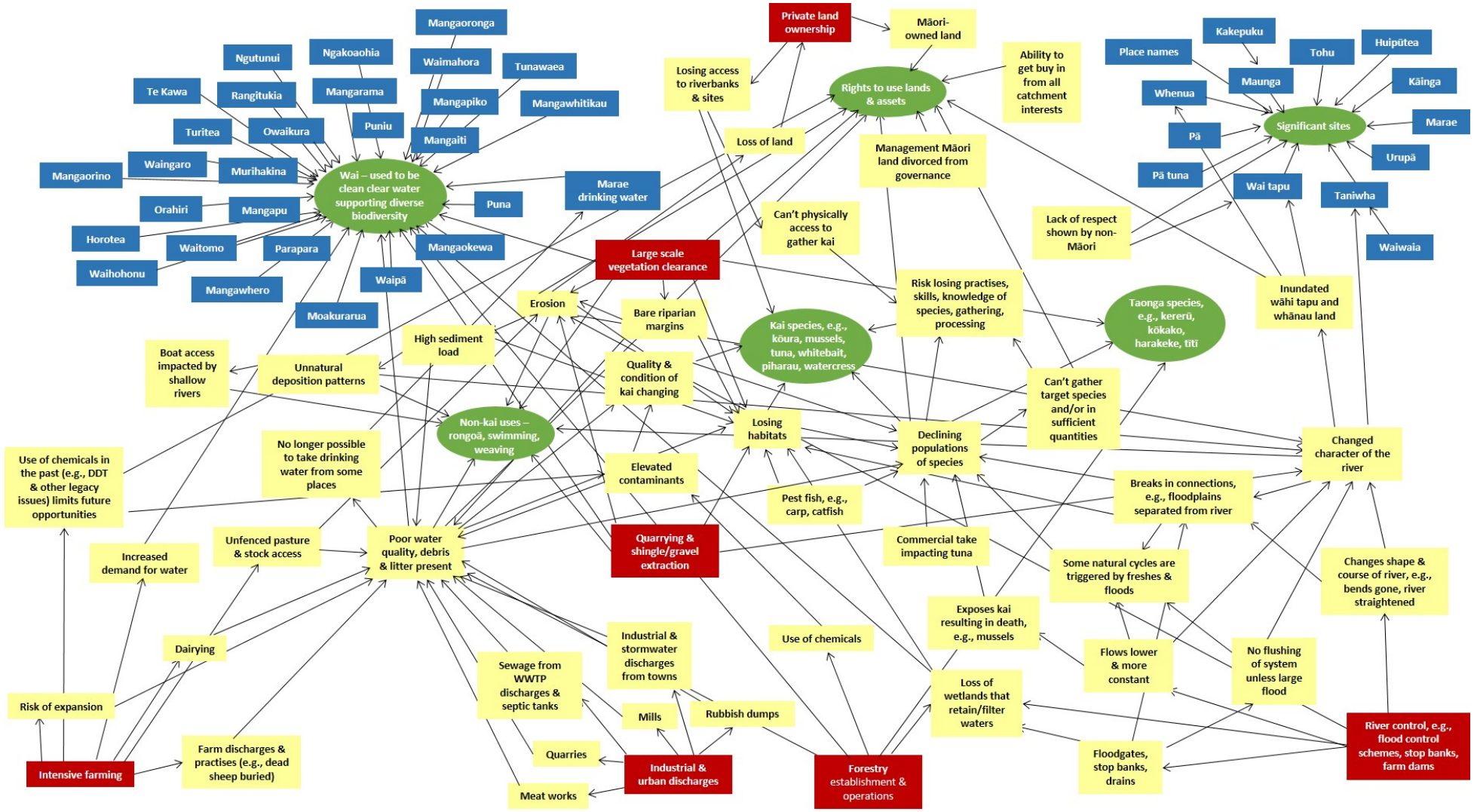


Figure 7: Concept map summarising the perceptions of Maniapoto whānau regarding the state of the Waipā River and the pressures impacting Maniapoto values, interests and opportunities in the catchment. (As contributed by Maniapoto whānau during the wānanga and one-on-one interviews and a review of the available literature). Where kōrero in the red box = perceived causes of changes to the Waipā catchment; yellow boxes = perceived impacts of the changes observed by whānau; blue boxes = attributes that whānau value and perceive have been impacted by human activities; and green circle = cultural outcomes that are sought by Maniapoto whānau.

3.2.1 Guidance for Future Use

Maniapoto whānau will determine for themselves how they want to use the site specific data gathered during this project in the future. Notwithstanding this, it is important to emphasise that the pressure-state-response tables, concept maps and resulting analyses developed during this project should give consideration to the full suite of knowledge and information gathered – from different species of importance to Maniapoto whānau to values cultural sites and functions.

In future the concept map could be used by Maniapoto to evaluate how many of the issues identified by whānau are being addressed, e.g., through provisions in the Waipā catchment plan.

Colour coding of the concept map allows pathways to be tracked as the provisions are formulated. For example concepts that are coded red at present because they are perceived as a pressure that is impacting Maniapoto cultural values can be recoded a different colour if a plan provision or management action addresses the perceived impact. Similarly, impacts that are currently coded yellow could change to green if they are remedied or mitigated to the satisfaction of Maniapoto whānau.

There is also an opportunity to use the pressure-state-response tables and spatial maps to inform the Healthy Rivers Plan for Change[18] process. For example, there are a number of species, sites or areas of importance that whānau want to see protected. These sites could be recognised in that plan change and influence the classification of activities (permitted, controlled, prohibited etc).

The depth of knowledge contributed by whānau in regards to fisheries practises (species, locations, methods of capture and preparation) will also be useful for informing the forthcoming Maniapoto Fisheries Management Plan.

Maniapoto whānau were very clear about what constitutes a Waipā catchment that is healthy and supports their wellbeing. A conceptualisation of a healthy Waipā catchment that provides for the economic, cultural, social and physical health of Maniapoto whānau and one that does not is shown in Figures 8 and 9 respectively.

[18] http://www.waikatoregion.govt.nz/Council/Policy-and-plans/Plans-under-development/Healthy-Rivers---Plan-for-Change/

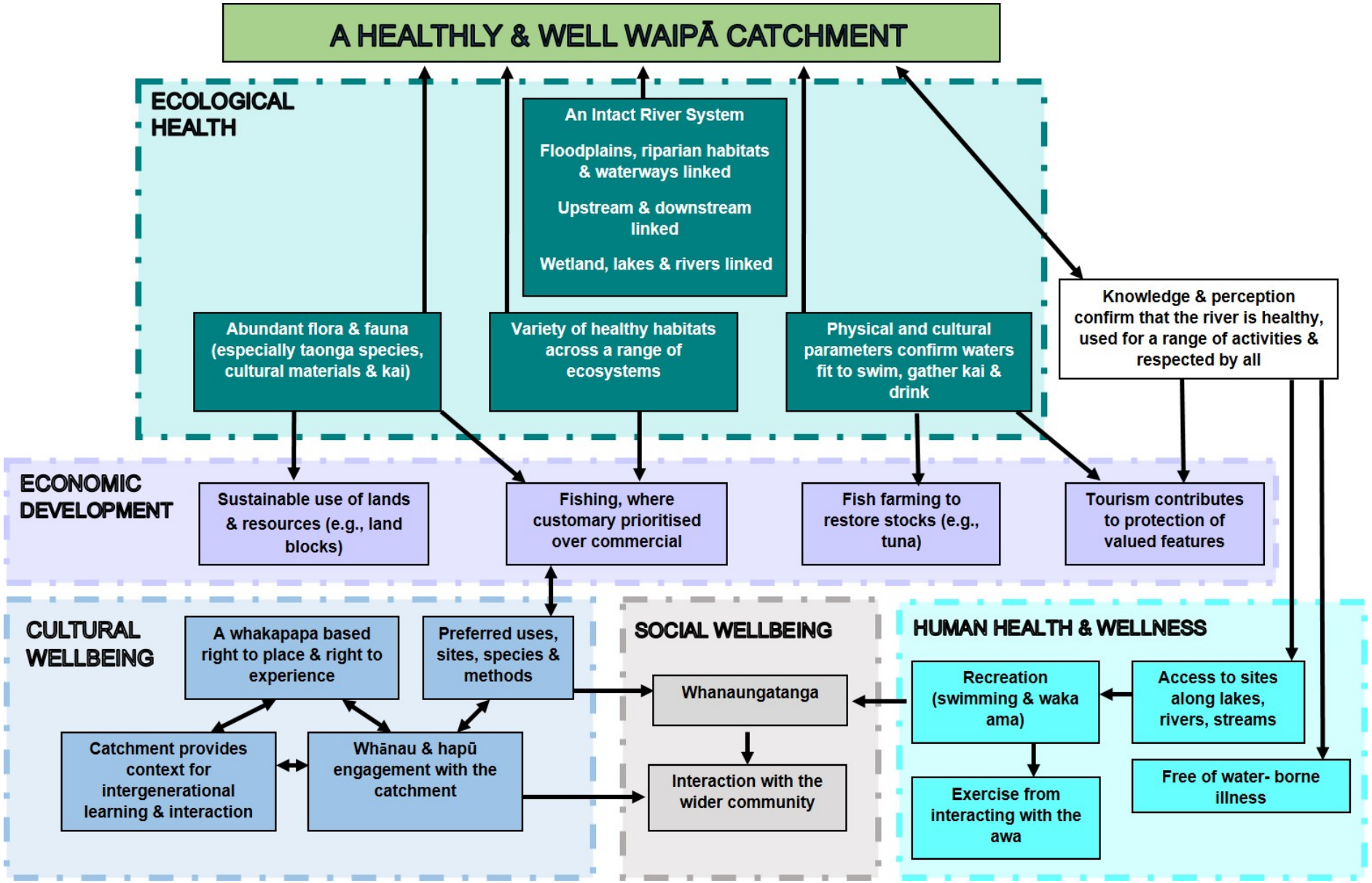


Figure 8: Conceptualisation of a healthy Waipā catchment that provides for the economic, cultural, social and physical health of Maniapoto whānau.

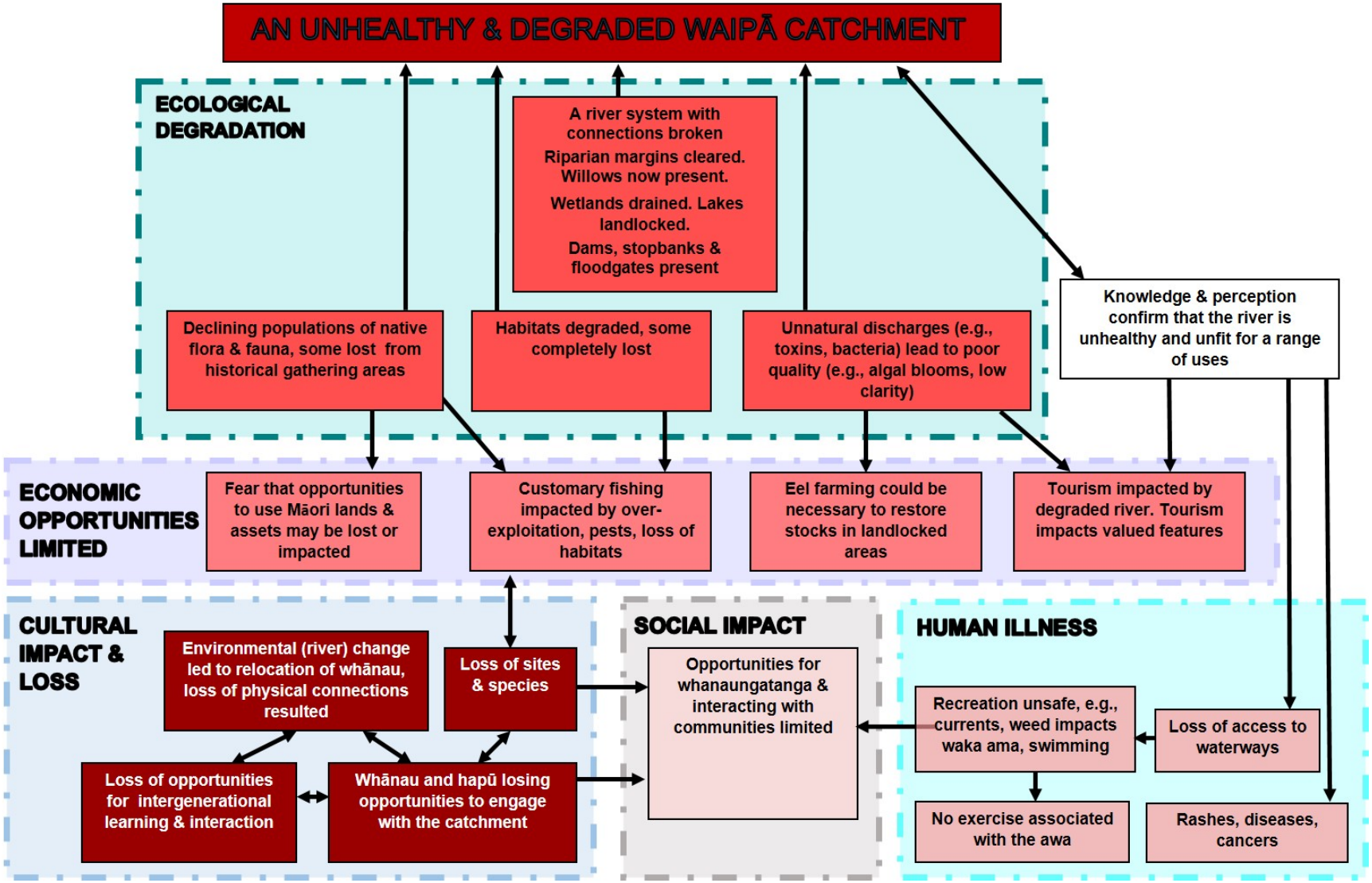


Figure 9: Conceptualisation of an unhealthy Waipā catchment that does not provide for the economic, cultural, social and physical health of Maniapoto whānau.

4 Discussion

4.1 Responding to Priorities

"Ko taku wawatatia kia kite anō, kia mā anō te wai! Kia hoki anō te ora o te awa, pērā anō i te wā i a au e tamariki ana. Kia taea anō e mātou te inu i te wai Māori rā"

"My vision would be to restore the river and improve the quality of the water to a state like how it was when I was a child. So that we are able to drink the fresh water."

– One-on-one interview, May 2014

"If the river is clean the kai will come back. It is most important that we see kai gathered from the river back on the marae again."

– Wānanga, Te Kūiti, February 2014

This section outlines the actions that could be implemented in response to each of the priority pressures and issues identified by Maniapoto whānau. In total, across all priorities, 53 responses were suggested. We provide some brief background information, then summarise feedback from whānau relating to various priorities before listing the responses identified. In addition to the solutions provided by whānau, the project team have suggested two further options based on their experience and knowledge:

1. Maniapoto whānau raised farming as a particular issue of concern. The use of farm plans is increasing in the North Island[19] as councils, farmer collectives, and farmers realise that farm plans are and will continue to play an increasingly important role as council's progress through limit setting processes[20]. WRC have also signalled a commitment to farm plans in the Waipā catchment plan (WRC 2014). The project team have drawn from initiatives that are underway and identified a number of responses that explore a potential role for whānau in the formulation and implementation of farm plans. Having a role in the farm planning process could be one of the few mechanisms that Maniapoto has available to them to engage directly with landowners once limits are set.

2. Although whānau emphasised the need for restoration in degraded areas of the catchment, they also identified areas/ecosystems that remained in good health, e.g., puna, wetlands and patches of indigenous vegetation. There is an urgent need to protect such areas so that they are not at the risk of further degradation and become places that the next Maniapoto generation needs to restore. The project team suggests

[19] For example, Horizons Regional Council refers in some of its rules to whole of farm plans. Northland Regional Council have rules that include reference to farm plans. The Overseer 6 software that is being promoted as a tool to assist with nutrient management is a "whole of farm tool".

[20] The National Policy Statement for Freshwater Management 2011 requires councils to set freshwater objectives and limits in regional plans. 'Freshwater objectives' are the intended environmental outcomes for a water body that will provide for the values the community considers important. Freshwater objectives need to be set for each water body, taking into account local and national values and aspirations and its existing condition. 'Limits' to use are derived from the specified objectives for each catchment and refer to the total amount of water that can be taken out of a freshwater body, or of contaminants that can be discharged into it without jeopardising the desired outcomes. (https://www.mfe.govt.nz/publications/water/freshwater-reform-2013/html/page6.html)

that protection of the remaining “good spots” be sought by utilising the current Waipā catchment planning process.

4.1.1 Levels of Priority and Implementation

At the request of the MMTB the report suggests an order of implementation that ranges from priority 1 to 4. Priority 1 is accorded urgent actions/responses while Priority 2 comprises those initiatives that need to commence as soon as possible. Priority 3 is used to categorise responses that should be initiated as corresponding opportunities arises or once the MMTB are confident that those initiatives identified as priority 1 and 2 are in the process of being addressed. Priority 4 currently comprises actions that promote communication and education initiatives across the wider community and are considered important for securing behavioural change across multiple resource users and generations.

The realisation of priority actions 1-4 identified through this work will be shared across the multiple agencies who have responsibility for administering and managing the Waipā River, including MMTB, regional and district councils, MfE, and Department of Conservation (DoC). The priority responses listed recognise four types of implementation. In Appendix F the project team have suggested the types of implementation strategy that could be employed for each response. These include:

1. Collaboration: Working closely with co-managers, scientists, advisers, planners, engineers, and resource users to synthesise current knowledge of the catchment into land and water management; and Incorporating Maniapoto whānau cultural and local knowledge about Waipā catchments into areas of policy development and decision-making;

2. Regulation: Using the provisions of regional planning instruments to address concerns identified by Maniapoto whānau.

3. Restoration: Actively promoting, supporting and undertaking catchment restoration. Maniapoto whānau already have a number of restoration projects underway in the Waipā catchment (e.g., Herangi 2014). There are also opportunities to engage the Waikato River Authority (WRA)[21] to fund initiatives that promote an integrated, holistic, and coordinated approach to the implementation of the Vision and Strategy and the restoration of the Waipā catchment.

4. Communication and advocacy: Providing information that enables informed decisions to be made about the range and types of initiatives needed to build lasting solutions to achieve a healthy Waipā River ecosystem.

4.2 Key Pressures

The three key pressures identified by Maniapoto whānau as impacting the health and wellbeing of the Waipā River catchment were vegetation clearance, farming and river control (Table 5, Figure 5). See Appendix C for more detail regarding the responses listed below.

[21] http://www.waikatoriver.org.nz/

4.2.1 Vegetation Clearance

"We used to cut there… Got money for digging the drains. Drain their land into what we call the main drain… It was a wrong thing to do because what was happening is we were collapsing the banks aye, because the vegetation was being cut away…"

"…the vegetation is still there in some places, there are good examples, but maintain these before we lose all of these sites"

– One-on-one interview, May 2014

Maniapoto whānau attribute many of the erosion-related problems in the catchment to vegetation clearance in the headwaters of tributary catchments and from riparian margins to enable farming and other land uses. Drainage of wetlands has accompanied much of this land conversion. Loss of vegetation in the headwaters is a particular concern and is seen as a major contributor to high sediment loading. Maniapoto whānau would like to see an extensive re-vegetation programme. However, in addition to any proposed replanting, they would also like to see the remaining areas of indigenous vegetation protected.

Responses (Table 6)

- Protect the "remaining good stuff", e.g., Rangitoto Ranges, Kakepuku, and Mangapiko.
- Prohibit any further clearance of indigenous vegetation through statutory plans.
- Support re-vegetation projects that "link" and provide ecological corridors; as well as protect and extend existing areas of indigenous vegetation.

Table 6: Vegetation clearance pressures in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
1	Protect the "remaining good stuff"	1	WRC, District Council (DC), Department of Conservation (DOC)	Section 4.2.3 refers to protecting / restoring indigenous biodiversity. For example, Action 6 in Section 4.2.3 refers to large ecologically intact indigenous terrestrial habitats and specifically lists Pirongia, Maungatautari, Kakepuku and Rangitoto ranges. Action 21 signals that the WRP (review due late 2015) is to include objectives, policies and methods that protect significant natural areas. Action 22 refers to working with Ngā Whenua Rāhui[22] to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks Section 4.2.2, Action 3 refers to the development and implementation of a programme of protection and restoration for Waipā wetlands
2	Prohibit any further clearance of indigenous vegetation	1	WRC, DC	This is considered out of scope for the WCP as it will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review Section 4.2.3, Action 15 refers to the provision of advice to landowners on the protection and restoration of biodiversity throughout the catchment
3	Support re-vegetation projects that "link" and provide ecological corridors	2	WRC, DC, DOC	Action 1 of Section 4.2.3 is to identify additional priority indigenous habitats and potential linkages to enable a comprehensive ecological network to be managed in the Waipā catchment

[22] Ngā Whenua Rāhui is a contestable Ministerial fund established to facilitate the voluntary protection of indigenous ecosystems on Māori-owned land. http://www.doc.govt.nz/getting-involved/run-a-project/funding/nga-whenua-rahui/nga-whenua-rahui-fund/

4.2.2 Farming

"The farming sector needs to improve their practice to make it more sustainable. The current practice is not acceptable…"

"...regulations should be made more strict if you're going to have an effect or impact on the awa you need to be compliant to certain regulations and if you're not you need to be punished"

– One-on-one interview, May 2014

"Key actions include fencing off the river to stop the stock from getting access especially during times of drought. Intensification on farm blocks has not included putting in more ponds, we need to increase the number of holding / settling ponds... Need tighter regulations, rules and enforcement… There should be a greater focus on… the upper catchment areas first and then work your way down…"

– One-on-one interview, March 2014

One of the objectives of the Waipā catchment plan is to raise awareness of water-related issues and to undertake activities locally to protect and enhance the catchment's rivers, lakes and streams. Changing land management practices, re-vegetation, and encouraging land managers to undertake riparian restoration cannot proceed however without first seeking permission by the tenure holder/s and specific agencies that have jurisdiction over areas "in and about a stream". Any recommendations must therefore be reviewed and be deemed acceptable by the relevant parties. Implementing recommendations will likely require working with local groups to provide relevant information and promote best management practices for landowners. It is expected that such collective actions will contribute to improvements in water quality, fish habitat, riparian zones and wetlands in the catchment area.

During the wānanga the need for better environmental land management programs for the catchment's agricultural producers was identified. However, it was also recognised that technical and financial assistance may be required. Whānau stressed the need to get "buy-in" from all landowners as it could be unfair to some landowners if they were the only ones being innovative, while others resisted change.

Responses (Table 7)

- Provide technical advice to farmers so that they do not incur the costs of seeking external advice. A pool of technical advisors should be available to explain to farmers what management practices could be included in their farm management plans to ensure a focus on habitat and water protection.
- Investigation of alternative land uses that would provide an economic return while providing better environmental outcomes. Consider incentivising for farmers so that it is in their best interest to consider alternative practices. Linked to this is an investigation of plants that could be planted in riparian zones or lands to be retired that serve an important ecosystem function, while also providing an economic return to landowners. For example one whānau member suggested medicinal grade manuka products.

- Pilot innovations on some farms so that the benefits can be demonstrated to other landowners. Resource a person to work with landowners and seek out and implement pilot schemes, where selected farms agree to trial innovative approaches. Such actions might include:
    - Supporting landowners implementing best management practice demonstration projects that focus on improved nutrient management.
    - Implementing improved nutrient management agricultural demonstration projects for landowners and whānau to reduce impacts on surface and ground water.
    - Coordinating the development of communication materials to promote the economic and environmental benefits of improved nutrient management.
    - Investigating and investing in research partnerships to explore alternative methods of dealing with nutrients from agriculture production.
- Conduct riparian health assessments with whānau for Waipā waterways. Such assessments might include:
    - Identifying areas that are classified as unhealthy and target for improvement and restoration.
    - Providing education to the public, landowners and stakeholders about the importance of healthy riparian areas.
    - Partnering with the local agricultural groups to develop a communication and education strategy targeted to landowners, the public and stakeholders, which focuses on the importance of healthy riparian areas.
- Support investigation of “legacy” contamination on farms by identifying locations of dumps, pits etc. This information would help to assess future risks, and potential lost opportunities.
- Encourage protection of groundwater and improved management of current landfills. Initiatives might include:
    - Diverting agricultural plastics from landfills into recycling programs;
    - Promoting the safe disposal of non-recyclable items;
    - Communicating options for disposal of oil, oil filter and oil containers;
    - Promoting proper disposal of unused agricultural pesticides and household hazardous waste.
- Initiate a project to work with the governors and managers of Māori land blocks to address the unique challenges that they face, including:
    - Māori governance being divorced from management and associated impacts on the ability to innovate.

  - Fragmentation of land blocks and what that means for long term management.
  - Identifying alternative uses that would still generate a return for shareholders.

- MMTB to determine in conjunction with farming interests, whether they want a role in the development and monitoring of farm management plans. Issues that could be considered include:
  - Whether "whole of farm plans" would be a more effective means of enabling MMTB to address the concerns of whānau[23]
  - What whānau want to see in farm management plans.
  - What role whānau want to have in monitoring, if any.
  - The capacity building that is needed by whānau if whānau want to be able to assess farm plans and audit farm performance.
- Maniapoto whānau who have observed the intensification of farming in the catchment believe that this has not been accompanied by an appropriate increase in the number or effectiveness of effluent management ponds. Regulation is needed in advance of land use intensification, which then needs to be enforced.
- Establish land refuse stations in rural areas to encourage farmers to change their habits (e.g., dumping dead carcasses into the nearest swamp or down a bank).

[23] Investigate the benefits of "whole property management plans" compared to farm management plans to identify what can best assist farmers in addressing all of the above issues as well as other aspects of farm management. Specifically management plans can: a) Provide a realistic alternative to the current model as they enable a property to be managed for the full range of values present rather than by partitioning values with potentially significant losses in all sets of values; b) Assist farmers in the resource consent process, through regional/district plans, by showing how a particular management action (e.g., water extraction, tree planting) fits the overall property goals; c) Provide documentation and guidance to assist farmers in meeting environmental and animal welfare certification and auditing requirements; d) Enable farmers to set and record their property goals/objectives; e) Through a formalised monitoring programme, assist farmers to identify developing problems before they become major issues and may still be readily manageable.

Table 7: Farming pressures in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
4	Provide technical advice to farmers	2	WRC	Section 4.2.1 refers to soil conservation. Action 1 refers to piloting at least 5 property/farm plans each in the Moakurarua and Kaniwhaniwha sub-catchments. Actions 1, 4, 5, 6, 25 focus on the use of farm plans to address issues. Actions 18, 24, 26 relate to the provision/promotion of advice to landowners, including Māori Multiple Owned Land Block trustees, and communities Section 4.2.2 refers to maintaining and improving water quality. Actions 1 and 2 refer to the development and implementation of farms plans in selected catchments to reduce nutrient loads. Action 9 relates to the provision/promotion of advice to landowners on methods to maintain/improve water quality. Action 11 refers to working with industry to promote stock exclusion from all waterways, karst systems, indigenous forests, wetlands and puna
5	Investigation of alternative land uses	3	WRC	Section 4.2.1, Action 23 refers to the investigation of alternative land use options, including afforestation, for areas where land use does not match capability Section 4.2.2, Action 12 signals that the Waikato Regional Plan review (due late 2015) is to include objectives/policies/methods that result in improved sustainable land management and water quality
6	Pilot innovations on some farms	2	WRC	Whānau wanted to see changed farm management practices being piloted. While the implementation of the strategies and actions outlined in the WCP should direct an improvement in current farming practises, the implementation of specific pilot innovations on farms is considered out of scope for the WCP
7	Conduct riparian health assessments for Waipā waterways	2	WRC, MMTB, WRA	Section 4.2.1, Action 15 refers to the implementation of new riparian enhancement programmes along sections of the Mangapiko, Waipā and Mangapu catchments. It is currently unclear what assessment processes are to be used outside of the high priority waterways identified in the WCP, and where assessments will be undertaken in the future Section 4.2.8, Action 3 refers to the development of a whole of catchment monitoring implementation plan which could include riparian health assessments
8	Support investigation of “legacy” contamination on farms	3	WRC, MfE	This is considered out of scope for the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review

Table 7 (continued): Farming pressures in the Waipā catchment.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
9	Encourage protection of groundwater and improved management of current landfills	2	WRC, Territorial Authorities (TAs)	This is considered out of scope for the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review
10	Initiate a project to work with the governors and managers of Māori land blocks	2	WRC	Section 4.2.1, Actions 26 and 27 relate to sharing/mentoring "best practice" and the identification and development of specific and targeted environmental programmes with Māori Multiple Owned Land Block trustees
11	MMTB to investigate a role in the development and monitoring farm management plans	2	MMTB, WRC	Section 4.2.1 assumes that farm plans are the vehicle for addressing a number of issues related to farming pressures. MMTB need to determine the level and type of on-going engagement they want to have in farm planning processes
12	Increase effectiveness of effluent management	2	WRC	Regulation around effluent management is outside the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review
13	Establish land refuse stations in rural areas	3	WRC, TAs	This is outside the scope of the WCP

4.2.3 River Control and Sites of Significance

"Large tracts of productive land have been lost over the years through erosion. No one is addressing the loss of this taonga"

– Wānanga, Te Keeti Marae, November 2013

"The primary benefit to our community is the minimised risk of flooding. The community retains vivid memories of the devastating effect of the 1958 flood. The negative effect on a number of families forced to vacate the areas now under water has not been dealt with adequately. The negative effect on the flora and fauna has not been adequately measured"

"This type of flooding is as a direct result of the introduction of the stop-banking, which begins immediately downstream from Te Keeti, and ends immediately upstream of Tarewaanga. The effect further downstream, extending into the Waikato through to its port are burdensome on all of those communities, Māori and other-than-Māori"

–Tarewaanga Marae Trustees and Committee Submission to the Māori Affairs Select Committee

The Waipā catchment is now a predominantly agricultural landscape interspersed with towns and smaller rural settlements, characterised by a network of stop banks, roads, ditches, with bridges and culverts required for waterway crossings. Several specific infrastructure concerns were raised during wānanga and interviews with Maniapoto whānau, including the discharges from meat works and sewage inputs into the river from townships. Concerns were

also raised about the flood control structures that are in place to protect public infrastructure, but have had the unintended consequence of flooding Māori lands and increasing the flood risk for marae, particularly Te Keeti Marae. The perceived inequity of the impacts of past river/flood control decision making processes and works on Maniapoto assets and values, and the impacts of changing the shape and nature of the river on taonga species, has still not been addressed to the satisfaction of Maniapoto whānau.

Whānau discussed a number of important areas or sites that were categorised by the project team as "sites of significance" for the purposes of this report. These included urupā, caves, taniwha, the headwaters of the Waipā, maunga, reserves and areas or landmarks where significant historical events occurred. The knowledge contributed by whānau during this study complements information that is held by the MMTB and listed on the New Zealand Historic Places Trust (NZHPT) Register. A number of whānau are concerned about how (past and present) river control and land use activities have impacted their sites of significance and suggested a range of responses. Whānau would like monitoring to be undertaken in the vicinity of selected sites of significance to be confident that any surrounding land use activities are not impacting these sites (e.g., Maniapoto's Cave, Pōtea the puna in Opārure) and/or need more protection.

Responses (Table 8)

- Review the flood risk to Maniapoto marae and agree on mitigation strategies with whānau. This will involve working in partnership with MMTB and manawhenua representatives to:
    - Investigate costs and requirements to obtain the support of affected landowners.
    - Identify what is required to modify existing schemes to protect Māori lands and marae, while still meeting engineering and building standards.
- Raise awareness within the community of the need for sustainable financing of water supply and wastewater treatment infrastructure to ensure continued high quality potable water for catchment residents, whānau and other river users. Work with local councils and other catchment agencies to influence central government to provide long-term funding programmes accessible to smaller rural communities to enable upgrades of infrastructure.
- Review stop banks along the river to identify instances of "informal stop banking". Whānau can identify examples where informal and ad-hoc construction adds to erosion problems.
- Initiate a process to review permitted activity status for drainage and the process around ensuring that the criteria for permitted activity status are met.
- Areas or sites of significance to Maniapoto whānau need be respected and preserved/protected.
    - Sites of significance to Maniapoto included in monitoring programmes.

Table 8: River control pressures in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
14	Secure targeted funding from central government to provide sustainable financing of water supply and wastewater treatment infrastructure	3	WRC, WRA, TAs, MMTB	This is outside the scope of the WCP and is likely to be considered as part of the Waikato Regional Plan review (due late 2015)
15	Review the flood risk to marae and agree on mitigation strategies with whānau	2	MMTB, WRC, WRA	Section 4.2.4 relates to flood management. Actions 9 and 10 refer to working with tāngata whenua to learn from their knowledge of flooding impacts/benefits on their values. While Action 9 refers to food gathering areas specifically this could be modified to also consider marae infrastructure. The knowledge/learnings gained from Actions 9 and 10 should then inform the hazard management plan (identify hazard areas and appropriate strategies to avoid, remedy or mitigate the adverse effects) referred to in Action 11
16	Raise awareness within the community of the need for sustainable financing of infrastructure	4	WRC, WRA, TAs, MMTB	This is outside the scope of the WCP and is likely to be considered as part of district planning processes
17	Influence central government to provide long-term funding programmes accessible to smaller rural communities to enable upgrades of infrastructure	3	WRC, WRA, TAs, MMTB	This is outside the scope of the WCP
18	Review stop banks along the river to identify instances of “informal stop banking”. Whānau can identify examples where informal and ad-hoc construction adds to erosion problems	2	WRC	WRC advise that whānau should contact the Resource Use Directorate (WRC management team responsible for investigations and incident response) to report instances of informal stop banking On-going surveillance could also be incorporated into the development of the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3)
19	Review permitted activity status for drainage activities	2	WRC, MMTB	This is outside the scope of the WCP and is likely to be considered as part of the Waikato Regional Plan review (due late 2015)
20	Areas or sites of significance to Maniapoto whānau are protected and included in monitoring programmes	2	WRC, MMTB	Section 4.2.5, Actions 3 and 4 refer to the identification and protection of sites of cultural significance Sites of cultural significance could be incorporated into the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3) and monitoring undertaken as part of Section 4.2.5, Action 6 (“monitor catchment water quality and ecosystem health including science and cultural health indicators”)

4.3 Key Issues

The five key issues identified by Maniapoto whānau as impacting the health and wellbeing of the Waipā River catchment were water quality, erosion and high sediment inputs, loss of habitats and changing shape of the rivers, and declining populations of species (Table 5, Figure 5).

4.3.1 Water Quality

"If the river is clean the kai will come back. It is most important that we see kai gathered from the river back on the marae again"

"You used to be able to see the bottom - you can't see the stones in the bottom now. Noticed the change from about 1980 onwards. When we were kids, we used to be able to hold a rock under and see how far we could go..."

– Wānanga, Te Kūiti, February 2014

"...in 1965 when the Waikato Valley Authority did all of that earthworks... that was the biggest contributor to making the river brown in a lot of cases, particularly from up the Rangitoto [Ranges] when the Tunawaea collapsed and that photo that the Waikato Times always prints... they have this big photo of the... Waipā coming into the Waikato at Ngāruawāhia and the Waipā is brown, well that was taken after the Tunawaea collapsed.... I certainly don't like it, because it's not a true reflection of the river, not at all"

– One-on-one interview, March 2014

"In case of emergency the marae needs to be able to connect to the river and use the water for drinking and for washing"

– One-on-one interview, May 2014

Maniapoto whānau are greatly concerned over water quality and supply within their rohe. They understand that water is a key part of the linkages in ecosystems that keep the land healthy, and want to ensure that their lakes, river and streams remain clean and healthy for all animals, fish and general whānau use. There are particular concerns over current and proposed industrial projects in the Waipā rohe that might impact water quality, quantity and timing of flow. Whānau are concerned that commercial and industrial water use in the rohe affects streams and rivers directly. Weeds and algal blooms are also experienced more frequently than in the past and are seen as symptoms of poor health.

Degraded water clarity is one of the most important issues for the Waipā. NIWA (2010) estimates that at base flow in the 1920s (i.e., before the hydro dams and significant catchment development) the clarity in the Waipā River and lower Waikato was about 1 metre due to the geology of the catchment which is dominated by erosion-prone mudstones and siltstones. In recent times the highest clarity in any Waipā tributary occurs in the Mangauika Stream, which is 95% native forest on the slopes of Pirongia, where base flow clarity averages 3.5 m. Waipā tributaries draining native forest on western hills at Whatawhata have lower base flow clarities of between 1 and 2 metres (Quinn & Stroud 2002).

The lower Waipā ranks 74th amongst the 77 major river sites monitored in the National River Water Quality for water clarity, the third lowest ranking river in New Zealand. While some of the causes of the observed decline in water clarity and changes in water colour are natural, much of this change has been exacerbated by human activity (e.g., clearance of vegetation destabilising hillsides in erosion prone areas, such as those in the upper Waipā catchments), increasing flood flows and stream bank erosion (NIWA 2010). Sedimentary rocks in parts of the catchment (notably near Te Kūiti, Waitomo and in the Rangitoto Ranges) are associated with low clarity even when covered by undisturbed native forest. Because water clarity is naturally low in such lithology[24], it will be difficult to achieve very high water clarity throughout the Waipā catchment and may be unrealistic when the cost/benefits are considered (NIWA 2010)[25]. A major contributor to low water clarity in the steep, upper reaches of the Waipā River is fine sediment from slips (landslides). In 1991 the Tunawaea slip deposited a large volume of sediment into the Tunawaea Stream. WRC and other stakeholders have since stabilised the area but material that slipped into the river is likely to still be releasing fine sediment especially at mean flows and above. Over time, the effects of the Tunawaea slip are expected to decline, but this may take decades (NIWA 2010).

The key issues for safe contact recreation are fundamental water quality problems, such as faecal pollution, blue-green algal blooms and low water clarity. Faecal contamination makes contact recreation unsafe in some parts of the Waipā catchment. In the context of the 77 sites in the National River Water Quality Network, two sites on the Waipā (Ōtewā and Whatawhata) are amongst the most polluted in the country for *E. coli* (ranked 74th and 75th respectively, using median levels for 2005–2008) (Davies-Colley & Ballantine 2010).

The WRISS identifies five point source discharges that go into the Waipā River, including the wastewater treatment plants (WWTP) at Te Kūiti, Ōtorohanga, and Te Awamutu and the Te Awamutu Dairy Factory and Roto-o-rangi Piggery. A point source discharge into the Waipā catchment also occurs in the vicinity of the Waitomo caves. Land disposal of effluent from municipal WWTPs is seen by many Waikato River Iwi as preferable to water discharge, as they and many Māori around the country have a strong cultural belief that human wastes should be cleansed through contact with land before returning to water bodies. Land disposal can be achieved in many ways with the most common in New Zealand being either slow rate irrigation (SRI) to pasture or forest, discharge via a wetland or discharge to a Rapid Infiltration Basin (RIB). Land disposal or wetland treatment of sewage at Te Kūiti (via Mangaokewa Stream), Ōtorohanga (via Mangaorongo Stream), and Te Awamutu (via Mangapiko Stream) is expected to reduce *E. coli* concentrations in the Waipā below the guideline targets (NIWA 2010)[26].

The technical and economic feasibility of land disposal has been investigated by the Waitomo District Council in some detail as part of the resource consent process for the Te Kūiti WWTP. This assessment found land disposal to be technically feasible but uneconomic because of the cost of land. One of the major technical hurdles is that the soil moisture deficit is typically positive for no more than six to eight weeks of the year which would mean that any irrigation or infiltration type scheme would be seasonal at best. The project team understands that the Waitomo District Council consult with a Joint Working Group regarding

[24] The general physical characteristics of rocks
[25] http://www.mfe.govt.nz/publications/treaty/waikato-river-scoping-study/appendix-13-waterquality.pdf
[26] https://www.mfe.govt.nz/publications/treaty/waikato-river-scoping-study/appendix-14-wastewatermanagement.pdf

options which includes representatives from the MMTB. The Ōtorohanga and Te Awamutu WWTPs currently have rock lined trenches that are intended to bring the effluent into cleansing contact with the land prior to discharge to surface water. However, there is no clear design specification for such rock lined trenches, and both the acceptability to whānau in terms of providing cultural cleansing through contact with the land, and scientific value in terms of beneficial treatment is thought to be questionable.

Responses (Table 9)

- Identify areas within the rohe, at the strategic and landscape scales, where development activities should be prohibited to protect water resource values.
- Review current regulations in statutory plans and policies, and guidelines (i.e., non-regulatory methods) in place to protect riparian areas and freshwater resources.
- Develop and implement guidelines for instream, upstream or upslope development activities to prevent siltation, temperature, and hydrological problems. These guidelines should require higher standards of precaution, greater accountability for proponents for impacts, and more significant penalties for infractions. Monitoring of the compliance levels and effectiveness of these guidelines is sought by whānau.
- Develop a study/programme across the catchment that monitors the use and quality of water supplies for communities and marae (e.g., using surface and ground waters (e.g., puna) in the catchment as the main source of water for washing and drinking)[27]. To provide safe drinking water on marae, a priority action is to install locally available water treatment plants at marae that require it (estimated cost per package of $106,200.00, excluding operating costs) (NIWA 2010)[28]. Note that the WRISS cautioned that the restoration actions will reduce, but not eliminate, the risk from pathogens in river and lake water, and hence will not enable untreated water to be drunk safely.
- Maniapoto whānau aspire to the elimination of sewage inputs from Te Kūiti, Ōtorohanga, Waitomo and Te Awamutu directly into their waterways. While the project team understands that the MMTB are involved in on-going discussions regarding the feasibility of implementing improved land based options as expiration dates for the various consent periods approach, the project team has included this as a priority to be revisited as and when funding and/or new technological advances become available. MMTB need to determine whether rock passage at the Ōtorohanga and Te Awamutu WWTPs is acceptable to whānau in terms of providing cleansing contact with the land.

In addition to the above the WRISS (NIWA 2010) also identified the following actions in relation to water quality improvements in the Waipā catchment:

- Reduce point source waste discharges (notably in the Mangaokewa Stream at Te Kūiti and the Mangapiko Stream at Te Awamutu).

[27] NIWA is fortunate to have funding from Ministry of Business, Innovation and Employment for a project titled "Resilient marae and community water and wastewater infrastructure". While this project is not addressing the quality of water supplies, it is working with Tarewaanga, Tokikapu and Ōtewā Marae to monitor water usage and wastewater generation patterns in order to assist marae communities to implement reliable and enduring water and wastewater solutions. http://www.niwa.co.nz/te-k%C5%ABwaha/publications/Aue-te-piro/Issue-1/water-and-wastewater-challenges-for-marae

[28] https://www.mfe.govt.nz/publications/treaty/waikato-river-scoping-udy/appendix-17-maraewatersupply.pdf

- Change farming practices to reduce the loss of fine sediment and nutrients to streams.
- Retire and reforesting pasture to reduce erosion.
- Re-vegetate stream banks to reduce bank erosion.
- Remove phosphorus from waste discharges thereby reducing total phosphorus concentrations in the Waipā River.

Table 9: Water quality issues in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
21	Identify areas where development activities should be prohibited to protect water resource values	1	WRC, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
22	Review current regulations in statutory plans and policies	1	WRC, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
23	Develop and implement guidelines for instream, upstream or upslope development activities	3	WRC	WRC advise that best practise guidelines for these types of activities already exist[29] Improving access to existing information sources should be reiterated in actions that address improved communication, advice and mentoring of landowners and communities
24	Develop a study/programme across the catchment that monitors the use and quality of water supplies for communities and marae (e.g., using surface and ground waters (e.g., puna) in the catchment as the main source of water for washing and drinking	2	WRC, MMTB, Ministry of Health	The use and quality of water supplies for communities and marae is considered outside of the scope of the WCP and WRC suggest that this response is covered by Variation 6 The usage and quality of (e.g., decentralised) water supplies for marae communities could be incorporated into the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3) and monitoring undertaken as part of Section 4.2.5, Action 6 (“monitor catchment water quality and ecosystem health including science and cultural health indicators”)
25	Eliminate sewage inputs from Te Kūiti, Ōtorohanga, Te Awamutu and Waitomo directly into waterways. In the interim MMTB need to determine whether rock passage at the Ōtorohanga and Te Awamutu WWTPs is acceptable to whānau in terms of providing cleansing contact with the land	3	WRC, TAs, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai This priority is to be revisited as and when new funding and/or technological advances become available

[29] For example, Best Practice Guidelines for Vegetation Management and In Stream Works (http://www.waikatoregion.govt.nz/PageFiles/5677/tr0741.pdf) (Gibbs 2007).

4.3.2 Erosion and High Sediment Loads

"I know along the Waipā there's kahikatea stands, pockets and there's still old pockets of kahikatea, but there's heaps of willows constricting the Waipā… the flooding there is terrible…"

– Wānanga, Waahi Marae, July2009 (NIWA 2010)

"Start by fixing large erosion and slip problems in the Tunawaea and Waimahora Streams first"

"Need planting along the river to mitigate erosion, involve schools, community groups and businesses"

– Wānanga, Te Kūiti, February 2014

"Replenish any native vegetation, fence off and plant natives - identify where they are and where they can grow"

– One-on-one interview, May 2014

Erosion causes degraded water clarity and sedimentation in the Waipā River and lower Waikato below the Waipā confluence at Ngāruawāhia. Maniapoto whānau want to see the establishment of an extensive planting regime, especially on the river banks that currently have no vegetation at all. Whānau are also concerned that the existing willows will eventually fall into and block the river, exposing the river banks, changing water flow and erosion patterns etc.

Maniapoto whānau believe that the priority is to start this work in the upper tributaries of the Waipā and work downstream. According to Palmer et al. (2013) 3.2% of the Waipā catchment is classed as Highly Erodible Land (HEL), with 3,180 ha at risk of land sliding with potential of delivery to streams. The HEL erosion mostly occurs along the western margins and in the upper reaches. Land with a moderate (4,360 ha) and severe earthflow risk (185 ha) occurs in the northwest and southern Waipā catchment.

NZeem® is a tool that helps identify sources of sediment in rivers. The NZeem® analysis identifies the steeper terrain along the north-western and western margins and the south-west of the Waipā catchment as having the highest erosion rates. When data are converted to a sediment load basis the Mangapū, Moakurarua, and the Whatawhata/Ngāruawāhia sub-catchments have the highest loads: 33,000, 30,000, and 21,000 t yr-1 respectively. Scenario modelling using NZeem® and AgriBase suggests on farm sediment reduction through mitigation strategies (farm plans) of 60,000 to 100,000 t yr-1 for farms identified as having the greatest HEL area across 100–500 farms, respectively (based on AgriBase polygons) is possible. This approach enables a focus on farms identified by AgriBase and HEL and the application of potential mitigation strategies for targeted farm numbers (Palmer et al. 2013).

The SedNetNZ model was used to assess stream bank erosion within the Waipā catchment (Palmer et al. 2013). The stream bank sediment yield (t m-1 yr-1) was modelled with no management intervention, 25% fenced (current status), 50% fenced, and 100% fenced on both sides of rivers and streams. Estimates show a potential reduction in sediment load (total) of 488,000 t yr-1 was potentially possible from the current modelled status of 650,000 t

yr-1 to 162,000 t yr-1 by fencing all rivers and streams of the Waipā catchment. Because of their relatively large areal extent and location in more hilly and erosion-prone land within the Waipā catchment, sheep-beef farms are estimated to generate the largest proportion of the 320,000 tonnes of sediment discharged from farmland each year (Palmer et al. 2013).

The clarity of the Waipā River remains poor even at low flows, which implies that particles suspended in the water column are fine (in size). To improve the clarity of the Waipā River a better understanding of the factors controlling clarity along with sediment load is needed. This would require targeting areas that produce the finest sediment (Palmer et al. 2013).

Responses (Table 10)

- Establish an extensive planting regime especially along the river banks that have no vegetation at all. For example, Wharekiri Station (Tiroa E Trust), 35 km of waterways - this station needs fencing off from the river and streams and an extensive riparian planting regime.
    - Work with catchment residents and the land owner groups to promote riparian area buffers to prevent future erosion.
    - Prioritise Tunawaea and Waimahora catchments.
- Investigate the feasibility of retirement and afforestation of steep dry stock farmland in the Waipā (from the WRISS, NIWA 2010). Undertake feasibility analysis of a change in land use from sheep-beef grazing to forestry on the steepest marginal farming land where erosion is greatest.
    - Local evidence from the Whatawhata Integrated Catchment Management Study in the Waipā Catchment shows that such an approach can enhance the long-term economic and environmental sustainability if the financial transformation hurdle can be overcome. A detailed analysis of the farm ecosystem by a stakeholder group came to the conclusion that enhancing overall sustainability required a better match of land use to land capability for this rolling steep-hill farm.
    - Prioritise Tunawaea and Waimahora catchments.
- Identify areas that are eroding badly and where localised engineering works are required to stabilise major earthflows (deep-seated landslides) and river bends (from the WRISS, NIWA 2010).
    - In partnership with local councils and landowners, prepare funding proposals for engineered erosion control projects to reduce stream bank erosion at identified high risk sites.
    - Work with catchment residents to implement the stream bank erosion projects.
- Review the willow management programme.
    - Agree with MMTB a means of willow control and maintenance, including consideration of the fisheries habitat being provided by willows that will need to be replaced/restored.

- Remove willows along the Waipā River that are impeding river flow, and replace with alternate riparian vegetation.

- Work with the harbourmaster to address issues of water users entering the navigable part of the Waipā resulting in wave action adding to the problem of riverbank erosion.

Table 10: Erosion and high sediment load issues in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
26	Establish an extensive planting regime, especially along the river banks that have no vegetation at all	2	WRC, WRA, MMTB	Section 4.2.1, Action 15 refers to the implementation of new riparian enhancement programmes along sections of the Mangapiko, Waipā and Mangapu catchments Section 4.2.3 refers to protecting / restoring indigenous biodiversity. Action 7 refers to the implementation of projects to protect/restore riparian habitat for taonga species. The key waterways to enhance include areas of the Firewood Creek, Kaniwhaniwha, Mangakara and Mangatutu catchments. Action 22 refers to "work with Ngā Whenua Rāhui[30] to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks" Section 4.2.4, Action 4 refers to the implementation of opportunities to retire and re-vegetate areas in the upper catchment.
27	Investigate the feasibility of retirement and afforestation of steep dry stock farmland in the Waipā	2	WRC	Section 4.2.1, Action 23 refers to the investigation of alternative land use options, including afforestation, for areas where land use does not match capability Section 4.2.2, Action 12 signals that the Waikato Regional Plan review (due late 2015) is to include objectives/policies/methods that result in improved sustainable land management and water quality
28	Identify areas that are eroding badly and where localised engineering works are required to stabilise major earthflows (deep-seated landslides) and river bends	2	WRC	Section 4.2.1 relates to soil conservation. Action 2 will assess the cost benefit of establishing new soil conservation schemes in priority areas including Kaniwhaniwha and Moakurarua. Actions 4 and 6 refer to working with farmers in the Kaniwhaniwha, Moakurarua, Mangapiko, Mangapu, Mangatutu, Puniu, Waitomo and mainstem of the Waipā catchments to implement farm plans. Action 13 includes a review of priority catchments with a consideration for factors like stability and flood passage. Action 16 aims to address isolated bank erosion through bank stabilisation works, removal of obstructions and river training and improvement where appropriate. WRC consider that Action 16 is relevant across the entire catchment, including sites identified by whānau

[30] Ngā Whenua Rāhui is a contestable Ministerial fund established to facilitate the voluntary protection of indigenous ecosystems on Māori-owned land. http://www.doc.govt.nz/getting-involved/run-a-project/funding/nga-whenua-rahui/nga-whenua-rahui-fund/

Table 10 (continued): Erosion and high sediment load issues in the Waipā catchment

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
29	Review the willow management programme	3	WRC	This is not currently covered by the WCP. WRC anticipate conducting research in the Waihou catchment (where large scale willow removal is underway) to investigate the impacts of this activity on aquatic life and water quality. New Zealand Landcare Trust and Waikato Raupatu River Trust are currently completing a WRA-funded project developing guidelines for willow and alder management within the catchment[31]
30	Work with the harbourmaster to address issues of water users entering the navigable part of the Waipā	4	WRC	This is outside of the scope of the WCP. The WRC Navigation Safety Bylaw 2013[32] covers all navigable waterways in the Waipā catchment. It sets out safe practices for people using the lakes, rivers and harbours for water skiing, swimming, boating, kayaking or other water activities safely, by seeking to reduce the conflicts between different activities. The Council may suspend any provision of this bylaw or exempt any activity from any provision of this bylaw

4.3.3 Loss of Habitat (including wetlands) and Changing Shape of the River

"We relied on the river for our sustenance, we lived off the river. Without the river we have no life, we've got no water that we can drink. If you haven't got any bores or puna wai you have no sustenance. It's everything to us"

– **One-on-one interview, May 2014**

"This wetland is still in a relative pristine state. It does not drain into the Mangapū but into the Waihohonu and Orāhiri. The unique wetland ecosystem near the Waihohonu has a rich biodiversity."

"All low lying lands or wetland areas are all gone due to extensive draining. A lot of bush has been cleared, mainly kahikatea, especially in the swampy low lying areas… These areas are drained and are now replaced with willow. The removal of the native bush from the banks of the rivers and streams seem to be a major reason why tuna numbers are so low these days"

– **One-on-one interview, March 2014**

As mentioned previously the loss of habitat and decline in the availability of freshwater fish and invertebrate species in the Waipā catchment are major concerns for Maniapoto whānau. Whānau talked about the value of wetlands and interconnections between streams, lakes, rivers and floodplains in a river system; and the need to protect existing wetlands (including puna), and restore degraded wetland areas. Wetlands originally covered some 110,000 ha of

[31] http://www.makearipple.co.nz/Action-groups/ripples/Best-Practice-Guidelines/
[32] http://www.waikatoregion.govt.nz/PageFiles/6773/Nav_Safety_2013_bylaw_web.pdf

the Waikato region, dominating the lowland basins of the lower Waikato River and the Waipā District and the Hauraki Plains; and although only 30,000 ha remain today, Waikato is still a national stronghold for wetlands (DOC 2014). The vulnerability and continued reduction in the extent of wetland ecosystems in the Waikato is a significant issue for wetland conservation. For example, the Waipā peat lakes and wetlands in the lower Waipā River catchment are a unique geological feature. DOC manages 6 out of 17 of these lakes and although these lakes have been modified by intensive agricultural land use they are nationally significant and represent the largest group of peat lakes in the country (DOC 2014). In the lower Waipā River catchment the Waipā Peat Lakes and Wetlands Accord 2002[33] is in place to align the activities of management agencies and iwi in working towards the restoration and enhancement of peat lakes and wetlands in the Waipā District.

Maniapoto whānau also highlighted how difficult it is to access some wetlands and puna due to a loss of knowledge, private land ownership and riparian weed growth, such as blackberry. Whānau are also concerned that water tables have changed which has contributed to the loss of some springs and water supplies, which were highly valued because of the purity of their waters and associated cultural uses (Figure 10).

Responses (Table 11)

- Identify wetland areas and puna within the rohe, at the strategic and landscape scales, where development activities should be prohibited to protect water resource values. For example whānau identified numerous puna during focus groups and interviews (see Appendix C). A buffer zone is needed around each wetland and puna.
- Review current regulations and guidelines in place to protect riparian areas and freshwater resources. Where these are insufficient, develop and implement guidelines for instream flows and upstream or up-slope development activities to prevent siltation, temperature, and hydrological problems. These guidelines should require higher standards of precaution, greater accountability for proponents for impacts, and more significant penalties for infractions. Monitor compliance with, and effectiveness of, these guidelines.
- Improve communication about the protection of fish habitat and riparian areas amongst agencies, local councils, industry, and landowners.
- Identify priorities to maintain and improve fish passage and connectivity.
- Support local whānau groups in their restoration initiatives.
- Restore stream habitats, create and/or restore lowland ponds and retrofit culverts that are a barrier to fish passage (from the WRISS, NIWA 2010).
- Investigate the levels of wetlands and security of water supply to wetlands. Whānau suspect that water levels are at risk from landowners extracting water from wetlands.

[33] http://www.waikatoregion.govt.nz/PageFiles/11188/Waipa%20District%20Peat%20Lakes%20and%20wetlands.pdf

Figure 10: Approximate locations of puna and water supplies identified by Maniapoto whānau. (See Appendices C and D for more information).

Table 11: Loss of habitat issues (including puna, wetlands and changing shape of the river) in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
31	Identify wetland areas and puna within the rohe, at the strategic and landscape scales, where development activities should be prohibited to protect water resource values	1	WRC	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
32	Review current regulations and guidelines in place to protect riparian areas and freshwater resources	1	WRC	Section 4.2.3, Action 7 implements projects to protect and restore riparian habitat for taonga species. Action 19 refers to working with TAs during district plan reviews to ensure maintenance of indigenous biodiversity and protection of significant natural areas. Action 21 signals that the WRP (late 2015) is to include objectives, policies and methods that protect significant natural areas and other measures to maintain wetlands, puna, shallow lakes, karst systems and areas of indigenous vegetation and habitats of indigenous fauna Section 4.2.4, Action 4 implements opportunities to retire and re-vegetate upper catchment areas
33	Improve communication about the protection of fish habitat and riparian areas	3	WRC, DOC[34]	Actions outlined in Sections 4.2.2 and 4.2.3 are likely to respond to the concerns of whānau, e.g., Section 4.2.3, Action 15 to provide information and advice to landowners on the protection and restoration of biodiversity throughout the catchment; and Action 16 to provide support, advice and funding for landowners undertaking biodiversity restoration projects. The development and implementation of educational programmes to involve schools is covered in Section 4.2.6, Action 1
34	Support local whānau groups in their restoration initiatives	2	MMTB, WRA, WRC	There is a commitment to support specific restoration programmes in the WCP including Section 4.2.3, Action 15 to provide support, advice and funding for landowners undertaking biodiversity restoration projects; Action 22 to work with Ngā Whenua Rāhui to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks The development and implementation of educational programmes to involve schools is covered in Section 4.2.6, Action 1. Action 4 refers to supporting specific projects to engage tāngata whenua and the community in achieving their aspirations

[34] Under the Conservation Act 1987 the Department of Conservation has a number of functions, including the preservation of indigenous freshwater fisheries (so far as is practicable); the protection of recreational freshwater fisheries and freshwater fish habitats; and conservation advocacy.

Table 11 (continued): Loss of habitat issues (including puna, wetlands and changing shape of the river)

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
35	Restore stream habitats, create/restore lowland ponds and retrofit structures that are a barrier to passage	2	WRC, DOC, WRA	Section 4.2.3, Actions 10 and 11 refer to the identification and improvement of fish passage in the catchment. In addition to the riparian habitat actions listed previously, Actions 12 and 18 refer to investigations that will determine the potential of using lateral inundation areas and in-stream enhancement structures to improve the habitat for taonga species in the Waipā catchment
36	Investigate the levels of wetlands and security of water supply to wetlands	3	WRC	This is considered outside of the scope of the WCP and WRC suggest that this response is covered by Variation 6

4.3.4 Declining Populations of Species

"I would like to see all of the schools in the catchment involved. Schools adopt nearby streams and get Maniapoto fishermen who know how to catch/harvest various species to teach them how to do it properly."

"We want all of the kai we used to have back, including freshwater mussels. Have any surveys been done, where have they all gone?"

"We need to know how to bring all the kai species back – we need access to information."

– Wānanga, Te Kūiti, February 2014

The declining abundance and distribution of freshwater fish species was often discussed by Maniapoto whānau during the wānanga and interviews (Appendix C). The fisheries or fish species of importance included piharau, mullet, tuna, īnanga, kōaro and kōkopu (whitebait), and trout. Kōura (freshwater crayfish), kūtae/kāeo (freshwater mussel), watercress, puha and kānga wai are also important kai species. Birds like kereru and tītī, plants and trees like harakeke, tāwhara, kahikatea and miro are also highly valued species in the catchment. With the exception of trout, all of the species mentioned above are considered by Maniapoto whānau to be much less common today than they were in the past. Speirs (2001) agrees with Maniapoto whānau, and considers that while the Waipā has a good diversity of fish species, they are at very low densities, and tend to be poorly distributed in the middle and upper reaches of the river.

Without species to catch, prepare and preserve, it is more difficult for rangatahi to gain the associated technical knowledge and cultural experiences, including important connections with kaumātua. The loss of traditional fishing areas and mātauranga surrounding the species threatens the significant loss of culture. Whānau want taonga species widely distributed within the Waipā catchment in numbers that fully provide for ecological, tribal cultural and harvest values. Ultimately Maniapoto whānau want to halt population declines and prevent

any additional losses of species, particularly in the tributaries where the majority of their kai gathering activities are focused.

Whitebait in the Waipā comprises two main species, īnanga and banded kōkopu, which were mainly gathered from the mainstem of the Waipā River. The key perceived pressures on whitebait in the Waipā River catchment are poor water quality, flood control / stop banks and loss of habitat. Low water clarity during the upstream migration period is thought to be one of the causes influencing the abundance of whitebait in the Waipā River (NIWA 2010). A major factor influencing the whitebait fishery in the Waipā and Waikato Rivers is the west coast marine environment. Better knowledge of how marine conditions (especially water temperature, food supply and current movements) affect whitebait survival and distribution off the Waikato coast is required to help inform river-based management (NIWA 2010).

Tuna (freshwater eels) were intensely harvested by Maniapoto whānau throughout the catchment. Historically many pā tuna or eel weirs were constructed on the mainstem, and on the outlets of lakes and tributaries of the Waipā River. The remnants of several of these structures are still visible in the catchment (Figure 11, Appendix C). While tuna continues to constitute an important part of the contemporary diet of many Maniapoto whānau, it is not acquired in the locations, quantities or with the regularity desired. The key perceived pressures on eels in the Waipā River catchment are the loss of habitat and wetlands, including the disconnection of the river from the surrounding waterways and natural floodplains (flood control), direct and diffuse discharges/pollution (particularly from farming), commercial fishing, and pest plants and fish.

Figure 11: Remnant pā tuna structure on the Waipā River mainstem, February 2014. (Photo: Jacques Boubée).

Flooded river margins are important feeding grounds for eels and many Maniapoto whānau recounted vivid stories of harvesting tuna during flood events with their kaumātua. Tuna feed heavily on terrestrial foods in flooded marginal land (e.g., Chisnall 1987, Chisnall 2000), much of which has been lost through channelisation and flood protection works. The value of flood plains for tuna production is currently unknown and is not taken into account during flood protection decision making.

Tuna have a complex life cycle and are long-lived. As such they are a difficult fishery to manage, notably because the relative importance and interaction between habitat, recruitment, and fishing pressure have not been quantified. Furthermore, as there is no

control on the life stages of tuna while at sea, the restoration of the tuna fishery has had to rely on activities that enhance populations while in freshwater (NIWA 2010).

Piharau (lamprey) is a highly regarded delicacy for many Māori communities. In the past piharau were seasonally abundant in many New Zealand rivers and were at times taken in huge quantities. Today piharau are rare in most New Zealand rivers and very little scientific information has been collected across Aotearoa - partially because of the rarity and secretive nature of adults, as well as the lack of projects targeting this species.

In this project Maniapoto whānau identified specific locations in the catchment where piharau were/are harvested (as they congregate at natural and man-made barriers during their migration) and tributaries where they are likely to spawn, including the Moakurarua, Turitea, Ngakoaohia, Mangakara and Rangitukia Streams. Maniapoto are fortunate that they have fishermen within the tribe and wider Waipā community who still hold and continue to develop their local knowledge about piharau harvest/processing, migration routes and spawning habitats of this taonga species.

Piharau have a unique lifecycle and there are large gaps in our understanding about what they do at certain stages of it. NIWA is fortunate to be undertaking a research project that seeks to address a number of key knowledge gaps including the timing of adult spawning migrations, the chemical cues (pheromones) used by adult piharau to select spawning (breeding) streams, and the location of the spawning nests. Although predominantly based in the South Island, this research has shown that piharau migrate mainly at night but there are some movements during the day. Most of this movement is linked with high river flows and floods. The majority of fish have been found in faster flowing waters and when piharau are not migrating they tend to hide underneath large rocks/boulders within the stream. This type of habitat is normally associated with longfin tuna but are also important kōhanga areas for piharau. A male and female piharau will make a nest underneath a large boulder (Figure 12) where the male will spend seven weeks guarding and caring for the eggs.

Figure 12: Kinloch Stream, Banks Peninsula: Examples of the type of headwater stream habitat spawning lamprey seem to prefer. The yellow arrow indicates boulders where lamprey spawning nests have been located underneath. To the best of our knowledge, this is the first time lamprey spawning nests have been located in a New Zealand waterway (Photos: Cindy Baker).

If we want to restore and appropriately manage this fishery in the Waipā we need to protect and restore key habitats for each of the life stages (including spawning areas in Waipā

tributaries) and address catchment-specific knowledge deficiencies. Over the last 50 years the piharau fishery has been observed by other Waikato River Iwi to have significantly declined. In the Waikato River this has been almost solely attributed to the effects of the hydro dams (NIWA 2010). As the Waipā River is one of the few large catchments left in the Waikato that is not controlled by power generation or water storage, Maniapoto are essentially the kaitiaki of the remainder of what was once a much larger and highly prized fishery, particularly of the headwater streams necessary for spawning.

Kūtae, kāeo or **kākahi** (freshwater mussels) were talked about as once being "*being plentiful but not popular*". Freshwater mussels were harvested from a variety of locations in the Waipā catchment, particularly where it was sandy, including the Waipā mainstem, Mangapū and Te Kawa. Many whānau members have eaten kūtae "*These were gathered but not a favourite kai. There was a real reluctance by us to waste any type of kai. If it was kāeo or any other type of shellfish it was placed in water to keep a little longer*" and have observed a decline in this resource over time. The perceived pressures on this resource include pollution and the decline in water quality, particularly the associated impacts of sedimentation on the habitat of freshwater mussels.

Freshwater mussels have a complicated life cycle that relies on fish to be successful. Briefly, in summer males release their sperm into the water where it is taken in by the females to fertilise their eggs. Inside the females mantle cavity the tiny larvae develop into a stage known as glochidia (about 3 mm). In spring the glochidia are released into the water column where they attach themselves to the fins/mouth/head of fish (including kōaro, eels, bullies) using a little tooth on their shell. The glochidia are parasites on the fish until they drop off into soft, sandy sediments in lake and river beds to develop further.

Large individuals usually dominate populations and it is rare to find juvenile mussels (i.e., less than 10 mm in length). Adult freshwater mussels can live a long time, for example, populations in Lake Waipori had a mean age of 20–25 years old, with some individuals aged at over 50 years. In other locations the age has ranged from 13 years (61 mm) in Lake Taupō to 33 years (84 mm) in the Waikato River. Because they can live for a long time, the presence of residual adult populations does not necessarily indicate viable, self-sustaining populations.

Freshwater mussels are under threat and are declining worldwide (Williams et al. 1993; Walker et al. 2001). In New Zealand, recognition of the potential threats to populations is reflected in the conservation classification status as of being in "gradual decline". This decline has been attributed to the loss of habitat associated with river regulation, eutrophication, and other types of pollution, and possibly through loss of the host fish on which completion of the life cycle depends. No single impacting factor has been identified as being consistently important to the decline of freshwater mussels. Modifications to, or destruction of habitat (e.g., river regulation, eutrophication, sediment type, water quality, water velocity, the degree of sedimentation, and the angle or slope of a lake or river bed) are thought to be key drivers of this decline, affecting adult populations as well as host fish species which are essential for completion of the life cycle.

The restoration of kāeo in the Waipā River mainstem will require a targeted programme to determine the location of remaining populations coupled with research to identify factors that

are limiting or reducing the physical habitat and the recruitment of juveniles (which depend on a 'host' fish species) to it.

Kōura (freshwater crayfish) are another resource that was available to Maniapoto whānau throughout the catchment. Many people talked about how plentiful and abundant koura were in the catchment "*Quite abundant… If you could see the sand then you could see kōura crawling about. The mothers would collect kōura when their tamariki were teething. Kōura were taken home immersed in boiling water for a short time then the flesh was used to rub the gums of children who were suffering from teething. Nothing was as good as or better than this to treat teething*." This resource was collected from the range of waterway types that characterise the catchment, including the Waipā River mainstem, the headwaters "*Kōura can be found all through the headwaters*", springs and tributaries all along the river, including Ngakoaohia, Parapara, Mangapū, Mangarapa, Mangawhitikau, Mangarama, Murihakina, Waitomo and Horotea Streams.

Generally kōura populations are considered by Maniapoto whānau to be in decline in the catchment. Habitat cover (e.g., large wood, undercut banks, cobbles, and boulders) is extremely important for kōura as it provides shelter from predation and cannibalism. Kōura generally prefer pools and areas of slow or no flow. At times of heavy flooding, forested streams with stable habitat from riparian vegetation (e.g., stable banks, tree roots, and pools) provide a better refuge for kōura populations than pasture streams dominated by unstable cover items such as cobbles and macrophytes. The perceived pressures on kōura include the removal of native forest, loss of habitat, discharges from farming, sedimentation and pest plants. "*That area the Mangarapa Stream… there was plenty of kōura and holes in the bank and the logs. That river was nice and clear then. You don't have the weeds that you get now in the river. Because you could see, i kite koe i ngā kōura me ngā tuna*."

There appears to be very little information on the current distribution and abundance of kūtae/kāeo and kōura populations in the Waipā catchment. The restoration of both kūtae/kāeo and kōura will be dependent on the restoration of water quality and substrate composition.

Watercress is an important aquatic plant that was abundant and harvested throughout the Waipā River catchment, "*Watercress was very plentiful found in streams and drains surrounding the marae*." For some whānau watercress formed an important component of their staple diet. Some of the locations that watercress was/is gathered from includes the Mangapū, Mangawhitikau, Mangaokewa, Murihakina, Mangarapa and Waitomo Streams. The key pressures on watercress in the Waipā River catchment include the drainage of swamps and wetlands, water extraction and non-point source discharges (particularly farming).

Responses (Table 12)

- Describe preferred habitat and environmental conditions for taonga and kai species throughout their life cycle (particularly tuna, kōura, piharau, whitebait and kāeo).
- Assess fish habitat and water quality limitations in the Waipā catchment (e.g., associated with sedimentation, channelization and scouring of rearing habitats, lack of shade and riparian cover, and large wood removal).

- Investigate presence of contaminants (such as pesticides, herbicides, and fertilizers) in habitats and tissues of freshwater species that are important kai for Maniapoto whānau.
- Locate and evaluate barriers to adult and juvenile passage (e.g., dams, flow, temperature, water withdrawal structures, culverts, flood gates).
  - Identify priorities to maintain and improve fish passage and connectivity in the Waipā catchment.
- Develop, implement and monitor species-specific restoration projects that augment habitat of taonga species and directly address limiting factors. Evidence suggests that restorative actions for whitebait involving removal of migration barriers and restoration of headwater stream habitat would have co-benefits for piharau (and longfin eels), particularly in tributaries of the Waipā where remnant populations currently exist (NIWA 2010).
- Improve fisheries habitat by fencing riparian areas to stabilise banks and planting native vegetation that will contribute leaves and woody debris, and add shade.
- Work with landowners and the public to improve knowledge and importance of lamprey to a healthy ecosystem:
  - Using information provided by Maniapoto whānau and other methods, identify piharau spawning streams.
  - Investigate use of pheromones as means for attracting piharau adults back to key habitats.
- Develop, evaluate, implement methods for introducing adults and/or juveniles into areas where suitable habitat exists, but populations have been lost or are low.
- Support projects to control key predators / competitors where taonga fish species are most vulnerable.
- Investigate new technologies and other knowledge streams like fish farming/ranching to increase populations (and ability to access to kai).
- Use the pressure-state-response tables (Appendix C) to:
  - Identify areas within the rohe where development activities should be prohibited to protect fish and fish habitat values.
  - Identify a mosaic of areas within the rohe at the strategic scale where development activities are restricted, so as to provide core areas of habitat for a diversity of wildlife species and connectivity between them wherever possible.
- Require site level assessments prior to any development activity that has the potential to impact fish, riparian or aquatic habitat.
- Prohibit development or disturbance in any area adjacent to or within fish habitats unless impacts on fish or habitat values are eliminated, or substantially mitigated by rehabilitation of equivalent areas that are also situated within the rohe. Where

mitigation measures are undertaken, require monitoring to ensure effectiveness of these rehabilitation measures.

- Identify and pursue capacity building initiatives to expand knowledge of and capabilities for the planning and management of fish and fish habitat, including training opportunities in cooperation with agencies and commercial/industrial operators.

Table 12: Declining populations of species issues in the Waipā catchment. Summary of responses, suggested prioritisation, organisational responsibilities and links to the Waipā catchment plan.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
37	Describe preferred habitat and environmental conditions for taonga and kai species throughout their life cycle	2	WRC, MMTB	This is not in the WCP. However, this information will need to be collated to inform the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai
38	Assess fish habitat and water quality limitations in the Waipā	2	WRC, MMTB	Section 4.2.3, Action 8 will identify data deficient locations for taonga fish species in the Waipā catchment (above Toa's bridge) and implement a programme to better understand the distribution of these species. Action 9 will develop a robust fish survey method(s) for use in the Waipā mainstem and non-wadeable tributaries. The involvement of tāngata whenua in the development of this method is not specifically referred to in the WCP
39	Investigate contaminants in kai species	3	WRA, MMTB	This is not in the WCP
40	Develop, implement and monitor species-specific restoration projects	2	WRA, MMTB	Strategy 4.2.3, Action 7 to develop and implement projects to protect and restore riparian habitat for taonga species such as kōkopu, piharau, tuna and kōura; Action 12 to investigate potential of using lateral inundation areas of rivers/streams for promoting native fish productivity; Action 18 is an investigation to determine the response of indigenous aquatic species to in-stream enhancement structures Species like watercress and kākahi/kutae (freshwater mussels) are not specifically referred to in the WCP Species specific monitoring could be incorporated into the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3) and monitoring undertaken as part of Section 4.2.5, Action 6 ("monitor catchment water quality and ecosystem health including science and cultural health indicators")
41	Improve knowledge and importance of lamprey, locate and protect spawning areas	2	WRC, MMTB, DOC	This is not in the WCP. New research is required

Table 12 (continued): Declining populations of species issues in the Waipā catchment.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
42	Identify priorities to maintain and improve fish passage and connectivity	3	WRC, MMTB	Section 4.2.3, Actions 10 and 11 refer to the identification and improvement of fish passage in the catchment Collectively, the implementation of the following actions (in addition to the fish passage actions listed above) should improve connectivity and therefore increase available/accessible habitat for several taonga species: - Review priority streams/rivers with a consideration for factors such as stability, flood passages, corridor formation, water quality, in-stream habitat, access and culturally important sites (Strategy 4.2.1, Action 13) - Develop and implement a programme for the protection and restoration of Waipā wetlands, including a funding strategy, and provide incentives for protection at these sites (Strategy 4.2.2, Action 3) - Work with industry to promote stock exclusion from all waterways (Strategy 4.2.2, Action 11) - Identify additional priority indigenous habitats and potential linkages to enable a comprehensive ecological network to be managed in the Waipā catchment (Strategy 4.2.3, Action 1) - Develop and implement projects to protect and restore riparian habitat for taonga species such as kōkopu, piharau, tuna and kōura (Strategy 4.2.3, Action 7) - Investigate potential of using lateral inundation areas of rivers/streams for promoting native fish productivity (Strategy 4.2.3, Action 12) - Work with TAs during district plan reviews to ensure maintenance of indigenous biodiversity and protection of significant natural areas (Strategy 4.2.3, Action 19) - Work with mana whenua to identify cultural knowledge of flooding and its relationship with their values of rivers and streams. This may include areas that flooded historically that could be recreated as food gathering or flood retention areas (Strategy 4.2.4, Action 9) - Invite tāngata whenua and other stakeholders to review annual consented WRC river management programmes to ensure cultural and environmental values are retained and enhanced (Strategy 4.2.4, Action 10) - Develop plans to restore access, mahinga kai and other cultural uses of the awa. Customary resources are restored where access exists (Strategy 4.2.5, Action 5)

Table 12 (continued): Declining populations of species issues in the Waipā catchment.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
43	Improve fisheries habitat by fencing riparian areas to stabilise banks and planting native vegetation	2	WRC, MMTB, WRA	Section 4.2.1, Action 15 refers to the implementation of new riparian enhancement programmes along sections of the Mangapiko, Waipā and Mangapu catchments Section 4.2.2, Action 11 refers to working with industry to promote stock exclusion from all waterways, karst systems, indigenous forests, wetlands and puna. Section 4.2.3 refers to protecting / restoring indigenous biodiversity. Action 7 refers to the implementation of projects to protect/restore riparian habitat for taonga species. The key waterways to enhance include areas of the Firewood Creek, Kaniwhaniwha, Mangakara and Mangatutu catchments. Action 22 refers to work with Ngā Whenua Rāhui[35] to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks Section 4.2.4, Action 4 refers to the implementation of opportunities to retire and re-vegetate areas in the upper catchment.
44	Develop, evaluate, implement methods for introducing adults and/or juveniles into areas	3	MMTB, WRA	This is not in the WCP. The focus of the current plan is on improving habitat and connectivity for taonga species so that populations are able to increase naturally
45	Support projects to control key predators / competitors	2	WRC, MMTB, DOC, WRA	This is generally not in the plan with the exception of Strategy 4.2.3, Action 12 that will investigate potential of using lateral inundation areas of rivers/streams for promoting native fish productivity over that of exotic species
46	Investigate new technologies like fish farming/ranching	3	MMTB, WRA	This is not in the WCP. The focus of the current plan is on improving habitat and connectivity for taonga species so that populations are able to increase naturally
47	Identify areas within the rohe where development activities should be prohibited	2	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review
48	Identify a mosaic of areas within the rohe at the strategic scale where development activities are restricted	2	WRC, MMTB. DOC	This is outside of the scope of the WCP and is an issue for the Regional Plan review
49	Require site level assessments prior to any development activity	1	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review and resource consent process

[35] Ngā Whenua Rāhui is a contestable Ministerial fund established to facilitate the voluntary protection of indigenous ecosystems on Māori-owned land. http://www.doc.govt.nz/getting-involved/run-a-project/funding/nga-whenua-rahui/nga-whenua-rahui-fund/

Table 12 (continued): Declining populations of species issues in the Waipā catchment.

Response No.	Response	Priority No.	Responsibility	How responses relate to the Waipā catchment plan
50	Prohibit development or disturbance in any area adjacent to or within fish habitats	1	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review
51	Identify and pursue capacity building initiatives	2	MMTB, WRA	While capacity building is not generally covered by the plan, Strategy 4.2.6, Action 1 refers to the development and implementation of educational programmes in partnership with Enviroschools, Wai Māori and other initiatives to involve school children in understanding and caring for the Waipā catchment
52	Restoring or creating new adult tuna habitat	2	WRC, MMTB, WRA	See responses 40, 41 and 42
53	Revise tuna catch regulations	3	MPI, MMTB	This is outside of the scope of the WCP

In addition to the above the following information is drawn from the WRISS (NIWA 2010):

- Restoring or creating new adult tuna habitat within the Waipā River:
  - Most of the habitat (for tuna) on dairy farms is expected to eventually be electric fenced to exclude livestock as part of the Dairying and Clean Stream Accord. From 2002-07 riparian fencing increased from an estimated 24% to 40% of total waterway bank length (Storey 2010), with 25% of waterway length fenced on both sides. Regional averages are 45% and 33% respectively. A high % of banks remain unprotected (Waikato Regional Council 2012). Enhancing this habitat would require planting along northern banks with tall trees and shrubs.
  - Restore upstream passage for juvenile eels by overcoming man-made barriers, particularly those associated with culverts and the flood control scheme, to ensure recruits can reach the available habitats.
- Revise tuna catch regulations to maximise the return per recruit and ensure that sufficient adults reach sexual maturity (e.g., Waikato River Fisheries Bylaw 1 and Waikato River Fisheries Bylaw 5[36])

[36] http://www.wrrt.co.nz/waikato-river-fisheries-bylaw-1/ and http://www.wrrt.co.nz/waikato-river-fisheries-bylaw-5/

5 Summary

This report has described Maniapoto aspirations, values, issues and priorities for the restoration of the Waipā River. Through wānanga, questionnaires, interviews and a review of selected literature Maniapoto whānau have shared their personal experiences of the Waipā River, how it is valued and used, what resources it provides to the local and wider community, and what pressures and issues challenge the integrity and well-being of the river system and its people. Subsequently, 53 responses or actions have been suggested in this study to inform and direct future restoration actions and efforts for the benefit of the waters of Waipā River catchment and the cultural values and resources it provides Maniapoto whānau and the wider community.

The realisation of priority actions 1-4 will be shared across the multiple agencies who have responsibility for administering and managing the Waipā River. It is also expected that the Waipā catchment planning process that is currently underway will help to advance these Maniapoto whānau objectives and aspirations.

A summary of the priority 1 (urgent/immediate) to priority 4 responses, organisational responsibilities, and an indication of how the responses suggested by Maniapoto whānau link to the Waipā catchment plan are summarised in Tables 13 to 16.

Table 13: Priority 1 (immediate) responses, organisational responsibilities and links to the Waipā catchment plan.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
1	Protect the "remaining good stuff"	WRC, District Council (DC), Department of Conservation (DOC)	Section 4.2.3 refers to protecting / restoring indigenous biodiversity. For example, Action 6 in Section 4.2.3 refers to large ecologically intact indigenous terrestrial habitats and specifically lists Pirongia, Maungatautari, Kakepuku and Rangitoto ranges. Action 21 signals that the WRP (review due late 2015) is to include objectives, policies, methods that protect significant natural areas. Action 22 refers to working with Ngā Whenua Rāhui to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks Section 4.2.2, Action 3 refers to the development and implementation of a programme of protection and restoration for Waipā wetlands
2	Prohibit any further clearance of indigenous vegetation	WRC, DC	This is considered out of scope for the WCP as it will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review Section 4.2.3, Action 15 refers to the provision of advice to landowners on the protection and restoration of biodiversity throughout the catchment
21	Identify areas where development activities should be prohibited to protect water resource values	WRC, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
22	Review current regulations in statutory plans and policies	WRC, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
31	Identify wetland areas and puna within the rohe, at the strategic and landscape scales, where development activities should be prohibited to protect water resource values	WRC	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan review
32	Review current regulations and guidelines in place to protect riparian areas and freshwater resources	WRC	Section 4.2.3, Action 7 implements projects to protect and restore riparian habitat for taonga species. Action 19 refers to working with TAs during district plan reviews to ensure maintenance of indigenous biodiversity and protection of significant natural areas. Action 21 signals that the WRP (review due late 2015) is to include objectives/policies/methods that protect significant natural areas and other measures to maintain wetlands, puna, shallow lakes, karst systems and areas of indigenous vegetation and habitats of indigenous fauna. Section 4.2.4, Action 4 implements opportunities to retire and re-vegetate upper catchment areas
49	Require site level assessments prior to any development activity	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review and resource consent process
50	Prohibit development or disturbance in any area adjacent to or within fish habitats	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review

Table 14: Priority 2 responses, organisational responsibilities and links to the Waipā catchment plan.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
3	Support re-vegetation projects that "link" and provide ecological corridors	WRC, DC, DOC	Action 1 of Section 4.2.3 is to identify additional priority indigenous habitats and potential linkages to enable a comprehensive ecological network to be managed in the Waipā catchment
4	Provide technical advice to farmers	WRC	Section 4.2.1 refers to soil conservation. Action 1 refers to piloting at least 5 property/farm plans each in the Moakurarua and Kaniwhaniwha sub-catchments. Actions 1, 4, 5, 6, 25 focus on the use of farm plans to address issues. Actions 18, 24, 26 relate to the provision/promotion of advice to landowners, including Māori Multiple Owned Land Block trustees, and communities Section 4.2.2 refers to maintaining and improving water quality. Actions 1 and 2 refer to the development and implementation of farms plans in selected catchments to reduce nutrient loads. Action 9 relates to the provision/promotion of advice to landowners on methods to maintain/improve water quality. Action 11 refers to working with industry to promote stock exclusion from all waterways, karst systems, indigenous forests, wetlands and puna
6	Pilot innovations on some farms	WRC	Whānau wanted to see changed farm management practices being piloted. While the implementation of the strategies and actions outlined in the WCP should direct an improvement in current farming practises, the implementation of specific pilot innovations on farms is considered out of scope for the WCP
7	Conduct riparian health assessments for Waipā waterways	WRC, MMTB, WRA	Section 4.2.1, Action 15 refers to the implementation of new riparian enhancement programmes along sections of the Mangapiko, Waipā and Mangapu catchments. It is currently unclear what assessment processes are to be used outside of the high priority waterways identified in the WCP, and where assessments will be undertaken in the future Section 4.2.8, Action 3 refers to the development of a whole of catchment monitoring implementation plan which could include riparian health assessments
9	Encourage protection of groundwater and improved management of current landfills	WRC, Territorial Authorities (TAs)	This is considered out of scope for the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review
10	Initiate a project to work with the governors and managers of Māori land blocks	WRC	Section 4.2.1, Actions 26 and 27 relate to sharing/mentoring "best practice" and the identification and development of specific and targeted environmental programmes with Māori Multiple Owned Land Block trustees
11	MMTB to investigate a role in the development and monitoring farm management plans	MMTB, WRC	Section 4.2.1 assumes that farm plans are the vehicle for addressing a number of issues related to farming pressures. MMTB need to determine the level and type of on-going engagement they want to have in farm planning processes

(Priority 2 responses are continued on the next page)

Table 14 (continued): Priority 2 responses.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
12	Increase effectiveness of effluent management	WRC	Regulation around effluent management is outside the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review
15	Review the flood risk to marae and agree on mitigation strategies with whānau	MMTB, WRC, WRA	Section 4.2.4 relates to flood management. Actions 9 and 10 refer to working with tāngata whenua to learn from their knowledge of flooding impacts/benefits on their values. While Action 9 refers to food gathering areas specifically this could be modified to also consider marae infrastructure. The knowledge/learnings gained from Actions 9 and 10 should then inform the hazard management plan (identify hazard areas and appropriate strategies to avoid, remedy or mitigate the adverse effects) referred to in Action 11
18	Review stop banks along the river to identify instances of "informal stop banking". Whānau can identify examples where informal and ad-hoc construction adds to erosion problems	WRC	WRC advise that whānau should contact the Resource Use Directorate (WRC management team responsible for investigations and incident response) to report instances of informal stop banking On-going surveillance could also be incorporated into the development of the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3)
19	Review permitted activity status for drainage activities	WRC, MMTB	This is outside the scope of the WCP and is likely to be considered as part of the Waikato Regional Plan review (due late 2015)
20	Areas or sites of significance to Maniapoto whānau are protected and included in monitoring programmes	WRC, MMTB	Section 4.2.5, Actions 3 and 4 refer to the identification and protection of sites of cultural significance Sites of cultural significance could be incorporated into the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3) and monitoring undertaken as part of Section 4.2.5, Action 6 (monitor catchment water quality and ecosystem health including science and cultural health indicators)
24	Develop a study/programme across the catchment that monitors the use and quality of water supplies for communities and marae (e.g., using surface and ground waters (e.g., puna) in the catchment as the main source of water for washing and drinking	WRC, MMTB, Ministry of Health	The use and quality of water supplies for communities and marae is considered outside of the scope of the WCP and WRC suggest that this response is covered by Variation 6 The usage and quality of (e.g., decentralised) water supplies for marae communities could be incorporated into the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3) and monitoring undertaken as part of Section 4.2.5, Action 6 (monitor catchment water quality and ecosystem health including science and cultural health indicators)

(Priority 2 responses are continued on the next page)

Table 14 (continued): Priority 2 responses.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
26	Establish an extensive planting regime, especially along the river banks that have no vegetation at all	WRC, WRA, MMTB	Section 4.2.1, Action 15 refers to the implementation of new riparian enhancement programmes along sections of the Mangapiko, Waipā and Mangapu catchments Section 4.2.3 refers to protecting / restoring indigenous biodiversity. Action 7 refers to the implementation of projects to protect/restore riparian habitat for taonga species. The key waterways to enhance include areas of the Firewood Creek, Kaniwhaniwha, Mangakara and Mangatutu catchments. Action 22 refers to work with Ngā Whenua Rāhui to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks" Section 4.2.4, Action 4 refers to the implementation of opportunities to retire and re-vegetate areas in the upper catchment.
27	Investigate the feasibility of retirement and afforestation of steep dry stock farmland in the Waipā	WRC	Section 4.2.1, Action 23 refers to the investigation of alternative land use options, including afforestation, for areas where land use does not match capability Section 4.2.2, Action 12 signals that the Waikato Regional Plan review (due late 2015) is to include objectives/policies/methods that result in improved sustainable land management and water quality
28	Identify areas that are eroding badly and where localised engineering works are required to stabilise major earthflows (deep-seated landslides) and river bends	WRC	Section 4.2.1 relates to soil conservation. Action 2 will assess the cost benefit of establishing new soil conservation schemes in priority areas including Kaniwhaniwha and Moakurarua. Actions 4 and 6 refer to working with farmers in the Kaniwhaniwha, Moakurarua, Mangapiko, Mangapu, Mangatutu, Puniu, Waitomo and mainstem of the Waipā catchments to implement farm plans. Action 13 includes a review of priority catchments with a consideration for factors like stability and flood passage. Action 16 aims to address isolated bank erosion through bank stabilisation works, removal of obstructions and river training and improvement where appropriate. WRC consider that Action 16 is relevant across the entire catchment, including sites identified by whānau
34	Support local whānau groups in their restoration initiatives	MMTB, WRA, WRC	There is a commitment to support specific restoration programmes in the WCP including Section 4.2.3, Action 15 to provide support, advice and funding for landowners undertaking biodiversity restoration projects; Action 22 to work with Ngā Whenua Rāhui to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks The development and implementation of educational programmes to involve schools is covered in Section 4.2.6, Action 1. Action 4 refers to supporting specific projects to engage tāngata whenua and the community in achieving their aspirations

(Priority 2 responses are continued on the next page)

Table 14 (continued): Priority 2 responses.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
35	Restore stream habitats, create/restore lowland ponds and retrofit structures that are a barrier to passage	WRC, DOC, WRA	Section 4.2.3, Actions 10 and 11 refer to the identification and improvement of fish passage in the catchment. In addition to the riparian habitat actions listed previously, Actions 12 and 18 refer to investigations that will determine the potential of using lateral inundation areas and in-stream enhancement structures to improve the habitat for taonga species in the Waipā catchment
37	Describe preferred habitat and environmental conditions for taonga species	WRC, MMTB	This is not in the plan. However, this information will need to be collated to inform the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai
38	Assess fish habitat and water quality limitations in the Waipā	WRC, MMTB	Section 4.2.3, Action 8 will identify data deficient locations for taonga fish species in the Waipā catchment (above Toa's bridge) and implement a programme to better understand the distribution of these species. Action 9 will develop a robust fish survey method(s) for use in the Waipā mainstem and non-wadeable tributaries. The involvement of tāngata whenua in the development of this method is not specifically referred to in the WCP
40	Develop, implement and monitor species-specific restoration projects	WRA, MMTB	Strategy 4.2.3, Action 7 to develop and implement projects to protect and restore riparian habitat for taonga species such as kōkopu, piharau, tuna and kōura; Action 12 to investigate potential of using lateral inundation areas of rivers/streams for promoting native fish productivity; Action 18 is an investigation to determine the response of indigenous aquatic species to in-stream enhancement structures. Species like watercress and kākahi/kutae (freshwater mussels) are not specifically referred to in the WCP Species specific monitoring could be incorporated into the whole of catchment monitoring implementation plan (Section 4.2.8, Action 3) and monitoring undertaken as part of Section 4.2.5, Action 6 ("monitor catchment water quality and ecosystem health including science and cultural health indicators")
43	Improve fisheries habitat by fencing riparian areas to stabilise banks and planting native vegetation	WRC, MMTB, WRA	Section 4.2.1, Action 15 refers to the implementation of new riparian enhancement programmes along sections of the Mangapiko, Waipā and Mangapu catchments Section 4.2.2, Action 11 refers to working with industry to promote stock exclusion from all waterways, karst systems, indigenous forests, wetlands and puna. Section 4.2.3 refers to protecting / restoring indigenous biodiversity. Action 7 refers to the implementation of projects to protect/restore riparian habitat for taonga species. The key waterways to enhance include areas of the Firewood Creek, Kaniwhaniwha, Mangakara and Mangatutu catchments. Action 22 refers to work with Ngā Whenua Rāhui to restore and protect priority wetlands, lakes, under represented indigenous habitats and large intact indigenous habitats on Māori Multiple Owned Land Blocks Section 4.2.4, Action 4 refers to the implementation of opportunities to retire and re-vegetate areas in the upper catchment.

(Priority 2 responses are continued on the next page)

Table 14 (continued): Priority 2 responses.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
41	Improve knowledge and importance of lamprey, locate and protect spawning areas	WRC, MMTB, DOC	This is not in the plan. New research is required
45	Support projects to control key predators / competitors	WRC, MMTB, DOC, WRA	This is generally not in the plan with the exception of Strategy 4.2.3, Action 12 that will investigate potential of using lateral inundation areas of rivers/streams for promoting native fish productivity over that of exotic species
47	Identify areas within the rohe where development activities should be prohibited	WRC, MMTB	This is outside of the scope of the WCP and is an issue for the Regional Plan review
48	Identify a mosaic of areas within the rohe at the strategic scale where development activities are restricted	WRC, MMTB. DOC	This is outside of the scope of the WCP and is an issue for the Regional Plan review
51	Identify and pursue capacity building initiatives	MMTB, WRA	While capacity building is not generally covered by the plan, Strategy 4.2.6, Action 1 refers to the development and implementation of educational programmes in partnership with Enviroschools, Wai Māori and other initiatives to involve school children in understanding and caring for the Waipā catchment
52	Restoring or creating new adult tuna habitat	WRC, MMTB, WRA	See responses 40, 41 and 42

Table 15: Priority 3 responses, organisational responsibilities and links to the Waipā catchment plan.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
5	Investigation of alternative land uses	WRC	Section 4.2.1, Action 23 refers to the investigation of alternative land use options, including afforestation, for areas where land use does not match capability Section 4.2.2, Action 12 signals that the Waikato Regional Plan review (due late 2015) is to include objectives/policies/methods that result in improved sustainable land management and water quality
8	Support investigation of "legacy" contamination on farms	WRC, MfE	This is considered out of scope for the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai and the Regional Plan Review
13	Establish land refuse stations in rural areas	WRC, TAs	This is outside the scope of the WCP
14	Secure targeted funding from central government to provide sustainable financing of water supply and wastewater treatment infrastructure	WRC, WRA, TAs, MMTB	This is outside the scope of the WCP and is likely to be considered as part of the Waikato Regional Plan review (due late 2015)
17	Influence central government to provide long-term funding programmes accessible to smaller rural communities to enable upgrades of infrastructure	WRC, WRA, TAs, MMTB	This is outside the scope of the WCP
23	Develop and implement guidelines for instream, upstream or upslope development activities	WRC	WRC advise that best practise guidelines for these types of activities already exist[37] Improving access to existing information sources should be reiterated in actions that address improved communication, advice and mentoring of landowners and communities
25	Eliminate sewage inputs from Te Kūiti, Ōtorohanga, Te Awamutu and Waitomo directly into waterways. In the interim MMTB need to determine whether rock passage at the Ōtorohanga and Te Awamutu WWTPs is acceptable to whānau in terms of providing cleansing contact with the land	WRC, TAs, MMTB	This is outside of the scope of the WCP and will be covered by the Healthy Rivers: Plan for Change/Wai Ora: He Rautaki Whakapaipai This priority is to be revisited as and when new funding and/or technological advances become available
29	Review the willow management programme	WRC	This is not currently covered by the WCP. WRC anticipate conducting research in the Waihou catchment (where large scale willow removal is underway) to investigate the impacts of this activity on aquatic life and water quality. New Zealand Landcare Trust and Waikato Raupatu River Trust are currently completing a WRA-funded project developing guidelines for willow and alder management within the catchment[38]

(Priority 3 responses are continued on the next page)

[37] For example, Best Practice Guidelines for Vegetation Management and In Stream Works (http://www.waikatoregion.govt.nz/PageFiles/5677/tr0741.pdf) (Gibbs 2007).
[38] http://www.makearipple.co.nz/Action-groups/ripples/Best-Practice-Guidelines/

Table 15 (continued): Priority 3 responses.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
42	Identify priorities to maintain and improve fish passage and connectivity	WRC, MMTB	Section 4.2.3, Actions 10 and 11 refer to the identification and improvement of fish passage in the catchment Collectively, the implementation of the following actions (in addition to the fish passage actions listed above) should improve connectivity and therefore increase available/accessible habitat for taonga species: - Review priority streams/rivers with a consideration for factors such as stability, flood passages, corridor formation, water quality, in-stream habitat, access and culturally important sites (Strategy 4.2.1, Action 13) - Develop and implement a programme for the protection and restoration of Waipā wetlands, including a funding strategy, and provide incentives for protection at these sites (Strategy 4.2.2, Action 3) - Work with landowners to promote stock exclusion from all waterways (Strategy 4.2.2, Action 11) - Identify additional priority indigenous habitats and potential linkages to enable a comprehensive ecological network to be managed in the Waipā catchment (Strategy 4.2.3, Action 1) - Develop and implement projects to protect and restore riparian habitat for taonga species such as kōkopu, piharau, tuna and kōura (Strategy 4.2.3, Action 7) - Investigate potential of using lateral inundation areas of rivers/streams for promoting native fish productivity (Strategy 4.2.3, Action 12) - Work with TAs during district plan reviews to ensure maintenance of indigenous biodiversity and protection of significant natural areas (Strategy 4.2.3, Action 19) - Work with mana whenua to identify cultural knowledge of flooding and its relationship with their values of rivers and streams. This may include areas that flooded historically that could be recreated as food gathering or flood retention areas (Strategy 4.2.4, Action 9) - Invite tāngata whenua and other stakeholders to review annual consented WRC river management programmes to ensure cultural and environmental values are retained and enhanced (Strategy 4.2.5, Action 10) Develop plans to restore access, mahinga kai and other cultural uses of the awa. Customary resources are restored where access exists (Strategy 4.2.4, Action 5)

(Priority 3 responses are continued on the next page)

Table 15 (continued): Priority 3 responses.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
33	Improve communication about the protection of fish habitat and riparian areas	WRC, DOC	Actions outlined in Sections 4.2.2 and 4.2.3 are likely to respond to the concerns of whānau, e.g., Section 4.2.3, Action 15 to provide information and advice to landowners on the protection and restoration of biodiversity throughout the catchment; and Action 15 to provide support, advice and funding for landowners undertaking biodiversity restoration projects The development and implementation of educational programmes to involve schools is covered in Section 4.2.6, Action 1
36	Investigate the levels of wetlands and security of water supply to wetlands	WRC	This is considered outside of the scope of the WCP and WRC suggest that this response is covered by Variation 6
39	Investigate contaminants in kai species	WRA, MMTB	This is not in the plan
44	Develop, evaluate, implement methods for introducing adults and/or juveniles into areas	MMTB, WRA	This is not in the plan. The focus of the current plan is on improving habitat and connectivity for taonga species so that populations are able to increase naturally
46	Investigate new technologies like fish farming/ranching	MMTB, WRA	This is not in the plan. The focus of the current plan is on improving habitat and connectivity for taonga species so that populations are able to increase naturally
53	Revise tuna catch regulations	MPI, MMTB	This is outside of the scope of the WCP

Table 16: Priority 4 responses, organisational responsibilities and links to the Waipā catchment plan.

No.	Response	Responsibility	How responses relate to the Waipā catchment plan
16	Raise awareness within the community of the need for sustainable financing of infrastructure	WRC, WRA, TAs, MMTB	This is outside the scope of the WCP and is likely to be considered as part of district planning processes
30	Work with the harbourmaster to address issues of water users entering the navigable part of the Waipā	WRC	This is outside of the scope of the WCP. The WRC Navigation Safety Bylaw 2013[39] covers all navigable waterways in the Waipā catchment. It sets out safe practices for people using the lakes, rivers and harbours for water skiing, swimming, boating, kayaking or other water activities safely, by seeking to reduce the conflicts between different activities. The Council may suspend any provision of this bylaw or exempt any activity from any provision of this bylaw

[39] http://www.waikatoregion.govt.nz/PageFiles/6773/Nav_Safety_2013_bylaw_web.pdf

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Appendix A Maniapoto Special Project Plan

Table A-1: Project plan for Phases 1 to 4 of the Maniapoto Special Project (courtesy of MMTB).

Phase	Activity	Deliverable	Due date	Organisations involved
Phase 1 – Clarify the WRISS outcomes in terms of the Waipā River Catchment	Coordinate NIWA to present WRISS outcomes for Waipā River catchment at technical meeting.	Preliminary WRISS presentation complete and feedback provided	Aug 2013	MMTB, NIWA, Waikato Regional Council (WRC)
	Determine next steps regarding NIWA's presentation.	A way forward is determined	Sep 2013	MMTB, NIWA
	Raise potential risk to the Maniapoto Special Project with MfE	Meeting held with MfE	Sep 2013	MMTB, MfE
	Engage NIWA to provide costs to: ▪ Clarify the WRISS outcomes in terms of the Waipā River catchment. ▪ Develop a Waipā River model which includes identifying priority areas and the costs to achieve the priority areas (NIWA Comment - Note that due to resourcing constraints a Waipā River-specific model was not developed during this project. Where appropriate Waipā-specific information identified in the WRISS, as a component of the model developed for the Waikato River, was used to inform this report). ▪ Facilitate wānanga and outcomes that determine Maniapoto values, mātauranga Māori, and our relationship to the river, issues, concerns, aspirations and priorities. ▪ Collate information from wānanga and report on outcomes.	Costs identified and project plan complete	Oct 2013	MMTB, NIWA
	Formalise contract with NIWA.	Contract signed	Oct 2013	MMTB, MfE, NIWA
	Confirm WRC's contribution in terms of addressing water quality, biodiversity and soil conservation issues, ground truthing the risk map model with farmers (6) and engagement with the community as per below.	Scope of WRC contribution clarified	Oct 2013	MMTB, WRC
Phase 2 – Maintain key datasets relating to the Waipā River catchment (stakeholders, capability building initiatives) in collaboration with councils	Source datasets from WRC every quarter to identify any significant changes: ▪ Identification of "hot spots" requiring attention. ▪ Identification of land ownership, land owners and land utilisation in the Upper Waipā River catchment. ▪ Identification of waterways that are fenced and planted and those that are not. ▪ Stocktake of resource consent i.e., water-take and discharge permits.	Regularly monitor the Waipā River catchment	Nov 2013 Feb 2014 May 2014 Aug 2014	MMTB, WRC

Phase	Activity	Deliverable	Due date	Organisations involved
Phase 3 – Determine priority activities for the Waipā River and agree on any further costing work required amongst key stakeholders	Coordinate wānanga 1	Wānanga 1 held	Nov 2013	MMTB, NIWA, WRC
	Coordinate wānanga 2	Wānanga 2 held	Feb 2014	MMTB, NIWA
	Coordinate wānanga 3	Wānanga 3 held	April 2014	MMTB, NIWA
	Coordinate community meeting 1	Community meeting 1 held	Dec 2013	MMTB, WRC
	Coordinate community meeting 2	Community meeting 2 held	Feb 2014	MMTB, WRC
	Coordinate community meeting 3	Community meeting 3 held	April 2014	MMTB, WRC
	Work with WRC to engage farmers	Engagement with farmers complete	Feb 2014 Apr 2014	MMTB, WRC
	Collate information from wānanga and report on outcomes that determine Maniapoto values, aspirations, mātauranga Māori, our relationship with the river, issues, concerns and priorities	Report complete	May 2014	MMTB, NIWA
Phase 4 – Procure independent cost assessments	Analyse the wānanga and community meeting reports and information with a view to confirming priority activities and identifying five projects that contribute to the priority activities	Analysis of reports complete	June 2014	MMTB, WRC
	Contract personnel to provide costs for the delivery of up to five projects identified in phase 3	Quote provided and costs identified for the delivery of up to 5 projects	June 2014	MMTB, NIWA
	Contract personnel to provide costs for any priority activities identified in phase 3 that have not yet been costed in the WRISS	Quote provided and costs identified for any priority activities identified in phase 3 that have not yet been costed in the WRISS	June 2014	MMTB, NIWA

Appendix B Questionnaire

Maniapoto Māori Trust Board

Ka pūwaha te tai nei, hoei tahi tatou

Maniapoto Special Project

Activity 1 – Short Questionnaire

In the spaces 1 to 5 below, please identify five sites of importance to you, and describe why these sites are important (e.g., pā tuna, piharau, watercress, ceremonial site, rongoā site, etc)

1) _____

_____

_____

2) _____

_____

_____

3) _____

_____

_____

4) _____

_____

_____

5) _____

_____

Please turn over

Te Keeti Marae, 30 November 2013 1

Have you seen any changes in the health or condition of these sites over time? (e.g., less tuna, can't get access, sewage outfall, water dirty, etc)

1)

2)

3)

4)

5)

Thank you, please hand this back to one of the NIWA or Maniapoto Māori Trust Board staff when you have finished

Appendix C Summary Pressure-State-Response Tables

The methods of data collection resulted in a considerable quantity of raw data being gathered, and data from a variety of sources had to be systematically analysed. After the kōrero from the questionnaires, wānanga and interviews were transcribed the information was collated using a modified pressure-state-response framework (other examples of use include OECD 1999 and Rapport & Singh 2006).

The pressure-state-response model has proven useful as a way to help Waikato River Iwi communicate and describe the changes they have seen in the Waipā and Waikato catchments (as was done during the WRISS) in a framework that is familiar to many of their catchment management colleagues. This framework is also useful to help group the diverse and in-depth knowledge contributed by Maniapoto whānau in a manner that is searchable for other purposes (e.g., Maniapoto Fisheries Management Plan).

Key themes were also used to help label (e.g., KAI, WAI, SWIM, SIGNIFICANT SITE, TAONGA SPECIES & MATERIALS) the site specific kōrero summarised on digitised spatial maps so that these locations can be traced back to the more detailed information contributed by whānau in the following pressure-state-response tables. Where whānau identified specific pressures impacting the health and wellbeing of the Waipā River these were also labelled (e.g., PRESSURE 1) on the digital map.

The text in the following six tables (Tables A-1 to A-6) has been contributed by Maniapoto whānau during the wānanga and one-on-one interviews (held between November 2013 and May 2014) and is expressed as much as possible “in their own words”. The way that the knowledge contributed by whānau has been categorised in this pressure-state-response table has been completed by the project team and not all categories are populated, for example, in many instances where whānau talked about their response(s) to resolve the impacts they identified they meant this to be associated with multiple descriptions of “state”; however, for the purposes of this summary we have generally only included this kōrero once. Please note that Source 1, 2, 3 is used to indicate a change in the person contributing information about a particular location (i.e., is not the same person).

For a more detailed account of the knowledge contained in these tables please see the excel database and transcripts held by the Maniapoto Māori Trust Board.

Table C-1: Freshwater species harvested for kai – Summary of the knowledge contributed by Maniapoto whānau. (To be read in conjunction with the spatial information contained in Appendix D, labelled KAI).

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
Not marked on map, general	Waipā River catchment	**Kōura**. (Source 1) Used to be a lot of kōura; (Source 2) Kōura were plentiful, cooked on site never taken home; (Source 3) Very plentiful; (Source 4) Were quite abundant, if you could see the sand then you could see kōura crawling about		
Not marked on map, general	Waipā River catchment	**Kāeo.** (Source 1) Were plentiful but not popular; (Source 2) These were gathered but not a favourite kai. However, there was a real reluctance by [Interviewee's] father to waste any type of kai		
Not marked on map, general	Waipā River catchment	**Tuna**. (Source 1) Used to catch a lot of tuna, there were so many you were standing on them. Very plentiful. The white tuna was considered a delicacy; (Source 2) There is not a lot of kai anymore. Used to be plentiful and large (size) but no longer. We still have tuna, but stocks are low; (Source 3) Tuna were very plentiful during [Interviewee's] youth all along the Waipā River. After the experiencing a flood [Interviewee's] kuia would go outside knowing that tuna would be lying in the hollows on the land. (Source 4) Some big tuna frequented the clay bank in the middle of the Waipā River. Otherwise eels were caught from any part of the bank along the river	**Wetland drainage, flood control, deforestation, pollution, access, convenience/life style.** (Source 1) Pollution has depleted the fish; (Source 2) Many hapū have discontinued customary harvesting practices from the river and streams throughout the rohe, such as eeling and white baiting. More convenient, a lot easier to buy it from the store; (Source 3) Wetlands at Mangarapa have been drained; (Source 4) No tuna holes. All the natives have been removed and there is no protection; (Source 5) Water flow has dropped; (Source 6) Fisheries are no longer there. 1958 flood then the stop banks were put in. Since the stop banks went in the fisheries have suffered; (Source 7) No kai anymore. No access, on private farms	**Re-establish lost species, fish farms, access to knowledge, leadership and communication** (Source 1) If the river is clean the kai will come back. It is most important that we see kai gathered from the river back on the marae again. Involve/use new technologies and other knowledge streams like fish farming. We need to be inclusive so that we are all working together around the same table
KAI 1–KAI 5	Waipā River	**Pā tuna**. (Source 1) Remnant pā tuna structures (photos taken Feb 2014)		
KAI 6	Ngakoaohia Stream	**Kōura, piharau**. (Source 1 & 2) Kōura and piharau were caught in the Ngakoaohia Stream		
KAI 7	Ngakoaohia Stream, Moakurarua Stream	**Pā tuna**. (Source 1 & 2) Pā tuna located near the mouths of the Moakurarua and the Ngakoaohia Streams. Pā tuna remnants along the west side of		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		the Waipā are still there today and are visible during drought or when the river is low. When these pā tuna were discovered, lands were taken by the Crown from the Whakairoiro Block to be a reserve and it was subsequently renamed Ngā Mahanga with the intention of protecting them. Access to these pā tuna were via Candy Rd on the east side of the Waipā River		
KAI 8	Waipā River (Ōtorohanga)	**Tuna**. (Source 1) Used to set hīnaki there, we caught a lot of tuna. (Source 2) Used to set hīnaki down by the Lakes Butchery outfall that drained into the Waipā River. Tuna would gather at the bottom of this outfall to feed on the offal. Caught a lot of tuna in this area; Tuna also very plentiful near Te Kōpua, Ouruwhero and the Te Kāwa swamps	**Drainage, farming practises.** (Source 1) We were cutting them [the tuna] aye, because they were inside the bank. It was a wrong thing to do because what was happening is we were collapsing the banks aye, because the vegetation was being cut away. But the pakeha's wanted it to be cut away because they reckoned that the water would flow quicker for the main	
KAI 9	Mangawhero Stream (Kakepuku)	**Pā tuna, piharau**. (Source 1) Pā tuna located near Te Kāwa Maunga in a swamp approximately an acre in size. (Source 2) Pā tuna located below the western flank of Kakepuku Maunga, near the Kakepuku 8C Block and after Morgan Rd before the bridge near Te Kopua on the Mangawhero Stream approximately 8 acres in size. Another pā tuna at the confluence of the Mangawhero Stream and the Waipā River. This information is held in the memories of local kaumātua but is also recognised in the Māori Land Court - the historical significance of these pā tuna at Te Kōpua. Hapū from the surrounding area would set up temporary camps when the tuna or piharau were running / migrating on the Mangawhero		
KAI 10	Turitea Stream, Moakurarua Stream	**Piharau**. (Source 1) Had little waterfalls on Turitea Stream that piharau used to climb up, this was a gathering spot. [Name] used to catch them. His father would ask his mother to prepare a fire when he left in the morning, and that's how they'd know he was going to get piharau. They would put them on top of the hot embers. Haven't eaten them since I was a boy. Don't know if there are any there still		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		today; (Source 2) The piharau also branched off the Moakurarua and up the Turitea Stream making their way up the waterfall using their suckering mouthparts to climb it. This is near the Ngā Tapuwae Catchment where they would spawn in the puna		
KAI 11, PRESSURE 43	Waitomo Stream	**Tuna, kōura**. (Source 1) Tuna are still present but not plentiful and are the main taonga species for Ngāti Uekaha that is expected to be seen on their tables. Kōura are still present but not plentiful like in [Interviewee's] youth; (Source 2) During [Interviewee's] childhood these rivers were a lot broader, deeper and still pristine. They still had a lot of vegetation (mixture of native, willow and poplar) along the banks. The clarity of the rivers and streams was excellent. [Interviewee] said that you could see kōura and tuna very clearly; [Interviewee] harvested from the Mangapū, Waihohonu, Orāhiri and Waitomo Rivers. Kōura were very plentiful	**Commercial eeling, farming, pest weeds**. (Source 1) Commercial tuna fishers have gone through the Waitomo Valley waterways and overfished the resource. The stream life has been observed to have changed dramatically since the commercial fishers went through and fished it out. It has never recovered since then; (Source 2) Much of the habitat in the surrounding streams near Pōhatuiri has been degraded due to farming; (Source 3) There were no weeds like today	**Vision, unity, relationships, building capacity, fencing**. (Source 1) Ngāti Uekaha are worried about impacts on their taonga species. Ngāti Uekaha are no longer able to catch, cook and feed their manuwhiri, let alone themselves, and feel a deep sense of loss and frustration especially that their own tamariki and mokopuna will not know, understand or get to practice the ancient way of gathering kai. Key actions that need to be put in place include: Unify Ngāti Uekaha first and foremost to work together as one to achieve the vision; Look at setting up training courses to educate Ngāti Uekaha to look after their natural resources; Fence off of the waterways to stop stock getting in and complete riparian planting with funding from WRA to get it kick started. The key challenges to overcome include: For Ngāti Uekaha only focusing on the Waipā Tributaries is very difficult thing to do as they have always viewed all the surrounding waterways as one, not separate identities. All the waterways need to be taken into account and treated as one entity; To ensure that other hapū members of Ngāti Uekaha are supportive and to educate those who are not or do not care to become proactive about their taonga tuku iho; Creating relationships with other parts of the Waitomo Valley community

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
				especially the Farming and Tourism sector, and most importantly WDC and WRC
KAI 12	Waipā River, Tarewaanga Stream (Ōtorohanga, Red Bridge)	**Īnanga, kūtae/mussels**. (Source 1) Used to get a lot of īnanga. Used two manuka poles with scrim netting. Don't go fishing anymore. The reach for catching īnanga was approximately 3-4 miles. (Source 2) Used to be able to get kūtae/mussels from around red bridge; (Source 3) Where we filled barrels of water, got kōura, īnanga, tuna and piharau. Caught īnanga on the Waipā River near Te Kāwa Street and then fished all the way along the river to Tarewaanga Stream, just below the Ōtorohanga College close to Kakamutu Rd. (Source 4) Īnanga, known as Moremore. Very plentiful during certain times of the year. Rawaru, bigger than an adult Moremore was black and had a big mouth. Was caught and used as a feed for the chooks	**Flood control, sedimentation** (Source 1) The impact of taking those bends out of the river changed the flow of the water. This was a big disadvantage. (Source 2) Was sandier then, now all muddy and no kūtae. (Source 3) None (īnanga) since the stop banks. Still the same volume of water here, but not the same quality	**Re-establish lost species, access to knowledge, intergenerational knowledge transfer**. (Source 1) We want all of the kai we used to have back, including freshwater mussels. Have any surveys been done, where have they all gone? We need to know how to bring all our kai species back - need access to information; I would like to see all of the schools in the catchment involved. Schools adopt nearby streams and get Maniapoto fishermen who know how to catch/harvest various species to teach them how to do it properly
KAI 13	Waipā River (Ōtorohanga, Kahotea)	**Mullet, tuna, īnanga, kānga wai, watercress**. (Source 1) Used to catch mullet here; (Source 2) Īnanga were plentiful here. Still get tuna but there are not the stocks that used to be there. Used to collect eels from the paddock after river flooded. (Source 3) A fire was always going for the purposes of cooking any kai for the local whānau living here at the marae. [Interviewee] never waited for her mother to cook kai for her and her siblings, she did it herself. No fridges in her youth. They either pawhara (dried) or smoked the eels. Very rarely boiled them. Essentially the Kahotea Marae community lived on a hill that was located amongst a vast wetland, a lagoon with the Waipā River running through it. So kai was not difficult to come by. Mullet were very plentiful at certain times of the year. Were also caught near the Ōtorohanga township. Watercress was very plentiful found in streams and drains surrounding the marae. Corn was put in a hessian sack and left in running water; (Source 4) [Name] used to catch mullet out of the Waipā River near Kahotea along the Kāwhia Rd;	**Rubbish**. (Source 1) River gets full of rubbish from people dumping stuff in there and logs - making it unsafe	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		(Source 5) Watercress and many other foods that were common in the catchment are now depleted		
KAI 14	Waipā River	**Tuna, kōura, kāeo, kānga wai.** (1) Tuna, kōura and kāeo in this stretch; (2) There used to be spots all along the river where we could set our hīnaki and prepare our kānga wai	**Water quality.** (Source 1) Can't even see under the water now	See KAI 12
KAI 15	Tunawaea Stream	**Tuna**. (Source 1) Seeding area for tuna		
KAI 16	Mangapū River	**Tuna**. (Source 1) When the river used to flood, they were able to catch tuna that had been pushed onto land. Grandmother used to go down to the paddocks (at night) to search pools of water that would have tuna in them; (Source 2) Caught tuna along the northern most section of the Mangapū River; (Source 3) Harvested from the Mangapū, Waihohonu, Orāhiri and Waitomo Rivers. Used spearing, bobbing (with muka and huhu grubs for bait), hīnaki, torching (rama tuna). Used the spear when the flats below near the Mangapū would flood, the tuna would be left within the holes. The hīnaki would be too heavy to pull up by his own. The drains would be full with tuna. [Interviewee's] grandmother would take the mokopuna down to the river to bob for tuna. She did this religiously to instil the practise and skill at catching tuna. [Interviewee] would catch and cook tuna on the spot. A lot of eels in the Mangapū and I'm talking about 1940s; (Source 4) Tuna was sourced from the Mangapū	**Flood control, land runoff**. (Source 1) Runoff from the land. Straightening of the Mangapū after 1958 floods. One of the major changes after this flood came at the concrete bridge, where the skate park is now. The Mangapū used to flow under here, it used to flow below the factory. At this bridge you used to be able to look straight up the old Mangapū riverbed. That's what I miss seeing	
KAI 17	Waipā River	**Tuna**. (Source 1) Tuna used to be spread all of the way through the catchment up to the headwaters		
KAI 18	Waipā River	**Kōura**. (Source 1) Kōura can be found all through the headwaters		
KAI 19	Waipā River	**Īnanga**. (Source 1) Used to be able to catch īnanga in the river by Toa Bridge		
KAI 20	Waipā River	**Piharau**. (Source 1) Used to get piharau here		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
KAI 21	Mangawhero Stream (Kakepuku)	**Tuna, watercress**. (Source 1) Used to be an eel farm; (Source 2) Watercress very plentiful, found in streams and drains on the western side of Kakepuku mountain near Kohatutapu on Kakepuku Rd	**Wetland drainage, farming practises**. (Source 1) Pākehā had created a main drain that received all the surrounding water from Te Kāwa and Kakepuku Maunga including the swamp situated between both maunga. The main drain was connected to the Mangawhero Stream that flowed out into the Waipā at Te Kōpua	
KAI 22	Waipā River	**Tuna, kāeo, īnanga, watercress**. (Source 1) Used to be a swimming hole and fishing spot - tuna, kāeo, īnanga; (Source 2) Tuna very plentiful near Te Kōpua, Ouruwhero and the Te Kāwa swamps; (Source 3) The kuia from the Te Kōpua community would catch tuna in a variety of ways (bobbing, hīnaki, rama torch, ripi). The first tuna were released back into the river. Hīnaki were used in the streams that ran into the Waipā and were set during a flood and in pools of water on the flat below the marae after a rainstorm. Kōura were plentiful. Kāeo were plentiful, but not popular. Would notice īnanga darting about amongst the soap suds when washing clothes in the river. Watercress also found along the Waipā where there were log jams. Watercress would grow in these conditions until the next flood event	**Land use change, deforestation**. (Source 1) Used to be all scrub and bush, now all farm land	
KAI 23	Waipā River	**Tuna**. (Source 1) Town water supply upgraded in August 2013. Tuna are caught at the weir now, much easier to catch them here - not sure if that's a good thing?	**Fish passage, flood control.** (Source 1) Fish passage was installed, but people are collecting the fish before they pass; (Source 2) When stop banks were put in and waterway courses were changed diverted our food sources disappeared - piharau, kōura, mussels, tuna. Some places were left with no water at all	
KAI 24	Ngakoaohia Stream and tributaries	**Tuna**. (Source 1) There were a lot of tuna present in the small tributaries from our farm that ran into the Ngakoaohia	**Sedimentation, flood control, access, algae, pest weeds, willows**. (Source 1) Changes that are occurring are the sediment flows and build-up of sediment, flooding of land including the lower parts of the urupā, and in parts the access to the river is now limited by the farmer’s fencing (which is a	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			good thing in terms of animals in the waterway). There is a lot of algae and periphyton which I don't know if that was always there or is something that has just built up in the drier summers. There is also oxygen weed growing but I don't know if it is invading further or not. Willows are causing problems by blocking the awa during flooding and also by changing the course of the water and causing banks to erode	
KAI 25	Mangaiti Stream, Ngakoaohia Stream	**Kōura**. (Source 1) There are sites near Mangaiti Stream that had kōura when I was younger	See KAI 24	
KAI 26	Mangarapa Stream (Hangatiki)	**Tuna, kōura, kāeo, watercress**. (Source 1) Every weekend would go out eeling with whānau along the banks of the Mangarapa River during the summer months. Would never travel further north away from their stretch of the Mangarapa River because that belonged to another whānau. During those times local farmers didn't mind [Interviewee] and the other kids crossing their farms to access the river for eeling or getting watercress for kai. They would camp alongside the river bank, light a fire and throw the tuna on the embers or put a billy on and boil the tuna with watercress. Eels would be found at the base of willow trees near the river bank. An abundance of kōura as well in holes within logs or under banks. "That river was nice and clear then". Plenty of kāeo in the area but did not eat them. No piharau, īnanga or goldfish; (Source 2) A source of tuna and kōura. From the old farm to Rereamanu you could get watercress all along the river	**Trout, access, willow, sedimentation, pest weeds, wetland drainage, deforestation, farming practises**. (Source 1) You don't have the weeds that you get now in the river. Because you could see "kite koe ngā kōura me ngā tuna". Farmers in recent times have stopped this access and therefore this practice from continuing. Trout viewed as a nuisance species. Streams and rivers have become a lot narrower due to many farmers not fencing off the access to rivers and streams contamination by stock has been detrimental to river quality. A lot of silting up of the river and streams clearly evident. More exotic weed clogging up the river ways. Lack of sufficient habitat for the tuna and kōura. All low lying lands or wetland areas are all gone due to extensive draining. A lot of bush has been cleared, mainly kahikatea, especially in the swampy low lying areas. These areas are drained and are now replaced with willow. The removal of the native bush from the banks of the rivers and streams seem to be a major reason why tuna numbers are so low these days; (Source 2) Wetlands have been drained in the	**Eliminate runoff, remove trout, plant riparian areas, create habitat for tuna. Priority areas are Maniapoto's Cave and Opārure** (Source 1) [Interviewee] would actively seek to remove trout from the river. Investigate why the river flow of the Mangarapa is so sluggish these days compared to when [Interviewee] was a youngster; and determine how it can be rectified. [Interviewee] would also like a river restoration project to be implemented including planting of the riparian strips, "and maybe the planting of riparian strips whether the roots go into the water or not, because you need those places for tuna to go into to..." Give Maniapoto's Cave where the quarrying going on priority. The same up at Opārure. Actions that need to be put in place include: ensure that runoff into the river is eliminated; planting of riparian strips; and create habitat for tuna. Challenges or barriers to overcome include: availability of funding

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			Mangarapa. There are no kōura, no more watercress	for the tributaries (i.e., Mangarapa) and the negative attitude of dairy farmers
KAI 27	Murihakina Stream	**Tuna, kōura, watercress**. (Source 1) Occasionally would go to the Murihakina River. Access was via a farmer's property. Most of the tuna caught would be brought back to the homestead, cleaned and either pawhara them or cooked. Tuna, kōura and watercress were staple kai during [Interviewee's] youth. All the streams and rivers were reasonably wide and deep, without much weed and also very clear, so clear that you could see where the tuna and kōura were hiding; (Source 2) At Murihakina, top end of the Mangapū, are eels and caves	**Water quality.** (Source 1) Can't even see under the water now	
KAI 28	Mangapū River	**Tuna, pā tuna, kōura, kāeo.** (Source 1) Pā tuna were further downstream (of Mangarapa). Twelve pā tuna are still in existence near Rereamanu Marae; (Source 2) Kāeo were very plentiful. Were boiled after being left to sit in fresh water to ensure that they were clean to eat - not too popular; and there was a lot of kōura	**Deforestation**. (Source 1) No tuna holes, all of the natives have been removed and there is no protection. Water flow has dropped	
KAI 29	Mangaokewa Stream	**Tuna, watercress, puha.** (Source 1) Hangatiki was known as the main source for tuna in the area. Watercress and pūhā were very plentiful in the Hangatiki area. Much of the tuna, kōura and kāeo that were in high numbers in [Interviewee's] youth are now in a dilapidated state, reflective of the current health of the rivers in the Hangatiki area, which look more like a drain	**Flood control, deforestation, water extraction.** (Source 1). The river to me was wider than it is now. It looks like a drain now...not only I say that, my nephews too, because they used to swim in that river and they say it's not the same anymore. I don't know where all the water is going, whether they're irrigating upstream or not... but it's certainly a lot different now, and it's been cleared of all the… and straightened up in parts	
KAI 30	Mangapū River	**Tuna**. (Source 1) Ōtōkā ika fished for tuna by the rock at the bottom of Opārure Marae. "I caught a hairy eel out of here...a barking hairy eel"; ...it's a good place to keep breeders, they're endangered out there…		**Protect large female tuna, areas for kai species, tuna farming**. (Source 1) "there are lovely little spots that we could have a tuna farm, we could have a cage in there and have our own tuna, we could have a couple of pools of kōura, we could have a couple of

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
				watercress patches… because we're going to alter it anyway… the willows have already altered it… and if we want to get rid of the willows that kind of leaves us in a bit of a position where we can like landscape the awa
KAI 31	Mangawhitikau Stream	**Tuna, kōura.** (Source 1) Stream comes in from the bottom of Motītī, has a stony bottom. Got tuna and kōura from here		
KAI 32	Parapara Stream	**Tuna, kōura.** (Source 1) About a kilometre up the Parapara Stream [Interviewee] came across an extremely huge tuna with white tusks, horns or whiskers. He viewed this as a taniwha. [Interviewee] used spears or gaffs to catch eels mainly along the Parapara Stream. The sides of banks of Parapara Stream were quite steep in places. You could easily walk upright underneath the bridge, which had a concrete culvert. This culvert during late spring early summer it would be absolutely covered (including the sides), a moving mass, and a silver carpet of elvers making their way upstream. You couldn't see any concrete or bank at all as it was a writhing silvery carpet. Accompanied sharemilkers if they were in to eeling. Never smoked them but roasted or cooked them with milk. [Interviewee] and his whānau never relied on it, it was treated as a luxury. Kōura were plentiful. [Interviewee] used to walk along the river and pull them out of the bank to eat. No kāeo, piharau, kōkopu, trout, goldfish observed		**Engagement with the Awa (e.g., cycle ways), acknowledgment of sites of significance**. (Source 1) Protect the Waipā River. The Waipā River is an important resource for future generations so that they are able to drink the water, fish from the rivers, that it sustains life for fish, tuna, and kōura. So that they [future generations] can have a strong sense of pride and identity - knowing where you are from. More needs to be done to enhance the association of the community with the river, including putting in cycle tracks along the stop banks and more/much better acknowledgement of sites of significance
KAI 33	Te Kāwa Swamp	**Tuna, kāeo.** (Source 1) Tuna very plentiful near Te Kopua, Ouruwhero and the Te Kāwa swamps; Evidence of kāeo near Te Kāwa through to Keukeu but only the shells (shell midden?) but [Interviewee] remembers seeing kāeo in the Te Kāwa swamp, not in the river. A black freshwater mussel		
KAI 34	Puniu River	**Tuna**. (Source 1) The last time [Interviewee] can remember anyone catching tuna in the area within		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		the last ten years was his relations from Auckland. They caught 8 tuna off the Puniu River using a gaff		
KAI 35	Moakurarua, Turitea, & Oamaru Streams	**Piharau.** (Source 1) [Interviewee's] father would get some piharau from a man who caught them on the Moakurarua Stream. Piharau swam up the Moakurarua Stream and up into the Waitomo Valley near Te Anga and Hauturu to spawn; (Source 2) Piharau was an important kai and was mainly sourced from the Moakurarua Stream and its tributaries (Oamaru). Not seen much these days, piharau numbers have dropped immensely (Source 3) Used to fish for piharau using fern. Piharau would swim up and attach to the fern		**JMA to provide leadership and guidance, work schemes, planting riparian areas. Priority areas are river banks that have no vegetation at all and tributaries.** (Source 1) Whānau have already started restoration work on the Moakurarua Stream. [Interviewee] would like the JMA to assist their efforts cleaning up the streams that border their land blocks. Key priorities include: Focus on the tributaries first not the Waipā River; Establish work schemes like the PEP schemes in the 1980's targeting unemployed Māori youth to clean the tributaries; JMA need to provide leadership and guidance with Māori owners; Establish an extensive planting regime especially the river banks that have no vegetation at all
KAI 36	Mangarama Stream	**Kōura**. (Source 1) Caught the female and juvenile kōura from the bottom of the farm		**Kōura translocation and harvest strategies.** (Source 1) Caught the female and juvenile kōura from the bottom of the farm and transferred them to the top of the stream, they did this to regenerate the population and also because they kept the dams clean. Only ate the males
KAI 37	Mangapū River	**Watercress**. (Source 1) Watercress patch for the whānau (Source 2) Watercress patch located near [person's name] property south of [person's name] kāinga	**Wetland drainage, resourcing** (Source 1) Wetlands areas are disappearing; Māori land that have insufficient funds to maintain areas	**Protect and replenish remaining wetlands and native vegetation** (Source 1) Ensure that the RMA has control of our assets particularly our waterways; Look at charitable status and the difference in comparison to a trust [in relation to Māori land]; We need a better understanding between our people, WDC, ODC and WRC;

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
				Replenish any native vegetation, fence off and plant natives - identify where they are and where they can grow; Look critically at trying to maintain those areas that were given to us - the vegetation is still there in some places, there are good examples, but maintain before we lose all of these sites
KAI 38	Okoko Stream	**Tuna.** (Source 1) Okoko the old Rd to Kāwhia near the quarry was another place where tuna was caught		
KAI 39	Mangawhero Stream	**Tuna.** (Source 1) The first place [Interviewee] remembers her father and brothers catching tuna is out of the Mangawhero Stream which ran into the Waipā River… [Interviewee's] brother would take the hīnaki out often usually in the Mangawhero as it was close to the homestead. Also by the bridge; (Source 2) Caught tuna out of the Mangawhero Stream at Tahaia near Ōtewā		
KAI 40	Waingaro Stream	**Tuna.** (Source 1) Would place a hīnaki in the stretch of the stream ran from the north to the south; closest to Pōhatuiri. They would use pūkeko or rabbit to bait their hīnaki	Also see KAI 11	
KAI 41	Oamaru Stream	**Tuna, kōkopu.** (Source 1) [Interviewee's] father-in-law used to dive down into the Oamaru Stream and select the biggest tuna using only his muka cordage to pull it up on to the bank. Kōkopu in the Oamaru Stream. [Interviewee's] father-in-law used to catch kōkopu near their homestead		
KAI 42	Waihohonu Stream	**Tuna.** (Source 1) Would often catch to tuna out of the Waihohonu Stream; (Source 2) Harvested tuna from the Mangapū, Waihohonu, Orāhiri and Waitomo Rivers		
KAI 43	Horotea Stream	**Kōura.** (Source 1) Caught kōura using hands along the stream. (Source 2) Place for kōura, small but plentiful	Also see KAI 11	
KAI 44	Waitomo Stream	**Kōura, watercress** (Source 1) Plentiful, especially at the bottom about 6 km along Te Anga Rd, caught	Also see KAI 11	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		many kōura there; Watercress was collected from various streams located close to Pōhatuiri		
KAI 45	Ngutunui Stream	**Kōkopu.** (Source 1) Used to catch kōkopu near the [whānau name] homestead in and around the Ngutunui / Hiona rohe		
KAI 46	Orāhiri Stream	**Tuna, kānga wai.** (Source 1) Harvested from the Mangapū, Waihohonu, Orāhiri and Waitomo Rivers. Corn was left within the Orāhiri River to ferment	**Devegetation**. (Source 1) Orāhiri River and the Waitomo River started to degrade once the willows and the native trees on its banks were cut out	
KAI 47	Waitomo Stream	**Tuna, trout.** (Source 1) The Waitomo River was a special place for swimming. Caught tuna and trout downstream from this place		
KAI 48	Waipā River	**Tuna.** (Source 1) Tuna has been depleted in and around Ōtewā		
KAI 49	Mangapū & Mangarama Streams	**Tuna, trout**. (Source 1) I know where a lot of tuna are, I know which corners the trout hang out on… This paddock leads into that drain and was one of the main eeling paddocks …in that paddock there would have been thousands of them in that flood… and they were big... they were beautiful... one of the things I remember was carrying a lantern and tripping over this log and the log getting up and swimming away when I turned around... it was an eel, that's how big they were…...like I say the eels that I ate out of that Mangarama they weren't bad… if there's a tangi up here and its Paparahi, I might go down to where that spring is and chuck a hīnaki in and get tuna from there. Or else I'll go down the bottom of there… if it's a tangi for someone else I'll try and go and get the tuna off their whenua…	**Willow management, farm effluent and sedimentation.** (Source 1) I eeled there about 6, 7 years ago and there was still thousands of eels. We caught different ones, from ones that were only small. I kept a couple for a month and they were still kaka, rotten, smelly, stinky tuna even after a month... I would never have even eaten them, I wouldn't catch them out of there. It was just an experiment to see how long it would take to cleanse them out... I opened one straight away… and it stank!	**Māori leadership, wānanga, regulations and enforcement.** (Source 1) Regulations should be made stricter to have an effect or impact on the Awa. You need to be compliant to certain regulations and if you're not you need to be punished. Marae-centred Māori (focused) leadership to drive restoration strategy and work programmes; Wānanga to share knowledge/expertise… but what do people know about what's going on in the river here?; ...it's that sharing forum that's missing. Where do I get to share my knowledge?... nothing is getting passed on...
KAI 50	Mangarama Stream & Mangapū River	**Tuna.** (Source 1) This is the Mangarama eeling plains, all of this part of the valley… I used to come down when I was a little fulla to hold the lamps [for the Opārure men]...over there was an eel nursery… there were thousands of eels, and there still are probably	**Pump stations, farm effluent, compliance/enforcement, drainage** (Source 1) I can see the effluent going off into that paddock and there's a lot of drainage drains off there which leads to this one which is then bringing it right back to over here…it's sort of an indirect way	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			pumping it into the Mangarama… That's only a recent thing that they've drained that paddock…	
KAI 51	Mangapū River	**Kōura, kāeo, watercress**. (Source 1) …get kōura out of the swimming hole… it was just a kōura hole to the max, you'd be swimming and walking all over them and there's rows and rows of holes along the sides of both banks... every time you went there, there was kōura and that was one of the main spots because it would sustain every weekend whānau hui… you could still go there during the week, and there'd still be kōura there… and then the following weekend there'd still be kōura there. But kōura all along the awa really. And those freshwater mussels... stinky bland things…the old man used to salt them aye; salt them and dry them. And then they'd just taste like salty jerky kind of stuff… the watercress was here, Makehinga and down at that swamp there, the kōura were even in the Makehinga… (Source 2) ... down here at Opārure where just below home going up towards the marae… we used to get watercress there. But there was all those little patches where…on these rivers and streams where it was a… it maintained all of them, the families…	**Sedimentation, riparian access**. (Source 1) ...it's changed. It's silted up and it's very shallow… flax shouldn't have been planted there, maybe one tree so that'll stop the weed from growing underneath it... next thing they're all filling the bank in	**Mangapū is a priority catchment for riparian planting.** (Source 1) Right up on the priority list for riparian planting… but not go over the top where no one can get out...
KAI 52	Mangawhitikau Stream	**Watercress.** (Source 1) It's got lovely watercress down around here… blue water was one of the nick names it used to have... Watercress was all gathered from the Makehinga…all of Te Kūiti and all Opārure used to come and get their watercress… There were huge fields of watercress in that swamp. A little bit further on, on the left there's a huge big swamp… that was our summer gathering spot because of the trees, it's always had those huge willow trees in there and it was always shaded so there was always watercress in there	**Farming practises, drainage** (1) Some of these places are all dried up now. The watercress disappearing slowly but surely and now there's absolutely nothing. There's been cows in there, which is pretty stink but if you don't own the place you can't lay the law down. There was also a diversion where the water was re-directed to a different spot that was a major. They put it back again but it wasn't enough to bring back the watercress	
KAI 53	Mangakara Stream	**Piharau**. (Source 1) In a 1998 survey on the downstream side of the Grey Rd culvert there were large boulders where we caught four adult lamprey.		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		Further upstream there were small areas of fine pebbles with loose mud where we found the juvenile lamprey		
KAI 54	Rangitukia Stream	**Piharau**. (Source 1) In a 1998 survey this area was similar to Grey Rd but had a perched culvert so very few lamprey were found above Corcoran Rd		
KAI 55	Ngutunui Stream	**Piharau**. (Source 1) Piharau were caught closer to Ngutunui near Pirongia		
KAI 56	Waipā River	**Carp**. (Source 1) Carp were caught at the end of Morgan Rd in a little lake	No little lake visible at the end of Morgan Rd using aerial maps	
KAI 57	Moakurarua Stream	**Tuna**. (Source 1) Gaff was used to catch tuna in the Moakurarua. [Interviewee] said that an uncle of his from Whanganui who wasn't familiar with the Moakurarua got a nasty surprise as the tuna bit his fingers or toes, a tendency that was known quite well by the locals for that stream		

Table C-2: Specific features identified by whānau relating to the physical character of the catchment, water sources, water quality and water security – Summary of the knowledge contributed by Maniapoto whānau. (To be read in conjunction with the spatial information contained in Appendix D, labelled WAI).

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
Not marked on map, general	Waipā River catchment	**Water quality, water security.** (Source 1) You used to be able to see the bottom, you can't see the stones in the bottom now. Noticed the change from about 1980 onward. When we were kids, we used to be able to hold a rock under and see how far we could go and you could see where you were going; Would not drink water straight out of the Waipā. Would swim in it, but certainly wouldn't drink it; 1985-86 you could actually see the riverbed. You could see the bottom; (Source 2) There was no wash house and we did our washing down in the river. A week after that [we] could go back to the same spot; Can't drink the water [from the river] anymore	**Farming, deforestation, equity**. (Source 1) Farming practices all along the river is a big contributor for poor water quality. Nitrogen runoff into river; (Source 2) It smells like a sewage pond now. Stock effluent and land run off is a huge concern. Size of the farms has grown. Increasing stock numbers and intensifying the impact on the river. In the 1940s, 60s whānau would have about 30 cows. Prioritising money over all else, the health of the awa comes last	**Alternate marae water supplies, shared vision, access to knowledge, education and communication.** (Source 1) In case of emergency the marae have to be able to connect to the river and use the water for drinking and washing. Have pumps on site as a standby; (Source 2) Cleaner water should be the common bottom line (not only economic). Need to recognise and respect landowners and farmers in the catchment. In order to be able to move forward together we need to help educate the community at large. How can we learn from the models developed by other iwi, like Tūwharetoa and Ngāti Awa?
Not marked on map, general	Waipā River catchment	**Physical character.** (Source 1) Wetland areas are drying out because of the low water level of the river	**Water extraction, drainage**.	**Access to knowledge, compliance and monitoring**. (Source 1) How do we maintain wetlands? We need to investigate water take consent process by farmers - are these impacting on river water levels?
WAI 1	Ngakoaohia Stream	**Water supply**		
WAI 2	Mangaokewa Stream	**Puna.** (Source 1) Hikiwikiwi is a major puna for the Mangaokewa – as long as both springs are going they will last. But if one dies, then the other could die too. This could happen because of the water takes	**Water extraction.** (Source 1) Waipā DC takes water from the Mangaokewa. Ōtorohanga DC attempted to get an allocation during the 60s, however it was rejected, as the river would not have been able to sustain two large takes	
WAI 3	Tunawaea Stream	**Drinking water.** (Source 1) Used to come up on the horses to go hunting in this area. During these trips we would drink water from the streams, no problem (Source 2) Water quality and water quantity (flow) has decreased	**Sedimentation, phosphorus, deforestation.** (Source 1) When they straightened the river we lost all the shingle bed (in the 1960s), when the	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		substantially. [Name] used to drink the water from the rivers but he doesn't anymore because it is so degraded	Tunawaea collapse occurred all of the oneone came down and blocked the Tunawaea	
WAI 4	Waipā River	**Physical character.** (Source 1) The river used to disappear underground around here for about 200 m		
WAI 5	Wharekiri Stream	**Puna**	**Transfer of knowledge.** (Source 1) Lack of knowledge regarding the exact locations of various puna in the catchment	**Prioritise puna identification and protection.** (Source 1) We must identify where all of our puna are in the catchment and make sure that more people know where they are so we can look after and protect them
WAI 6	Waipā River	**Water quality, access**. (Source 1) Used to ride along the river from Te Keeti down to Pūrekireki Marae, good clear flow of water		
WAI 7	Waipā River	**Water quality, access**. (Source 1) In the 1950s used to cross the awa in a waka to get to the native school. The water here is now brown		
WAI 8	Mangaoronga Stream	**Puna**. (Source 1) This puna used to be used for healing, wairua, for tohunga use	Spring from Te Waireka gone	
WAI 9	Mangapū River	**Puna.** (Source 1) There are 8 puna in our rohe and [name] is interested in any information about their locations and names. She's aware of 3-4 of them at this stage, one of them is just down from Te Kauae Marae in Hangatiki called Te Puna o Te Ata. Te Puna o Te Ata flows underground out to the coast, used to see pātiki in the puna but in recent times that has changed due to farming practices and for that reason the Kaitiaki that was placed in the puna was moved to another area because of the pollution. (Source 2) Name of the puna unknown – [Name] and [Name] property near Hangatiki School situated below Te Kauae Marae. It had sacred significance associated with healing waters; (Source 3) Kawaurukuroa, puna at Hangatiki	**Farming.** (Source 1) Used to see pātiki in the puna but in recent times that has changed due to farming practices and for that reason the Kaitiaki that was placed in the puna was moved to another area because of the pollution	**Puna stocktake, investigate groundwater connections, access to information.** (Source 1) I'm not sure if the 8 puna are connected to our river catchment, it would be interesting to find out; (Source 2) We must identify where all of our puna are in the catchment and make sure that more people know where they are so we can look after and protect them
WAI 10	Mangarapa Stream	**Puna**. (Source 1) Puna situated north east from the [Name] homestead; (Source 2) Puna-o-te-ata - this puna was seen as a special spring as detritus that was familiar at Marokopa would be seen inside of it; (Source 3) Rua o te Ata		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
WAI 11	Wharekiri Stream	Power generation opportunity		
WAI 12	Waipā River	**Puna.** (Source 1) Puna located just below the marae. [Interviewee] remembers horse and cart/sledge carrying kegs and kegs of freshwater from the puna at the bottom to the top of the marae. This puna was used not only for drinking but for washing body and for washing clothes. This puna would naturally run into the lagoon then into the Waipā. It used to be quite a deep puna. A box with a lid was constructed to sit on top of the puna. The boxed puna was to keep the tuna and a mullet that was left deliberately in the puna to keep it clean. [Interviewee] explained that in her youth they did not have rainwater tanks until much later in her life	**Water security**. (1) Unfortunately the puna does not exist now as it is covered up and filled in. [Interviewee] states, "We relied on the river for our sustenance, we lived off the river. Without the river we have no life, we've got no water that we can drink. If you haven't got any bores or puna wai you have no sustenance. It's everything to us"	**Restore wetland areas**. (Source 1) Wetlands returned and the waterways, streams clear so that the Waipā is healthy and able to sustain life like how the river sustained us in our youth
WAI 13	Waitomo Stream	**Puna, kānga wai.** (Source 1) Puna located to the east of the Pōhatuiri Pā. Ponga was used to provide support around it to stop the sides falling in and muddying up the water. [Interviewee] remembers some summers being long and very dry so that the puna and the surrounding streams were low. So they would resort to using the water out of the tank by the koropu to get them by or the Ruapekapeka spring. A tuna was placed in the tank to keep it clean. Adjacent to the Ruapekapeka puna waimāori, a hole was dug and filled with water. Corn was placed in there to ferment – kanga wai; [Interviewee] has noticed that it is a lot dryer during the summer months now and that the dry period has extended in autumn and even early winter	**Drought**.	
WAI 14	Horotea Stream	**Physical character.** (Source 1) Horotea Stream (not named/shown on topomap) located to the east of Pōhatuiri Pā. This stream followed the base of the ridge, running in a north to south aspect and disappears underneath the ground and pops up behind the Pari-āniwaniwa ridge. It runs downstream to the south until it spills into the Waitomo Stream at the bottom. Although only a small stream, because it was the closest to Pōhatuiri it played an important part in the community's lives		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
WAI 15	Mangapū River	**Puna**. (Source 1) Puna-o-te-roimata a significant spring; arc shaped at the bottom of Golf Road opposite the entrance to Rereamanu Marae		
WAI 16	Waihohonu, Orāhiri	**Physical character.** (Source 1) Wetlands situated behind the Onematua hill. This wetland is still in a relative pristine state. It does not drain into the Mangapū but into the Waihohonu and Orāhiri. The unique wetland ecosystem near the Waihohonu has a rich biodiversity. The Waikato University is interested in this ecologically rich, unique ecosystem		
WAI 17	Waitomo Stream	**Physical character.** (Source 1) Wetlands at the headwaters of the Waitomo Stream, a place for healing		
WAI 18	Mangapū River, Mangawhitikau Stream	**Water quality.** (Source 1) Mangawhitikau is a lovely stream with a stone bottom over there, but it turns to mud once it turns into the Mangapū; Mangawhitikau was always the kind of bigger looking awa… more water volume... Mangawhitikau has a lot of mana because... Hotumaue… he was a river jumper from Waikato… he's got footprints on the side of the Waikato River up Huntly... where he leapt across the Waikato River… made him famous and he came down here and tried to jump the Mangawhitikau... fell over broke his leg, and he coined a saying that the Mangawhitikau has true mana because he's jumped the mighty Waikato and got over it, but the Mangawhitikau he couldn't do it..."	**Willow management, sedimentation, riparian planting**. (also see PRESSURE 44). (Source 1) …the next farm… needs fencing and planting as well... But see he's got harakeke only, see that's the bank of the Mangapū there and all they've done is just plant harakeke, they haven't got trees or anything and the fence is right by the stream	
WAI 19	Mangawhitikau Stream	**Puna.** (Source 1) There's also a spring down there on the other side of that pine tree it's called Pōtea. It's probably the lowest spring around here… it's beautiful and cold. Because on the hottest days, you come and fight your way through that blackberry and sit down in that awa and 30 seconds later you want to go home because you're nice and cool… I remember as a kid used to fill up the spray tank out of there... It used to be a good little waterfall that... quite reasonable flow	**Access, quarry.** (Source 1) ...fight your way through that blackberry… Personally I wouldn't have hid it away with all of those flaxes… I would have gone for trees over flax because there's not a lot of filtering that needs to be done. So you want something that's going to grow a bit high... so you can have access to that creek underneath. But not that row of harakeke, that's just blocked you out; So many trucks come up and down this road every day, so from that you can understand the extent of work that's been	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			done in that live quarry and the effect that could have on sub-terrainian water aquifers around here...	
WAI 20	Waipā River	**Puna**. (Source 1) Three puna waimāori - one located right next to Te Kōpua Marae, and two just below the marae on the flat. The one closest to the marae was used for special occasions like blessings or baptisms. The two puna down the bottom on the flat were used for washing yourself and for washing clothes. These two puna had a distinctively iron taste in the water		
WAI 21	Mangarama River	**Puna**. (Source 1) We had puna at home and that one I just referring too. That supplied three households but then it used to supply the old homestead as well at Mangarama and the pipes are still there but we don't use those pipes, we put new pipes in. So that came down to the homestead and then down to our place. That puna's been going for years, it pumps about two and half thousand gallons an hour. And in 1973 at our worst drought… and it was pumping that then... and since then we've got the water going down to Tanehopuwai to service the farms down there and the marae, but it goes over the road… and it comes down until it gets down to about two inch, but the pressure's strong enough to push it way the hell down there… I don't know 6 farms down there now. And so that's what that puna is doing... all these people have their puna… I guess that's how we survived you know in those days… so we never wanted for anything		
WAI 22	Mangapū River	**Puna.** (Source 1) ...To the right before you got to Makahengai there's a little stream running up where [name] family urupā is now…. It's right on the crest of that river …. that's where they had their puna for making black dye… the paru…		**Reserve areas to protect puna (and their connection with the waterways)**. (Source 1) I said to them 'why didn't you include that in the reserve…just extend it and take in the river as well and those puna…'

Table C-3: Swimming and whānau recreation – Summary of the knowledge contributed by Maniapoto whānau. (To be read in conjunction with spatial information contained in Appendix D, labelled SWIM).

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
Not marked on map, general	Waipā River catchment	**Swimming, access** (Source 1) Access to the awa has changed, there are some parts of the river that we can't access at all anymore. Old farming families are allowed access but new farmers don't have this relationship with the locals. (Source 2) [Interviewee's] whānau grew up at Te Kōpua before the marae was built. They relied on the Waipā River to provide kai for their cupboard, and as a laundry place during summer when the water started to run low in their tanks; (Source 3) Children could swim and walk across parts of the river; Swimming holes no longer used as they are no longer safe	**Farming practises, pollution, access, gravel extraction, lifestyle.** (Source 1) Stench of settling ponds during the hottest part of the summer months. Increase of stock numbers from 400-500 to 2000. Same number of settling ponds incapable of dealing with increased stock numbers. Current model of farming is more profit focused. Growing far too big now. Much of the bush has been removed; (Source 2) Privately owned land and relationships; (Source 3) Lifestyle change, community/whānau not as close as they used to be; Swimming holes gone due to pollution and erosion because of past river works and farming; Water levels have changed from taking the metal out and changing the shape of the river. Not as safe for swimming. Metal extraction has influenced the water clarity, using drag lines, digging pockets of the river out. Council had two draglines to take metal out of the river, without asking. Just left a big hole. [They] used the Public Works Act. They still take metal out further upstream	**Improve access, more recreation/reserve areas, involve rangatahi, riparian planting, improve communication and understanding of council**. (Source 1) Cycle ways and walking tracks along the length of the Waipā River, like the Waikato. Make more things visible to the public, so there is peer pressure to maintain/improve. Need more recreation areas along the river. Recreation areas for waka ama, but need to improve flow levels as well; (Source 3) Get schools involved in restoration mahi. Need more community projects to get whānau involved. Need planting along the river to mitigate erosion, involve schools, community groups and businesses. Bring the focus of the community back to the awa. Encourage whānau to build relationships with council - but council need to be open and willing. Be more proactive and involved in making submissions and objections to district plan (etc) processes. Improve lines of communication between council and whānau.
SWIM 1	Mangaokewa Stream	**Swimming.** (Source 1) Used to swim across river to racecourse to watch horses. Don't swim here now	**Pest fish, water quality, lack of engagement**. (Source 1) goldfish and algal blooms; (Source 2) carp; (Source 3) …people …not interested in the awa like they used to be. We used to live off it, we used to live with it. We don't anymore and that's why people aren't interested… take it back to the traditional activity ngā wai o mua which is waka… it's a traditional activity that we don't do anymore	**Re-engage the community with the awa**. (Source 1) Reintroduce waka races into the Mangaokewa… raft races generate a lot of interest, and take people down to the awa...something in town, localised, not too big and a lot of fun to generate more interest in the Mangaokewa awa… try and get people to realise what they've got there running through their backyards
SWIM 2	Waipā River	**Swimming.** (Source 1) As the [Name] homestead was situated at the confluence of the Waipā and the Mangawhero Stream the whānau were spoiled for choice for swimming. When [Interviewee] was a child she could stand on the	**Gravel extraction.** (Source 1) Drew all the metal out and created a big hole. When they used to swim down the river they never swam through the hole	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		bank of the river and see right to the bottom. It used to have a sandy bottom. You can't do that now it's muddy and very dirty. Principally the both sides of the banks of the Waipā and surrounding farms were rākau whiro (willows) and other introduced exotic trees. [Interviewee] would use branches of the rākau whiro to swing into the river; (Source 2) Children used to be able to swim and walk across parts of the river. Crossing was wide but shallow and there was a natural ridgeline from Kihikihi. Mokopuna still swim in the summer, but the river is dirty/murky		
SWIM 3	Mangapū River	**Swimming**. (Source 1) Described as "more of an alluvial river'. Because of its colour and the land it travels through. Previously swam in as kids, but never really took notice of the colouring. Used the measure of 'swimming' to gauge the cleanliness. My mother used to class it as clean because they used to swim and eel in it. (Source 2) A lot of eels in the Mangapū and I'm talking about 1940s. We went there most days when it was fine, we'd go down there, swim there, wash there, and our cousins they were the next families were up a bit further they took their clothes there to wash	**Water quality**. (Source 1) Mangapū River starting declining during the late 1970's. Kids stopped washing themselves in the river due to how dirty it had become	
SWIM 4	Waipā River	**Swimming, school picnics.** (Source 1) Used to be a swimming hole about 500 m from Te Kōpua Marae where we used to swim. The current was not too strong here, not too deep and there were trees that you could jump off; (Source 2) The location of the puna kaukau was just below the Te Kōpua Marae on the flat. You could see the bottom of the river bed, not now. All the children learnt how to swim. It was a necessity living close to the river. They used a poplar log as a diving board. School picnics were held here too	**Land use change, deforestation, gravel extraction**. (Source 1) Now all farmland surrounding, used to be all scrub and bush. (Source 2) There has been a gradual deterioration of river quality. There is more frequent flooding. Log jams cause further flooding. The Waipā County dug out truckloads of gravel from the Waipā just below the marae. Much of the natives have been burnt or removed except for the native bush of mainly kahikatea near the [Name] whānau property	**Protect remnants of native bush and kahikatea**
SWIM 5	Mangaokewa Stream	**Swimming, waka**. (Source 1) Used to use this stretch for swimming, washing, access, waka	**Industry.** (Source 1) Timberworks "...then we weren't allowed to swim near that hole"	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
SWIM 6	Waipā River	**Swimming.** (Source 1) Used to be a swimming hole but can't swim there now. Water has also changed colour; (Source 2) [Interviewee] and her whānau swam mainly in the lagoon. The lagoon was an important area for the community. It use to have a sandy river bed. It was a lot shallower before but it is a lot deeper now. It was very clean and safe, now it is mainly stagnant water and very dirty. Now undrinkable	**Flood control, deforestation**. (Source 1) The river used to be clean, excellent quality of water for drinking but absolutely not now. More frequent flooding now the council straighten up the Waipā. Poplars and willows planted along the banks of the Waipā. Much of the natives have been cleared, burnt or removed	
SWIM 7	Waipā River	**Swimming.** (Source 1) Swimming hole at Toa Bridge	**Flood control, farming, erosion.** (Source 1) Many swimming holes have now gone due to erosion or pollution from farming	
SWIM 8	Mangaokewa Stream	**Swimming.** (Source 1) Aspire to swimming in the Mangaokewa again - unsafe at present due to amount of rubbish in residential/urban stretches of the awa. The Mangaokewa Stream is a favourite swimming place for local whānau and rangatahi, and is well utilised over the summer months. The recreational and health and safety aspects for whānau particularly rangatahi swimming in the Mangaokewa is a problem and the area between the Lawrence St bridge and New World on Te Kumi Rd was identified as the focus for the clean-up (Herangi 2014); (2) Also valued for kayaking, eeling, plant life (Mangaokewa Landscape Plan)	**Rubbish, pollution, flow, pest fish**. (Source 1) Residential and commercial rubbish in the stream, including tyres, bicycles, shopping trolleys, traffic cones, woody debris, broken glass to name a few. The December 2013 waste audit found that plastic wrappers, aluminium cans, pens and clothing and shoes were among the highest ranked items found, reflective of the recreational activity that occurs such as picnicking and swimming; (2) Pollution running into the Mangaokewa from timber mill, beef works, saw mill, limeworks; The towns focus is not the river. We have turned our backs on the river, e.g., shops all facing away, you wouldn't know that the town had a river because you can't see it from the road; functions held close to the river, beer bottles end up in it; Used to swim with tubes but too shallow now; Carp are pests to our awa and fish; Stream unsafe for kids	**Mangaokewa Stream Clean-up** (Source 1) Raise community awareness; encourage people to cease littering or polluting the Mangaokewa Stream; and ensure the Mangaokewa Stream is a safe place to swim. Recommendations from the December 2013 waste audit include: Install rubbish bins and picnic tables along the Mangaokewa; Create and implement a landscape plan design incorporating the ideas for the Mangaokewa Stream; Remove and prevent further dumping of tyres and shopping trolleys in the Stream; Prior to the clean-up there was a strong sense from those involved, that the Mangaokewa was a body of water running through Te Kūiti, we live around it, drive over it, walk and run along it and some of us swim in it but there didn't appear to be a great deal of appreciation. After the clean up the feelings of those involved from the community have changed significantly, pride, admiration and respect were the words used to describe their affection for the Mangaokewa. Showing love and compassion for our waterways and environment by participating in these types of activities provides us with an opportunity to develop a personal connection with our awa

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
SWIM 9	Ngakoaohia Stream and tributaries	**Swimming.** (1) There are swimming sites all along the awa that we used regularly	**Sedimentation, flood control, access, algae, pest weeds, willows**. (Source 1) Changes that are occurring are the sediment flows and build-up of sediment, flooding of land including the lower parts of the urupā, and in parts the access to the river is now limited by the farmer's fencing (which is a good thing in terms of animals in the waterway). There is a lot of algae and periphyton which I don't know if that was always there or is something that has just built up in the drier summers. There is also oxygen weed growing but I don't know if it is invading further or not. Willows are causing problems by blocking the awa during flooding and also by changing the course of the water and causing banks to erode	
SWIM 10	Mangarapa Stream	**Swimming.** (Source 1) [Interviewee] and whānau only swam within the Mangarapa River stretch that they frequented. No bush around our way it had all been cleared. Just mainly kahikatea growing where we lived because of the swampy nature of the land	**Deforestation, farming practises**. (Source 1) There was a lot of kahikatea growing and they're all been cleared now And really when I've driven up there some of those farmers haven't really fenced off or fenced off the rivers or drains that run into the Mangarapa. So I guess there'd be a certain amount of contamination to the water	
SWIM 11	Horotea Stream	**Swimming.** (Source 1) Even though the Horotea was quite small, tamariki would still swim in this stream being the closest waterway to the kāinga		
SWIM 12	Waitomo Stream	**Swimming, picnics**. (Source 1) Below Pōhatuiri along Te Anga Rd is a puna kaukau known as Ngā Pikonga. This is a place where [Interviewee] and his whānau would swim. It wasn't very big or deep (c. 1 m deep and about 2 m wide), but it provided a lot of enjoyment for them as tamariki. Generations of Ngāti Uekaha bathed in this same puna kaukau so it was special for them, a place to reconnect. Streams seem to be a lot smaller and not as wide today compared to [Interviewee's] youth. The streams used to be free flowing with a sandy bottom, now it's more like water flowing through a	**Rubbish, farming, deforestation**. (Source 1) Much of the Pōhatuiri rubbish was placed in a hole and buried; (Source 2) [Interviewee] remembers a local farmer in his youth who had a sheep farm, drenching his sheep by the Waitomo polluting the river every year. Now [Interviewee] realises what that farmer was actually doing while they were swimming not to mention the risk to their health too. It was normal practise to put dead animals in the awa. Orāhiri River and the Waitomo River started to degrade once the willows and the native trees on its banks were cut out	**Protect remaining bush, riparian planting, fencing, more settling ponds, prioritise upper catchment areas.** (Source 1) Leave the remaining trees from being cut down. Create a riparian margin by replanting with natives or exotics (poplars, willows). Fencing off the river to stop the stock from getting access especially during times of drought. Increase the number of holding / settling ponds. Intensification on farm blocks have not included putting in more ponds. Need tighter regulations and rules (and enforcement) There should be a greater focus on the restoration

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		crevice in a rock. The water was lot cleaner in [Interviewee's] youth. [Interviewee] is a lot more cautious about where he would source his water from these days not like when he was a child when the water from the streams provided excellent drinking water. The waterways are more degraded than before. Water clarity is not as good as well; (Source 2) The Waitomo River was a special place for swimming		and revitalisation of the upper catchment areas first (tributaries) and then work your way down to the main stem of the Waipā River
SWIM 13	Waipā River	**Swimming.** (Source 1) Teachers used to take us to go to red bridge in Ōtorohanga to go swimming. The water was clear as. That was our swimming pool	**Willow management, industry**. (Source 1) Clearing of willows by red bridge in 2012 is causing erosion; (Source 2) Used to be a pig farm up from the swing bridge. Council depot was also just up the road, about 40 trucks in and out every day, I think their waste went into the river	
SWIM 14	Mangapū River	**Swimming.** (Source 1) A lot of sedimentation, and even in winter it's still not deep. It's not deep, like I know I remember when I was a child and we'd dive off banks, well no kids can dive off banks into the awa now they'll break their necks on the dirt…they'd just be poking up out of them mud	**Willow management, sedimentation.** (Source 1) You can see it's quite silted up…; it's quite silted up compared to what it used to be… it's quite shallow… it turns to mud once it turns into the Mangapū; Here's the willows they're all sprayed, they've fallen in… I'm of the opinion that the first big flood that comes along will wash all of those away… See the sedimentation there [Mangapū], see how shallow that is. Now when I was young it wasn't that shallow	
SWIM 15	Mangapū River	**Swimming.** (Source 1) Back in the day when everyone used to play football, all the whānau used to come down here [old Opārure Football club]… and we'd go and get kōura out of the swimming hole... it was great for the kids because it slowly got deeper and deeper and deeper and deeper… you'd be swimming and walking all over [the kōura]…	**Sedimentation**. (Source 1) It's changed. It's silted up and very shallow	**Riparian planting, priority catchment**. (Source 1) The Mangapū is right up on the priority list for riparian planting
SWIM 16	Waipā River	**Swimming.** (Source 1) Used to be a swimming hole and fishing spot	**Land use change, deforestation.** (Source 1) Now all farmland surrounding, used to be all scrub and bush	
SWIM 17	Mangapū River	**Swimming**. (Source 1) ...identified a corner on a stretch of … river frontage below… Whare		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		Tawhito project that the old ladies of Opārure used to go down and swim on a certain corner… in between there and a swimming place for the young boys, was part of this taniwha's domain		
SWIM 18	Waipā River	**Swimming, picnics.** (Source 1) Below the drop of the Parapara Stream [Interviewee], his whānau and friends would congregate here to swim and have kai by the Waipā River. Swimming near Shingle Island located further up the Waipā River nearly lost his life and the life of his friend Brian when they both fell into a deep hole. He learnt a valuable lesson to not only be careful but also to respect the river. The Waipā River can rise very quickly even when it isn't raining, as the river levels rise due to raining in the upper catchment of the Rangitoto Ranges. The water used to be clean and refreshing not like today. Stands of kahikatea were everywhere in [Interviewee's] youth	**Farming practises, industry, fragmentation of Māori land**. (Source 1) The Waipā River and the surrounding tributaries didn't smell offensive like it can do these days; The fragmentation of Māori land blocks is an ongoing concern	**Communication, engagement, willow removal.** (Source 1) Key actions that need to be put in place include: It is important that farmers and those who live along the river including the towns, cities need to be mindful of the waterways to keep them clean. People need to know where the milk comes from and where the waste goes to; Removal of willows along the Waipā River due to the branches impeding the river flow. The key challenges to overcome include: Proper communication, consultation with everyone not just one or two kaumātua

Table C-4: Sites of Significance – Summary of the knowledge contributed by Maniapoto whānau. (To be read in conjunction with spatial information contained in Appendix D, labelled SIGNIFICANT SITES).

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
Not marked on map, general	Waipā River catchment	**Taniwha, urupā, whānau land, marae**. (Source 1) Te Korae was a taniwha in the form of a log. Used to go to the swing bridge and then go back against the current. Te Korae used to be above Te Keeti in a tributary. The swing bridge was about ½ mile downstream from here. Since the river course was changed haven't seen the taniwha and eel; Rohirohi urupā still there and is at risk of further flooding; Loss of whānau land (taonga) over the years through erosion and impacts of flood control works; Te Keeti is marae effected by flooding (also see PRESSURE 2)	**Flood control, inequity in impacts of decision-making on Māori assets.** (Source 1) Large tracts of productive whānau land (taonga) have been lost over the years through erosion and impacts of flood control works – none is addressing the loss of this taonga; Can't build on some whānau land now because of flooding; Council placed fence on our land without permission; River has been shifted and straightened without consultation with us; Weir put in without consultation to keep town water supply and causes back flooding (also see PRESSURE 2)	**Increase knowledge and understanding of council decision-makers regarding historical grievances / inequity in impacts of past decision-making, protect whānau-land, marae, pā and other sites of significance to Maniapoto to prevent any further loss and economic cost to whānau**. (Multiple sources) The loss and sense of injustice in relation to raupatu / inequity in impacts of decision making / on-going impacts of flood control scheme in Māori assets has/is not been dealt with adequately
SIGNIFICANT SITE 1	Waipā River	**Urupā.** (Source 1) When the (flood) diversion was being done, the council removed a vast amount of soil from the puke below Kotahitanga which just about unearthed the urupā; (Source 2) Much soil removed from the vicinity of Kotahitanga urupā to build the stop banks; (Source 3) Kariki urupā: Situated on a hill opposite Huipūtea on the southern bank of the Waipā River. Originally this hill was a lot bigger and higher than it is now. This hill was also a lot closer to the bank of the river, showing just how much soil has actually been removed. The council dug tremendous amounts of soil to construct the stop banks after the Great Flood of 1958. They only stopped removing the soil when kōiwi started to be dug up. Most of the [names] whānau are buried here by the river	**Flood control, inequity in impacts of decision-making on Māori.**	
SIGNIFICANT SITE 2	Waipā River	**Urupā.** (Source 1) [Ōtorohanga, Phillips Ave] There was a slide that used to go down to the river where Tūpāpaku were cleaned. Before the land was gifted for the pākehā urupā, that is the location where tūpāpaku were cleaned		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
SIGNIFICANT SITE 3	Waipā River	**Pekepeke.** (Source 1) Reponui o Pekepeke. Headwaters of the Waipā; (Source 2) Starting to go red on the edges of the water; (Source 3) Water quality and water quantity (flow) has decreased substantially	**Deforestation, forestry**. (Source 1) Much of the bush [in the headwaters/Rangitoto ranges] has been logged. It was very thick bush during [Interviewee's] youth, and it has changed dramatically these days. Native bush has been cleared off Maraeroa and is now planted in Pinus radiata. This occurred during the 1970-1980's. The native bush at the headwaters of the Waipā was also cleared. Huge impact on bird life and the quality of the streams; Need to keep much larger buffer areas [around Pekepeke], forestry felling too close	**Prioritise headwater protection, fencing, riparian planting, intergenerational capacity, compliance and monitoring, refuse stations in rural areas.** (Source 1) Wharekiri Station, 35km of waterways, needs fencing off from the river and streams and an extensive riparian planting regime. (Source 2) We must start by protecting the headwaters. We need to make sure we don't lose any more vegetation around Pekepeke. Need to keep much larger buffer areas, forestry felling too close; (Source 3) Focus on generational change on smaller number of people (kaitiaki). Very encouraged when Waimiha School used to support sustainable practices and recycling. By targeting the children the environment has a more than better chance especially when a whole community are actively supporting a change to address environmental concerns about the waterways and the bush. Key actions that need to be put in place include: Strengthen and improve capacity of kaitiaki; Focus on the tamariki not the elderly; Changing negative attitudes and behaviours; Legislative change; Always start with the upper catchment first including its tributaries; Make the Meat Works comply with the rules; There are no land refuse stations in rural areas hence the reason why farmers (especially older ones) are not changing their bad habits like dumping dead carcasses into the nearest swamp or down a bank
SIGNIFICANT SITE 4	Okahukura Stream	**Hapahapai o Tarapikau.** (Source 1) Te Ara o Tarapikau. The proper name for Okahukura is Okurawhāngae, which is a protected area		
SIGNIFICANT SITE 5	Waipā River	**Huipūtea.** (Source 1) Before the straightening of the river, we used to swim near the kahikatea tree (Source 2) This 300-year-old	**Flood control**. (Source 1) With the diversions, the Waipā does not flow past this point and Huipūtea has been dislocated from the river	**Improved recognition**. (Source 1) We must protect all of our significant features to help protect the kōrero and knowledge that goes

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		kahikatea tree on the outskirts of Ōtorohanga is historically significant because of its connections with a battle between Ngāti Maniapoto and Ngāpuhi, which occurred in 1822. After defeating Waikato forces near Pirongia a Ngāpuhi war party moved south. They captured some local women and made camp under the tree. The women were carrying baskets when captured, and they were told to place them under the tree, which came to be known as Huipūtea (heap of baskets). Another war party comprised of Ngāti Maniapoto, Ngāti Matakore and Waikato warriors had tracked the Ngāpuhi party and were watching them from hiding places. They attacked and the Ngāpuhi party was defeated. Huipūtea is on the ODC's register of significant trees (Legal description Lot 3 DPS 62786, Historic Reserve, Ōtorohanga Township. Location description. A tapu kahikatea tree site located off Huipūtea Drive (http://www.heritage.org.nz/the-list/details/7558))		with these places; (Source 2) Council should do more about Huipūtea and its significance to Māori
SIGNIFICANT SITE 6	Mangapū River	**Access.** (Source 1) Used to be a river crossing / access point that all whānau used to use to get to and from sister marae	**Flooding, flood control**. (Source 1) The Mangapū River was altered after the 1958 flood changing its natural character and profile	
SIGNIFICANT SITE 7	Mangawhero Stream	**The Three Sisters**.	**Quarry, farming practises**. (Source 1) I would like to know if these sites are being impacted by quarry and runoff from farming; (Source 2) For Maniapoto the pre-existing status quo failed to prevent the extensive excavation (for quarrying) of Pukerimu, Whiti te Marama, and Tokanui Pā (known as 'the three sisters') favourites places of many Maniapoto tūpuna	**Protect sites of significance, access to information, sites of significance to Maniapoto included in monitoring programmes**
SIGNIFICANT SITE 8	Ngakoaohia Stream	**Urupā.** (Source 1) One of our urupā is right next to the awa	**Sedimentation, flood control, willows**. (Source 1) Changes that are occurring are the sediment flows and build-up of sediment, flooding of land including the lower parts of the urupā, and in parts the access to the river is now limited by the farmer's fencing (which is a	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			good thing in terms of animals in the waterway). Willows are causing problems by blocking the awa during flooding and also by changing the course of the water and causing banks to erode	
SIGNIFICANT SITE 9	Mangaorino Stream	**Maniapoto's Cave**.	**Quarry**. (Source 1) For Maniapoto the pre-existing status quo failed to prevent the excavation (for quarrying) of Te Ana Uriuri o Maniapoto (protests saved from complete destruction)	**Protect sites of significance, access to information, sites of significance to Maniapoto included in monitoring programmes**. (Source 1) up at Maniapoto's Cave you got the quarrying going on, that gives that area a priority. The same up at Opārure
SIGNIFICANT SITE 10	Waitomo Stream	**Waitomo Caves**.	**Erosion, sedimentation, rubbish, wastewater.** (Source 1) Waitomo Caves affected by erosion/slips.; (Source 2) In the last 15 years Waitomo has become a significant player in the Tourism sector. Tourism numbers have increased since the opening of the Ruakurī and the Aranui Caves including the high adventure water excursions on offer. Ngāti Uekaha have some concerns about the detrimental impacts that high tourist numbers would be having on the environment but are convinced that the Ruapuha Uekaha Hapū Trust (beneficiaries of the Waitomo and Ruakurī Caves) are doing everything that they can do to minimise those impacts such as increased wastewater loading, rubbish etc. [Interviewee] noticed that there used to be one treatment pond before but now there are three. It looks like the treated wastewater is allowed to flow back into the Waitomo Stream	**User pays**. (Source 1) With an increase in tourism comes an increase in pressure on local treatment ponds, and other waste that comes with tourism. If you are going to benefit from the environment then it is only right that a part of that income helps to support and protect this valuable natural resource for all of us and the future generations of Ngāti Uekaha yet to come
SIGNIFICANT SITE 11	Mangarama Stream	**Rongoā**. (Source 1) Big rock of kawakawa on Mangawhitikau Rd, local pharmacy for the people; There's a big rock there and it's got a kawakawa plant on it and that rock was looked at as being part of our pharmacy. Kawakawa for all sorts of things… it's still there and people still use it		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
SIGNIFICANT SITE 12	Owaikura Stream	**Taniwha**. (Source 1) A known taniwha resided in a cave along the steep banks of the Owaikura Stream located to the north of Kahotea Marae. Will never be able to stabilise the whenua at this location due to the taniwha. A natural drain runs from this point to the Owaikura Stream and then into the Waipā. If the taniwha decided to move for whatever reason it will bust its way through to the Waipā. [Interviewee] also stated that there is another taniwha (not marked on map) located south of Kahotea Marae is of a similar nature to the one mentioned above		
SIGNIFICANT SITE 13	Waitomo Stream	**Pari-āniwaniwa, urupā**. (Source 1) These are the cliffs that are located along the eastern boundary of Pōhatuiri. They are incorrectly known on Topo Maps as Horotea Cliffs. The name literally means Rainbow Cliffs. At the northern most extremity of Pari-āniwaniwa there are two urupā, one is a conventional grave (Lat: 38°14'22.10"S/ Long: 175° 6'2.79"E) on top and the other is a rua kōiwi (Lat: 38°14'21.23"S / Long: 175° 6'3.96"E) or a burial cave. [Interviewee] also mentioned that Patupaiarehe also were known to frequent this area as well. The Patupaiarehe would leave a mark `he roke (hamuti) i waihotia e rātou' when a certain type of thick fog descends in this area. When this is seen it is a sign to be vigilant and wary		
SIGNIFICANT SITE 14	Waitomo Stream	**Ruakurī Cave** (Source 1) A passage exists that runs from this cave all the way through to underneath Pōhatuiri Pā. There is a valley that runs between Pōhatuiri and the Matakana Maunga and Te Hurahanga used to say to [Interviewee] that Uekaha used to live in the caves within this valley and never to be frightened		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
SIGNIFICANT SITE 15	Mangawhitikau Stream	**Burial caves**.		
SIGNIFICANT SITE 16	Kakepuku	**Kakepuku**. (Source 1) Kakepuku Maunga is a known place where Patupaiarehe would visit. Mainly southern side of the maunga	**Residential subdivisions, dairy farming**. (Source 1) I've been pulling kōiwi out of the foot of Kakepuku mountain for years. Five different times. (Source 2) Historically only farming in a small area, now the whole area is farmed - dairy. Clearing began in 1940s, 50s.	**Protect remaining native bush on Kakepuku**
SIGNIFICANT SITE 17	Waipā River	**Reserve.** (Source 1) Some of those places we set aside as reserves and in one case we've got up here in Pureora at Maraeroa was where Te Kooti came into the King Country from Ngāti Tūwharetoa to us, that's where we sheltered him up there at Maraeroa just below the Maunga o Purioke, but on our side. That place is set aside as a reserve but right around it is all these miro trees and cabbage trees they look pretty pre-historic		**Reserves to protect areas of significance to Maniapoto** (Source 1) ...make more reserves along the river, there are some there right now, well there's no reason why we ought to stop short of making reserves of those significant historic things that are significant to our own people
SIGNIFICANT SITE 18	Mangapū River	**Taniwha.** (Source 1) ... on a stretch of… river frontage below… Whare Tawhito project that the old ladies of Opārure used to go down and swim on a certain corner, that corner has been identified. It was also identified within the same korero that it was part of a taniwha's domain, and between that swimming and fishing place, it was a fishing place for the old ladies… in between there and a swimming place for the young boys, was part of this taniwha's domain, and the swimming hole for the young boys is a spot where um one death occurred by drowning and a couple of corners down another death by drowning...		

Table C-5: Taonga (non-kai) species and materials identified as being important to the cultural landscape and ecological integrity of the Waipā catchment – Summary of the knowledge contributed by Maniapoto whānau. (To be read in conjunction with spatial information contained in Appendix D, labelled TAONGA SPECIES & MATERIALS).

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
Not marked on map, general	Waipā River catchment	**Rongoā.** (Source 1) Rongoā still in use, but no longer available at the same spots	**Deforestation**.	**Protect remaining areas of native bush**
TAONGA SPECIES & MATERIALS 1	Tunawaea & Mata Streams	**Kōkopu**.		
TAONGA SPECIES & MATERIALS 2	Rangitoto Ranges (Headwaters)	**Miro**. (Source 1) Ngā Waahi o te Miro – a species of special significance		
TAONGA SPECIES & MATERIALS 3	Rangitoto Ranges (Headwaters)	**Mahi Titi.** (Source 1) Protected area under DoC estate. It is home to some endangered species		
TAONGA SPECIES & MATERIALS 4	Okurawhanga Stream	**Kōkopu**.		
TAONGA SPECIES & MATERIALS 5	Waipā River	**Bird corridor.** (Source 1) They have an ecological bird corridor all around here		
TAONGA SPECIES & MATERIALS 6	Waitomo Stream	**Pā harakeke** (Source 1) Close by to the koropu [at Pōhatuiri] was a pā harakeke and a māra kai. Water was channelled from a tank down between the pā harakeke and a māra kai to irrigate them both. It was quite ingenious. Both the pā harakeke and māra kai was maintained by all the whānau living there. Harakeke also used for making 'bob' (to catch tuna)		
TAONGA SPECIES & MATERIALS 7	Waitomo (Headwaters)	**Kererū, miro, tāwhara**. (Source 1) Even though kererū is protected today, kererū is still seen as a taonga species to Ngāti Uekaha. Kererū were caught along the ridges where miro trees grew. Between the months of March and April miro berries were gathered within the Waitomo Valley. It was used as a `kinaki' or relish with all different types of meats. It was also put in the chest cavity of chickens to flavour the meat as well as in stuffings. The sweet fruit of the tāwhara was ready to be picked and eaten during mid-April. Anywhere rata vines grew tāwhara were found in a fork of a branch. Principally the Waitomo Valley was a podocarp forest consisting of kahikatea, miro, maire, rata, matai, pūriri, rimu, tōtara. Smaller trees found in the valley		

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		are mamaku (fern), ponga (fern), karaka, aka, horoeka (lancewood), mahoe, manuka and kanuka.		
TAONGA SPECIES & MATERIALS 8	Waipā River	**Paru**. (Source 1) Located south of the Te Kopua Marae along the flat. Used for dyeing piupiu and whāriki.		
TAONGA SPECIES & MATERIALS 9	Mangarama Stream	**Rongoā**. (Source 1) Big rock of kawakawa on Mangawhitikau Rd, local pharmacy for the people. There's a big rock there and it's got a kawakawa plant on it and that rock was looked at as being part of our pharmacy. Kawakawa for all sorts of things…it's still there and people still use it		
TAONGA SPECIES & MATERIALS 10	Waipā River	**Aka aka, miro, cabbage trees.** (Source 1) Aka aka for things like teeth and that; we had all of those… right down to the cabbage trees and the rest of it. In fact some of those places we set aside as reserves and in one case where we've got up here Pureora at Maraeroa… where we sheltered him up there at Maraeroa just below the Maunga o Purioke, but on our side. That place is set aside as a reserve but right around it is all these miro trees and cabbage trees they look pretty pre-historic		
TAONGA SPECIES & MATERIALS 11	Mangapū River	**Paru, raurēkau**. (Source 1) Right before you got to Mākahengai there's a little stream running up where [Name] is now… It's right on the crest of that river where they…. had their puna for making black dye you know the paru…. and then they had the raurēkau there as well… raurēkau... the yellow colour in the flax, in the muka … the raurēkau is a bark they used		

Table C-6: Pressures impacting the Waipā River catchment – Summary of the knowledge contributed by Maniapoto whānau. (To be read in conjunction with spatial information contained in Appendix D, labelled PRESSURE).

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
Not marked on map, general	Waipā River catchment		**Flood control, inequity in impacts of decision-making on Māori assets.** (Source 1) Large tracts of productive whānau land (taonga) have been lost over the years through erosion and impacts of flood control works – none is addressing the loss of this taonga; Can't build on some whānau land now because of flooding; Council placed fence on our land without permission; River has been shifted and straightened without consultation with us; Weir put in without consultation to keep town water supply and causes back flooding (also see PRESSURE 2, 4, 5, 7, 9, 17, 22, 23, 29, 30)	**Increase knowledge and understanding of council decision-makers regarding historical grievances / inequity in impacts of past decision-making, protect whānau-land, marae, pā and other sites of significance to Maniapoto to prevent any further loss and economic cost to whānau**. (Multiple sources) The loss and sense of injustice in relation to raupatu / inequity in impacts of decision making / on-going impacts of flood control scheme on Māori assets has/is not been dealt with adequately
PRESSURE 1	Mangapiko Stream	**Wastewater discharge**. (Source 1) Discharges from the Waipā Council treatment plant in Te Awamutu in 1947 you could smell the Mangapiko (from 4 miles away), but now that smell has gone	**Wastewater discharge**. (Source 1) The Council still discharges from the treatment plant into the river. All councils discharge treated wastewater into the Waipā River	
PRESSURE 2	Waipā River	**Flood control.** (Source 1) Te Keeti Marae is marae effected by flooding. 1958 floods diversion of the river where the stop bank starts downstream from Te Keeti did not protect the marae from being flooded. The Waikato District and Waipā Valley Councils decided the placement of the stop banks. Following this the Waikato DC built a weir which diverts the water toward the marae causing flooding. When the diversion was being done, the council removed a vast amount of soil from the puke below Kotahitanga which just about unearthed the urupā. (Source 2) We are aware that our sister marae, Te Keeti, upstream of the stop banks also bares an extra burden in terms of the flooding that takes place there; (Source 3) Stop banks erected downstream of Te Keeti Marae causes it to flood during high water.	**Flood control, inequity in impacts of decision-making on Māori assets.** (Source 1) This type of flooding is as a direct result of the introduction of the stop-banking, which begins immediately downstream from Te Keeti, and ends immediately upstream of Tarewaanga. The effect further downstream, extending into the Waikato through to its Port are burdensome on all of those communities, Māori and other-than-Māori; (Source 2) The weir and stop bank contribute to the flooding of the marae and school. (Source 3) Can't build on some land now because of the flood risk. Council put a fence on our land without our permission. Bridge and culvert do not facilitate draining	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		Council put their water intake downstream as well building a weir compounding the problem of flooding during heavy rain as the river levels would back up a lot quicker towards the marae and the local school. The marae committee has complained for many years to rectify the situation but nothing has been actioned. The stop banks had a huge impact on Maniapoto and the nature of the Waipā River catchment (also see PRESSURE 9)		
PRESSURE 3	Waipā River	**Physical character** (Source 1) Diverted the river so that they could build the town (Ōtorohanga) stopping the river from flooding	**Loss of habitat, lost access to kai**. (Source 1) The diversion of the river meant it killed the kai, the beds where they used to get their kai from were taken away with the changing of the river	
PRESSURE 4	Waipā River	**Urupā** (also see SIGNIFICANT SITE 1)	**Flood control, decision-making processes**. (Source 1) When the (flood) diversion was being done, the council removed a vast amount of soil from the puke below Kotahitanga which just about unearthed the urupā	
PRESSURE 5	Waipā River		**Flood control.** (Source 1) It floods nearly every year [at Puketōtara] when there is heavy rain. Leaves the track and floods over the land	
PRESSURE 6	Waipā River		**Residential subdivisions**. (Source 1) Pukenui has been farmed for generations, but was recently sold. The farm was subdivided into a 'cul de sac' up the mountain, which should have remained as bush. On this same road is a block that is the only land that remains in hapū ownership	**Appropriate land development/use, protect remaining native bush on Pirongia.** (Source 1) Should be restricting residential growth (now on the hillside, Pirongia) to the town, but they continue to allow homes/subdivisions to be built along rural roads that cannot sustain that type of development; Should have remained as bush
PRESSURE 7	Waipā River		**Flood control, residential subdivisions**. (Source 1) Over engineering the river to protect a subdivision (see PRESSURE 6) widening of roads, digging out of banks and installation of a gabion basket. But problems still remain with road stability	See PRESSURE 6

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
PRESSURE 8	Kakepuku, Mangapiko Stream		**Residential subdivisions, dairy farming**. (Source 1) I've been pulling kōiwi out of the foot of Kakepuku mountain for years. Five different times. (Source 2) Historically only farming in a small area, now the whole area is farmed - dairy. Clearing began in 1940s, 50s.	**Protect remaining native bush on Kakepuku**
PRESSURE 9	Waipā River	**Physical character, water quality**. (Source 1) The impact of taking those bends out of the river changed the flow of the water. This was a big disadvantage. (Source 2) The Tarewaanga Marae Community have experienced as householders/landowners in the Ōtorohanga township both the benefits and the burdens of the effects from the introduction of the stop-banks to halt the flooding. The weka as one example was in the 1950's plentiful in and around the township. Today it is non-existent; (Source 3) In 1958 Ōtorohanga township was devastated by a 100 year flood event. Years following this catastrophe a flood protection regime was implemented constructing extensive stop banks in and around the township to future proof the region from experiencing a similar event from happening; (Source 4) In the old days you could see the bottom of the river outside Te Keeti, we used to drink out of the river if there wasn't a puna wai close by	**Flood control.** (Source 1) This type of flooding is as a direct result of the introduction of the stop-banking, which begins immediately downstream from Te Keeti, and ends immediately upstream of Tarewaanga. We are told that our antecedents warned the original surveyors of the flooding risk, but their warnings went unheeded. Little regard was paid also to any consultation with our parents regarding the establishment of the stop-banks and the effects both upstream and downstream let alone on the riverbed left from the diversion	**Increase knowledge and understanding of council decision-makers regarding historical grievances / inequity in impacts of past decision-making, protect whānau-land, marae, pā and other sites of significance to Maniapoto to prevent any further loss and economic cost to whānau.** (Source 1) The primary benefit to our community is the minimised risk of flooding. The community retains vivid memories of the devastating effect of the 1958 flood. The negative effect on a number of families forced to vacate the areas now under water has not been dealt with adequately. The negative effect also on the flora and fauna has not been adequately measured
PRESSURE 10	Waipā River		**Wastewater discharge.** (Source 1) Vivid memories also remain of raw, untreated sewage pumped directly into the stream floating past	
PRESSURE 11	Mangaokewa Stream		**Goldfish.**	
PRESSURE 12	Mangaokewa Stream		**Algal blooms.**	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
PRESSURE 13	Waipā River		**Farming practises**. (Source 1) Nutrients and nitrates from farmland	
PRESSURE 14	Waipā River		**Farming practises**. (Source 1) Nutrients and nitrates from farmland	
PRESSURE 15	Tunawaea Stream, Waipā River		**Sedimentation, phosphorus, deforestation.** (Source 1) When they straightened the river we lost all the shingle bed (in the 1960s), when the Tunawaea collapse occurred all of the oneone came down and blocked the Tunawaea	
PRESSURE 16	Waipā River		**Gravel extraction, industry, farming, deforestation, rubbish, wastewater.** (Source 1) Drew all the metal out and created a big hole. You could swim everywhere except where the hole was dug for metal extraction; (Source 2) Water levels changed from taking the metal out, changed the shape of the river, not as safe for swimming; (Source 3) Council taking gravel from the awa affects spawning grounds and stirs up the silt affecting water quality and adding sediment to the awa; (Source 4) No smell in [Interviewee's] youth except now it stinks of dairy effluent. [Interviewee] remembers being away from Te Rohe Pōtae for a while then one time she brought her children back and during that time went for a swim and noticed the absolute stench of roke kau in the area, so much so she didn't want to return. Locally the piggeries upstream were major contributors to polluting the environment. Unfortunately local Māori are also to blame. Many Māori homes situated on the banks of the river had rubbish piled high. This was seen often especially when whānau would go swimming, their rubbish was left behind most of the time. During the 1958 flood the river gouged out a lot of the rubbish buried at the location of the old town dump near Phillips Ave located opposite the [Name] Homestead. When the water subsided what was left was the stench from the local piggeries. Even though some	**Improved farming practises, restore to drinking water standard.** (Source 1) Farmers' need to be more mindful of their cows so that they don't urinate or excrete into the water; (Source 2) Ko taku wawatatia kia kite anō, kia mā anō te wai! Kia hoki anō te ora o te awa, pērā anō i te wā i a au e tamariki ana. Kia taea anō e mātou te inu i te wai Māori rā. My vision would be to restore the river and improve the quality of the water to a state like how it was when [Interviewee] was a child. So that we are able to drink the fresh water

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			native bush is still growing in the area much of it has been cut down and cleared	
PRESSURE 17	Waipā River		**Inequity in impacts of decision-making on Māori** (Source 1) All whānau lived in the town. When the railway went through and the Crown gave all of that whenua to the local council, all Māori were removed off their whenua and the land was leased to pākehā. It became a ghetto, from the high level bridge onward. It used to be that whānau were kaitiaki for certain parts of the river and that was their place to gather kai and they were responsible for it. The Crown took a lot of Māori lands under different Acts of Parliament forcing many Māori to leave their lands except for some who refused to leave. So the Council decided to build around them to force them to leave	**Increase knowledge and understanding of decision-makers regarding historical grievances / inequity in impacts of past decision-making, protect whānau-land, marae, pā and other sites of significance to Maniapoto to prevent any further loss and economic cost to whānau**
PRESSURE 18	Waipā River	**Water quality.** (Source 1) Used to be very clear [at Te Kōpua Marae], but you couldn't see the bottom because it was so deep; (Source 2) You could see the bottom of the river bed, not now	**Sedimentation, pest fish, farming, gravel extraction, deforestation**. (Source 1) Poor clarity now, contributors include farming, runoff from the land. But carp is a big contributor to poor water quality. First saw carp in the river around 1985; (Source 2) You used to be able to see the bottom of the river, gravel bed. There has been a gradual deterioration of river quality. There is more frequent flooding. Log jams cause further flooding. The Waipā County dug out truckloads of gravel from the Waipā just below the marae. Much of the natives have been burnt or removed except for the native bush of mainly kahikatea near the [Name] whānau property. There has been increase run off / fertilisers into the river from farms as a result of increased stocking rates	**Protect remnant native bush areas, plant willow trees to stop erosion, improved farming practises, relationships with farmers**. (Source 1) [Interviewee's] stated that they hope that these last remnants of native bush is never cut down. In case of emergency the marae needs to be able to connect to the river and use the water for drinking and for washing. Have a pump on site as a standby; (Source 2) I have been waiting years for the Waipā River to be restored so that we can have nice, clean water like before. I would also like willow trees to be replanted along the banks of the Waipā to help stop erosion from occurring. The River has a mauri, a life force. The Farming Sector needs to improve their farming practice to make it more sustainable. The current practice is not acceptable. Presently local farmers have applied for consent to flush more pollutants from their farm into the Waipā River. [Interviewee] stated that they did not give their consent. [Interviewee] also asks the

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
				question why farm pollutants are not passed through Papatūānuku instead of released into the waterways. Both [Interviewee's] identified that having a better relationship with the Farming Sector is important if they want to improve the waterways
PRESSURE 19	Waipā River	**Water quantity.** (Source 1) Pirongia, Crown reserve where DoC is, there was a year that the block was exposed, the river dropped so low it was almost extinguished. Still get low flows now, but not as bad as the one previously mentioned	**Water extraction, drought.** (Source 1) ...the following year, a farmer applied to the Waipā DC to extract approximately one million litres of water from the Waipā River	
PRESSURE 20	Mangapiko Stream		**Water extraction.** (Source 1) Fonterra previously extracted water from Mangapiko but don't know if they still do	**Access to information**
PRESSURE 21	Mangaokewa Stream	**Puna.** (Source 1) Hikiwikiwi is a major puna for the Mangaokewa – as long as both springs are going they will last. But if one dies, then the other could die too. This could happen because of the water takes	**Water extraction.** (Source 1) Waipā DC takes water from the Mangaokewa. Ōtorohanga DC attempted to get an allocation during the 60s, however it was rejected, as the river would not have been able to sustain two large takes	
PRESSURE 22	Waipā River	**Physical character.** (Source 1) The tributaries that used to run through Ōtorohanga are now all gone. Many of these streams provided places to catch tuna and go swimming and also had spiritual significance	**Inequity in impacts of decision-making on Māori**. (Source 1) Due to the 1958 flood, the Council shifted the bridge that was at the end of Te Kāwa Str and moved it south to line up with Te Kanawa Str. [Interviewee] did not view this as a positive move as the Council wanted to put the road on the western side of the Waipā through Māori land near McCready Rd without any consultation with the Māori owners. Belated consultation did occur in the end with [whānau names] when they started to complain	
PRESSURE 23	Mangatea Stream		**Flood control.** (Source 1) The rivers around Mōtiti Marae have been straightened and this has caused many issues	
PRESSURE 24	Mangaokewa Stream		**Wastewater discharges**. (Source 1) Sewage overflows; (Source 2) Discharge of treated sewage at Te Kūiti	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
PRESSURE 25	Mangaokewa Stream		**Timberworks**.	
PRESSURE 26	Waipā River (Headwaters)	**Pekepeke.** (Source 1) Reponui o Pekepeke. Headwaters of the Waipā; (Source 2) Starting to go red on the edges of the water; (Source 3) Water quality and water quantity (flow) has decreased substantially	**Deforestation, forestry**. (Source 1) Much of the bush [in the headwaters/Rangitoto ranges] has been logged. It was very thick bush during [Interviewee's] youth, and it has changed dramatically these days. Native bush has been cleared off Maraeroa and is now planted in Pinus radiata. This occurred during the 1970-1980's. The native bush at the headwaters of the Waipā was also cleared. Huge impact on bird life and the quality of the streams; Need to keep much larger buffer areas [around Pekepeke], forestry felling too close	**Prioritise headwater protection, fencing, riparian planting, intergenerational capacity, compliance and monitoring, refuse stations in rural areas.** (Source 1) Wharekiri Station, 35km of waterways, needs fencing off from the river and streams and an extensive riparian planting regime. (Source 2) We must start by protecting the headwaters. We need to make sure we don't lose any more vegetation around Pekepeke. Need to keep much larger buffer areas, forestry felling too close; (Source 3) Focus on generational change on smaller number of people (kaitiaki). Very encouraged when Waimiha School used to support sustainable practices and recycling. By targeting the children the environment has a more than better chance especially when a whole community are actively supporting a change to address environmental concerns about the waterways and the bush. Key actions that need to be put in place include: Strengthen and improve capacity of kaitiaki; Focus on the tamariki not the elderly; Changing negative attitudes and behaviours; Legislative change; Always start with the upper catchment first including its tributaries; Make the Meat Works comply with the rules; There are no land refuse stations in rural areas hence the reason why farmers (especially older ones) are not changing their bad habits like dumping dead carcasses into the nearest swamp or down a bank
PRESSURE 27 & 28	Waimahora Stream		**Erosion, sedimentation.** (Source 1) Have lots of slips in winter, sediment starting to build up around Ōtewā Marae, [river] getting shallow now	**Prioritise Tunawaea and Waimahora catchments.** (Source 1) Must start by fixing large erosion/slip problems in the Tunawaea and Waimahora Streams first

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
PRESSURE 29	Tunawaea Stream		**Sedimentation**. (Source 1) The earthworks on the Waipā in [Interviewee's] estimation was the greatest contributor to causing the water to turn a very strong brown colouration. This is what has been widely documented by the Waikato Times in a photo of the Waipā as it flows a deep rich brown colour into the main stem of the Waikato River at Ngāruawāhia. This was after the Tunawaea collapsed (landslide) in the headwaters up in the Rangitoto Ranges. [Interviewee] believes that this not a true reflection of the Waipā River and that it is wrong	See PRESSURE 27 & 28
PRESSURE 30	Waipā River		**Sedimentation** (Source 1) The amount of sediment in the river is really noticeable from Toa Bridge downstream. (Source 2) Large tracts of productive land have been lost over the years through erosion. No one addressing the loss of this taonga	
PRESSURE 31	Moakurarua Stream		**Discharges**. (Source 1) Smells [from the piggery] reach Kahotea on a hot day	
PRESSURE 32A & B	Waipā River		**Erosion/sedimentation.** (Source 1) Erosion of banks here. Floods come through and stay high for days	
PRESSURE 33	Waipā River	**Swimming**. (Source 1) Teachers used to take us to go to red bridge in Ōtorohanga to go swimming. The water was clear as. That was our swimming pool	**Willow clearance, discharges.** (Source 1) Clearing of willows by red bridge in 2012 is causing erosion; (Source 2) Used to be a pig farm up from the swing bridge. Council depot was also just up the road, about 40 trucks in and out every day, I think their waste went into the river	
PRESSURE 34	Waipā River		**Gravel extraction.** (Source 1) Council taking gravel from the river. Infilling with silt and causing erosion downstream	**Mitigation, riparian planting**. (Source 1) Erosion must be mitigated. Impacting private land owners. Must be planted all along here
PRESSURE 35	Mangaokewa Stream	**Swimming.** (Source 1) Aspire to swimming in the Mangaokewa again - unsafe at present due to amount of rubbish in residential/urban stretches of the awa. The Mangaokewa Stream is a favourite swimming place for local	**Rubbish, pollution, flow, pest fish**. (Source 1) Residential and commercial rubbish in the stream, including tyres, bicycles, shopping trolleys, traffic cones, woody debris, broken glass to name a few. The December 2013	**Mangaokewa Stream Clean-up** (Source 1) Raise community awareness; encourage people to cease littering or polluting the Mangaokewa Stream; and ensure the Mangaokewa Stream is a safe place to

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
		whānau and rangatahi, and is well utilised over the summer months. The recreational and health and safety aspects for whānau particularly rangatahi swimming in the Mangaokewa is a problem and the area between the Lawrence St bridge and New World on Te Kumi Rd was identified as the focus for the clean-up (Herangi 2014); (Source 2) Also valued for kayaking, eeling, plant life (Mangaokewa Landscape Plan)	waste audit found that plastic wrappers, aluminium cans, pens and clothing and shoes were among the highest ranked items found, reflective of the recreational activity that occurs such as picnicking and swimming; (Source 2) Pollution running into the Mangaokewa from timber mill, beef works, saw mill, limeworks; The towns focus is not the river. We have turned our backs on the river, e.g., shops all facing away, you wouldn't know that the town had a river because you can't see it from the road; functions held close to the river, beer bottles end up in it; Used to swim with tubes but too shallow now; Carp are pests to our awa and fish; Stream unsafe for kids	swim. Recommendations from the December 2013 waste audit include: Install rubbish bins and picnic tables along the Mangaokewa; Create and implement a landscape plan design incorporating the ideas for the Mangaokewa Stream; Remove and prevent further dumping of tyres and shopping trolleys in the Stream; Prior to the clean up there was a strong sense from those involved, that the Mangaokewa was a body of water running through Te Kūiti, we live around it, drive over it, walk and run along it and some of us swim in it but there didn't appear to be a great deal of appreciation. After the clean up the feelings of those involved from the community have changed significantly, pride, admiration and respect were the words used to describe their affection for the Mangaokewa. Showing love and compassion for our waterways and environment by participating in these types of activities provides us with an opportunity to develop a personal connection with our awa
PRESSURE 36	Mangaiti Stream, Ngakoaohia Stream	**Kōura**. (1) There are sites near Mangati Stream that had kōura when I was younger	**Sedimentation, flood control, access, algae, pest weeds, willows**. (Source 1) Changes that are occurring are the sediment flows and build-up of sediment, flooding of land including the lower parts of the urupā, and in parts the access to the river is now limited by the farmer's fencing (which is a good thing in terms of animals in the waterway). There is a lot of algae and periphyton which I don't know if that was always there or is something that has just built up in the drier summers. There is also oxygen weed growing but I don't know if it is invading further or not. Willows are causing problems by blocking the awa during flooding and also by changing the course of the water and causing banks to erode	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
PRESSURE 37	Mangarapa Stream	**Tuna, kōura, kāeo, watercress**. (Source 1) Every weekend would go out eeling with whānau along the banks of the Mangarapa River during the summer months. Would never travel further north away from their stretch of the Mangarapa River because that belonged to another whānau. During those times local farmers didn't mind [Interviewee] and the other kids crossing their farms to access the river for eeling or getting watercress for kai. They would camp alongside the river bank, light a fire and throw the tuna on the embers or put a billy on and boil the tuna with watercress. Eels would be found at the base of willow trees near the river bank. An abundance of kōura as well in holes within logs or under banks. "That river was nice and clear then". Plenty of kāeo in the area but did not eat them. No piharau, īnanga or goldfish; (Source 2) A source of tuna and kōura. From the old farm to Rereamanu you could get watercress all along the river	**Trout, access, willow, sedimentation, pest weeds, wetland drainage, deforestation, farming practises**. (Source 1) You don't have the weeds that you get now in the river. Because you could see "kite koe ngā kōura me ngā tuna". Farmers in recent times have stopped this access and therefore this practice from continuing. Trout viewed as a nuisance species. Streams and rivers have become a lot narrower due to many farmers not fencing off the access to rivers and streams contamination by stock has been detrimental to river quality. A lot of silting up of the river and streams clearly evident. More exotic weed clogging up the river ways. Lack of sufficient habitat for the tuna and kōura. All low lying lands or wetland areas are all gone due to extensive draining. A lot of bush has been cleared, mainly kahikatea, especially in the swampy low lying areas. These areas are drained and are now replaced with willow. The removal of the native bush from the banks of the rivers and streams seem to be a major reason why tuna numbers are so low these days; (Source 2) Wetlands have been drained in the Mangarapa. There are no kōura, no more watercress	**Eliminate runoff, remove trout, plant riparian areas, create habitat for tuna. Priority areas are Maniapoto's Cave and Opārure** (Source 1) [Interviewee] would actively seek to remove trout from the river. Investigate why the river flow of the Mangarapa is so sluggish these days compared to when [Interviewee] was a youngster; and determine how it can be rectified. [Interviewee] would also like a river restoration project to be implemented including planting of the riparian strips, "and maybe the planting of riparian strips whether the roots go into the water or not, because you need those places for tuna to go into to..." Give Maniapoto's Cave where the quarrying going on priority. The same up at Opārure. Actions that need to be put in place include: ensure that runoff into the river is eliminated; planting of riparian strips; and create habitat for tuna. Challenges or barriers to overcome include: availability of funding for the tributaries (i.e., Mangarapa) and the negative attitude of dairy farmers
PRESSURE 38	Mangaorino Stream	**Maniapoto's Cave**.	**Quarry**. (Source 1) For Maniapoto the pre-existing status quo failed to prevent the excavation (for quarrying) of Te Ana Uriuri o Maniapoto (protests saved from complete destruction)	**Protect sites of significance, access to information, sites of significance to Maniapoto included in monitoring programmes**. (Source 1) At Maniapoto's Cave you got the quarrying going on, that gives that area a priority. The same up at Opārure
PRESSURE 39	Mangapū River		**Quarry, sediment sources**. (Source 1) …When that quarry got consent to open McDonalds Limes Quarry, no measures got put in to safeguard our awa... That cave system has caves that run that way and I suspect that they run straight… into McDonalds Lime Quarry… I suspect the quarry has a lot to do	**Priority area for restoration, protect puna, access to information about groundwater sources/flows, access to monitoring information.** (Source 1) At Maniapoto's Cave you got the quarrying going on, that gives that area a priority. The same up at Opārure; (Source 2) ...to my knowledge

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			with the silting, the sedimentation because their works filters back into the Mangawhitikau...and feeds the Mangapū... to my knowledge there's no studies about the impact the quarry is having on all of this… (local landowner joins)...they're told to monitor that, once or twice a week. So you can get water samples… I don't get the results... But if there's more than so much rain they're gotta be down here and take a sample just to make sure...	there's no studies of what impact the quarry is having on all of this... we need to knock on their door and see if they can throw some money into the pot as well to help fence off and plant...
PRESSURE 40	NOT IN USE			
PRESSURE 41	Mangawhero Stream (Kakepuku)	**Tuna, watercress**. (Source 1) Used to be an eel farm; (Source 2) Watercress very plentiful, found in streams and drains on the western side of Kakepuku mountain near Kohatutapu on Kakepuku Rd	**Wetland drainage, farming practises**. (Source 1) Pākehā farmers created a main drain that received all the surrounding water from Te Kāwa and Kakepuku Maunga including the swamp situated between both maunga. The main drain was connected to the Mangawhero Stream that flowed out into the Waipā at Te Kōpua	
PRESSURE 42	Waitomo Stream	**Waitomo Caves**.	**Erosion, sedimentation, rubbish, wastewater.** (Source 1) Waitomo Caves affected by erosion/slips.; (Source 2) In the last 15 years Waitomo has become a significant player in the Tourism sector. Tourism numbers have increased since the opening of the Ruakurī and the Aranui Caves including the high adventure water excursions on offer. Ngāti Uekaha have some concerns about the detrimental impacts that high tourist numbers would be having on the environment but are convinced that the Ruapuha Uekaha Hapū Trust (beneficiaries of the Waitomo and Ruakurī Caves) are doing everything that they can do to minimise those impacts such as increased wastewater loading, rubbish etc. [Interviewee] noticed that there used to be one treatment pond before but now there are three. It looks like the treated wastewater is allowed to flow back into the Waitomo Stream	**User pays**. (Source 1) With an increase in tourism comes an increase in pressure on local treatment ponds, and other waste that comes with tourism. If you are going to benefit from the environment then it is only right that a part of that income helps to support and protect this valuable natural resource for all of us and the future generations of Ngāti Uekaha yet to come

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
PRESSURE 43	Waitomo Stream	**Tuna, kōura**. (Source 1) Tuna are still present but not plentiful and are the main taonga species for Ngāti Uekaha that is expected to be seen on their tables. Kōura are still present but not plentiful like in [Interviewee's] youth; (Source 2) During [Interviewee's] childhood these rivers were a lot broader, deeper and still pristine. They still had a lot of vegetation (mixture of native, willow and poplar) along the banks. The clarity of the rivers and streams was excellent. [Interviewee] said that you could see kōura and tuna very clearly; [Interviewee] harvested from the Mangapū, Waihohonu, Orāhiri and Waitomo Rivers. Kōura were very plentiful	**Commercial eeling, farming, pest weeds**. (Source 1) Commercial tuna fishers have gone through the Waitomo Valley waterways and overfished the resource. The stream life has been observed to have changed dramatically since the commercial fishers went through and fished it out. It has never recovered since then; (Source 2) Much of the habitat in the surrounding streams near Pōhatuiri has been degraded due to farming; (Source 3) There were no weeds like today	**Vision, unity, relationships, building capacity, fencing**. (Source 1) Ngāti Uekaha are worried about impacts on their taonga species. Ngāti Uekaha are no longer able to catch, cook and feed their manuwhiri, let alone themselves, and feel a deep sense of loss and frustration especially that their own tamariki and mokopuna will not know, understand or get to practice the ancient way of gathering kai. Key actions that need to be put in place include: Unify Ngāti Uekaha first and foremost to work together as one to achieve the vision; Look at setting up training courses to educate Ngāti Uekaha to look after their natural resources; Fence off of the waterways to stop stock getting in and complete riparian planting with funding from WRA to get it kick started. The key challenges to overcome include: For Ngāti Uekaha only focusing on the Waipā Tributaries is very difficult thing to do as they have always viewed all the surrounding waterways as one, not separate identities. All the waterways need to be taken into account and treated as one entity; To ensure that other hapū members of Ngāti Uekaha are supportive and to educate those who are not or do not care to become proactive about their taonga tuku iho; Creating relationships with other parts of the Waitomo Valley community especially the Farming and Tourism sector, and most importantly WDC and WRC
PRESSURE 44	Mangapū River	**Swimming.** (Source 1) A lot of sedimentation, and even in winter it's still not deep. It's not deep, like I know I remember when I was a child and we'd dive off banks, well no kids can dive off banks into the awa now they'll break their necks on the dirt…they'd just be poking up out of them mud	**Willow management, sedimentation.** (Source 1) You can see it's quite silted up…; it's quite silted up compared to what it used to be… it's quite shallow… it turns to mud once it turns into the Mangapū; Here's the willows they're all sprayed, they've fallen in… I'm of the opinion that the first big flood that comes along will wash all of those away… See the	

Map Topo ID	Location	State (past and present)	Pressure / impact	Response
			sedimentation there [Mangapū], see how shallow that is. Now when I was young it wasn't that shallow	
PRESSURE 45	Mangarama Stream	**Physical character.** (Source 1) These are traditional flood plains… meant for the rivers… to back the water up and flood it and that's why these are all rich alluvial plains... then farmers come and they don't want it to flood anymore. But that's… why they wanted it in the first place because of the richness it got from the sediment...then... they go opposite and stop it from supplying sediment to that flat, so they can put their truck loads of stuff from out here…destroying habitat and stuff in the quarry…so really from the quarry to the paddock there's nothing but damage and all they had to do really was keep letting it flood and have alternatives…they've got hills there for when it floods, they don't have to have the cows on that river flat in the front	**Farming practises.** (Source 1) I just wanted to show you this [interview during hikoi] and how big this thing is… you would hardly know that there is a big pump there pumping that awa into this awa… anything like this that gets done they're going to need to have a consent to comply to some sort of regulations… there's a flood plain there… the cowshed is up behind the shed here… so their effluent runs on the other side of that belt and… my suspicion is that farmers spray that effluent on river flats so it will runoff into the river quickly. If they were using it for fertiliser they would spray it all on the tops of the hills and it will run down and fertilise all the hills and the lowlands under the hills... I can see the effluent going off into that paddock and there's a lot of drainage drains off there which leads to this one which is then bringing it right back to over here… it's sort of an indirect way pumping it into the Mangarama… (photos) That's a canal that they've dug themselves, there was no awa there. So that awa is to carry that water down there to this awa, so that's a drain but this is an awa… So they've drained all of that to here and they've got a pump there. Now when it floods over... they pump all of that into here and push the flooding onto the next property which is another problem again… I just wanted you to see it with your own eyes… Differences in management styles/attitudes between large corporate farms vs. small family owned (and managed) farms, one puts $ into restoration only because they have to (and only if they are caught out) vs. putting $ in because they want to be part of the long term solution	**Improved farming practises, compliance and enforcement.** (Source 1) Monitoring and compliance; improved effluent management – I don't agree with it going indirectly into the streams the way this seems to be to me; I don't know why they can't manage their farms to be in-sync in the river and it's flooding. Because it's a week you know, it's not that big of an issue

Appendix D Spatial Map Data

Table D-1: The spatially mapped data derived from each wānanga and interview with Maniapoto whānau. Key themes were used to help label (e.g., KAI 1) the site specific kōrero summarised on digitised spatial maps so that these locations can be traced back to the more detailed information contributed by whānau in the pressure-state-response framework (see Appendix C). Where whānau identified specific pressures impacting the health and wellbeing of the Waipā River these were also labelled (e.g., PRESSURE 1) on the digital map. For a more detailed account of the knowledge contained in these tables please see the excel database and transcripts held by the Maniapoto Māori Trust Board.

Colour	Map ID	Brief description	Lat	Long	NZTM East	NZTM North	NZMG East	NZMG North
	KAI 1	Remnant pā tuna	-38.0683189	175.2075	1793645	5784304	2703845.9	6345950.6
	KAI 2	Remnant pā tuna	-38.0724119	175.2045	1793373	5783856	2703573.3	6345503.1
	KAI 3	Remnant pā tuna	-38.0763808	175.2048	1793386	5783415	2703585.7	6345062.2
	KAI 4	Remnant pā tuna	-38.0765948	175.2049	1793396	5783391	2703595.7	6345038.2
	KAI 5	Remnant pā tuna	-38.1042053	175.2001	1792900	5780337	2703095.7	6341985.6
	KAI 6	Kōura, piharau	-38.047506	175.1706	1790460	5786690	2700664.9	6348340.4
	KAI 7	Pā tuna	-38.0417914	175.1969	1792780	5787270	2702985.1	6348917.1
	KAI 8	Tuna	-38.1774507	175.1994	1792650	5772210	2702835	6333860.8
	KAI 9	Pā tuna, piharau	-38.0632433	175.2253	1795220	5784830	2705421.2	6346474.3
	KAI 10	Piharau	-38.1247468	175.1453	1788040	5778170	2698233.9	6339825.5
	KAI 11	Tuna, kōura	-38.2070095	175.1654	1789590	5769000	2699771.6	6330655.4
	KAI 12	Īnanga, mussels, kōura, tuna, piharau, water	-38.1825617	175.2032	1792965	5771635	2703149.2	6333285.5
	KAI 13	Tuna, īnanga, mullet	-38.1538103	175.2083	1793490	5774815	2703678.2	6336464
	KAI 14	Tuna, kōura, kāeo	-38.3939791	175.3594	1806050	5747835	2716201.2	6309475.9
	KAI 15	Tuna seeding area	-38.3941012	175.4088	1810360	5747710	2720509.6	6309345.9
	KAI 16	Tuna (esp on floods)	-38.2440644	175.1862	1791315	5764845	2701490.9	6326499.1
	KAI 17	Tuna distributed right to headwaters	-38.4496607	175.5259	1820420	5741270	2730558.4	6302896.6
	KAI 18	Kōura all through headwaters	-38.4505931	175.5244	1820290	5741170	2730428.3	6302796.8
	KAI 19	Īnanga	-38.281393	175.3526	1805775	5760345	2715941.4	6321982.3
	KAI 20	Piharau	-37.9921755	175.1949	1792740	5792780	2702952.8	6354425.9
	KAI 21	Tuna, watercress	-38.0704766	175.2288	1795505	5784020	2705705.1	6345664.1
	KAI 22	Tuna, kāeo, īnanga, watercress	-38.0634827	175.2006	1793055	5784855	2703256.8	6346502.3
	KAI 23	Tuna, kōura, piharau, mussels	-38.1888304	175.222	1794595	5770900	2704777.9	6332548.6
	KAI 24	Tuna	-38.0578609	175.1067	1784825	5785670	2695029.6	6347328.3
	KAI 25	Kōura	-38.0493663	175.1626	1789750	5786500	2699954.8	6348151.4
	KAI 26	Tuna, watercress, kōura	-38.264973	175.1981	1792300	5762500	2702472.8	6324153.5
	KAI 27	Tuna	-38.295476	175.2219	1794305	5759065	2704473	6320716.8
	KAI 28	Tuna, kōura, kāeo	-38.2370838	175.1981	1792375	5765595	2702551.6	6327247.6
	KAI 29	Tuna, watercress, pūhā	-38.2520353	175.184	1791100	5763965	2701274.9	6325619.6
	KAI 30	Tuna	-38.3205717	175.1147	1784865	5756500	2695032	6318163.9
	KAI 31	Tuna, kōura	-38.3280468	175.0822	1782005	5755735	2692171.7	6317402.5
	KAI 32	Tuna, kōura	-38.2116795	175.3011	1801465	5768195	2711642.6	6329835.4
	KAI 33	Tuna, kāeo	-38.074202	175.2812	1800090	5783495	2710288.2	6345133
	KAI 34	Tuna	-38.0120926	175.2164	1794575	5790525	2704784.2	6352168.8
	KAI 35	Piharau	-38.0909244	175.1617	1789565	5781890	2699763.5	6343542.7
	KAI 36	Kōura	-38.3781803	175.1478	1787610	5750040	2697768.7	6311702
	KAI 37	Watercress	-38.3174164	175.1148	1784880	5756850	2695047.5	6318513.8
	KAI 38	Tuna	-38.0912319	175.0798	1782380	5782020	2692580.1	6343682.3

Colour	Map ID	Brief description	Lat	Long	NZTM East	NZTM North	NZMG East	NZMG North
	KAI 39	Tuna	-38.192588	175.2139	1793875	5770500	2704057.5	6332149.6
	KAI 40	Tuna	-38.2340857	175.1036	1784110	5766120	2694289.1	6327783
	KAI 41	Tuna, kōkopu	-38.1447997	175.0775	1782045	5776080	2692237.3	6337743.8
	KAI 42	Tuna	-38.2381379	175.1485	1788030	5765580	2698207.6	6327238.1
	KAI 43	Kōura	-38.2407044	175.1013	1783895	5765390	2694073.2	6327053.4
	KAI 44	Kōura, watercress	-38.261424	175.0661	1780765	5763160	2690941	6324827.7
	KAI 45	Kōkopu	-38.0933952	175.115	1785470	5781710	2695669.1	6343368.2
	KAI 46	Tuna, kānga wai	-38.2113833	175.1846	1791265	5768475	2701445.5	6330128.4
	KAI 47	Tuna, trout	-38.2603701	175.1051	1784180	5763200	2694355.4	6324863.4
	KAI 48	Tuna	-38.2273375	175.3022	1801515	5766455	2711690.3	6328095.9
	KAI 49	Tuna, trout	-38.3333975	175.1005	1783590	5755105	2693755.6	6316770.7
	KAI 50	Tuna	-38.3377879	175.1044	1783920	5754610	2694085	6316275.4
	KAI 51	Kōura, kāeo, watercress	-38.3190856	175.1147	1784865	5756665	2695032.2	6318328.9
	KAI 52	Watercress	-38.3299668	175.0933	1782970	5755500	2693136.2	6317166.4
	KAI 53	Piharau	-37.9546069	175.1653	1790235	5797010	2700454.4	6358658.5
	KAI 54	Piharau	-37.9446133	175.1228	1786525	5798205	2696746.8	6359858.6
	KAI 55	Piharau	-38.0896078	175.085	1782840	5782190	2693040.2	6343851.7
	KAI 56	Carp	-38.0553492	175.1995	1792975	5785760	2703178	6347407.2
	KAI 57	Tuna	-38.0771288	175.167	1790070	5783410	2700270.5	6345061.7
	WAI 1	Water supply	-38.0370312	175.072	1781830	5788050	2692038.4	6349712
	WAI 2	Hikiwikiwi puna important	-38.4294447	175.2909	1799965	5744050	2710113.6	6305699.1
	WAI 3	Drinking water	-38.3878715	175.4355	1812715	5748340	2722864.5	6309972.9
	WAI 4	Physical / natural character	-38.4119682	175.3832	1808080	5745785	2718228.1	6307424.2
	WAI 5	Puna	-38.4686238	175.5072	1818730	5739210	2728866.7	6300839.4
	WAI 6	Access between marae - good flow of water	-38.0131958	175.208	1793834.7	5790420.1	2704044	6352065
	WAI 7	Access - waka across awa	-38.0628877	175.2011	1793100	5784920	2703301.9	6346567.2
	WAI 8	Healing	-38.159839	175.2515	1797255	5774055	2707441.3	6335699.3
	WAI 9	Puna	-38.2500357	175.1728	1790125	5764210	2700300.4	6325865.8
	WAI 10	Puna	-38.2519991	175.2076	1793165	5763920	2703339.3	6325572
	WAI 11	Power generation	-38.4633846	175.4782	1816215	5739860	2726353.4	6301491.9
	WAI 12	Puna	-38.1528475	175.2044	1793150	5774930	2703338.5	6336579.5
	WAI 13	Puna, kānga wai	-38.2378945	175.0922	1783100	5765720	2693278.8	6327384.3
	WAI 14	Horotea Stream	-38.2424228	175.101	1783860	5765200	2694038	6326863.4
	WAI 15	Puna-o-te-roimata	-38.2338579	175.1875	1791455	5765975	2701632.3	6327628.7
	WAI 16	Pristine wetlands	-38.2245116	175.1667	1789660	5767055	2699839.1	6328710.8
	WAI 17	Wetlands	-38.289714	175.0355	1778015	5760080	2688187.7	6321751.6
	WAI 18	Water quality historical flow	-38.332197	175.0971	1783295	5755245	2693460.8	6316911
	WAI 19	Pōtea Puna	-38.3317211	175.096	1783200	5755300	2693365.9	6316966.2
	WAI 20	Puna (three of them around Marae)	-38.0622533	175.2061	1793540	5784980	2703741.8	6346626.6
	WAI 21	Puna	-38.3794364	175.1333	1786340	5749930	2696498.9	6311593.5
	WAI 22	Puna for making black dye	-38.3160915	175.1183	1785190	5756990	2695357.6	6318653.4
	SWIM 1	Swimming	-38.3004279	175.1496	1787970	5758665	2698139	6320324.7
	SWIM 2	Swimming	-38.1910753	175.2129	1793790	5770670	2703972.8	6332319.6
	SWIM 3	Swimming	-38.244954	175.1844	1791155	5764750	2701330.9	6326404.4

Colour	Map ID	Brief description	Lat	Long	NZTM East	NZTM North	NZMG East	NZMG North
	SWIM 4	Swimming	-38.0632504	175.2058	1793510	5784870	2703711.7	6346516.6
	SWIM 5	Swimming	-38.324053	175.1537	1788260	5756035	2698425.8	6317694.9
	SWIM 6	Swimming	-38.1530463	175.2082	1793484.7	5774900	2703673	6336549
	SWIM 7	Swimming	-38.2820558	175.3533	1805830	5760270	2715996.3	6321907.3
	SWIM 8	Swimming	-38.333001	175.1668	1789390	5755015	2699554.3	6316673.7
	SWIM 9	Swimming	-38.0619778	175.1481	1788445	5785130	2698648.1	6346783.5
	SWIM 10	Swimming	-38.2634945	175.1976	1792265	5762665	2702438	6324318.5
	SWIM 11	Swimming	-38.241386	175.101	1783865	5765315	2694043.1	6326978.4
	SWIM 12	Swimming	-38.2605656	175.1018	1783885	5763185	2694060.4	6324848.8
	SWIM 13	Swimming	-38.1857159	175.2008	1792745	5771290	2702928.8	6332940.8
	SWIM 14	Swimming	-38.3325702	175.1012	1783655.3	5755195.4	2693821	6316861
	SWIM 15	Swimming	-38.3193362	175.1158	1784960	5756635	2695127.2	6318298.8
	SWIM 16	Swimming	-38.0639876	175.2001	1793010	5784800	2703211.7	6346447.3
	SWIM 17	Swimming	-38.3155854	175.1214	1785460	5757040	2695627.6	6318703.1
	SWIM 18	Swimming	-38.1981504	175.253	1797290	5769800	2707470.8	6331445.4
	SIGNIFICANT SITE 1	Urupā	-38.1919352	175.2127	1793770	5770575	2703952.7	6332224.7
	SIGNIFICANT SITE 2	Tūpāpaku	-38.1858257	175.2189	1794330	5771240	2704513.4	6332888.8
	SIGNIFICANT SITE 3	Pekepeke	-38.4323906	175.5453	1822170	5743140	2732309.8	6304763.9
	SIGNIFICANT SITE 4	Hapahapai o Tarapikau	-38.4138413	175.4367	1812745	5745455	2722891.1	6307088.9
	SIGNIFICANT SITE 5	Huipūtea	-38.1899408	175.2108	1793615	5770800.2	2703798	6332450
	SIGNIFICANT SITE 6	River crossing, access between marae	-38.323961	175.1166	1785025	5756120	2695191.5	6317783.8
	SIGNIFICANT SITE 7	Three sisters	-38.0937954	175.2838	1800265	5781315	2710460.2	6342953.4
	SIGNIFICANT SITE 8	Urupā	-38.061232	175.1469	1788350	5785215	2698553.3	6346868.6
	SIGNIFICANT SITE 9	Maniapoto's Cave	-38.2915547	175.1812	1790755	5759585	2700924.5	6321241
	SIGNIFICANT SITE 10	Waitomo caves	-38.2596179	175.1019	1783895	5763290	2694070.6	6324953.8
	SIGNIFICANT SITE 11	Rongoā	-38.3578935	175.1138	1784690	5752360	2694852.1	6314025
	SIGNIFICANT SITE 12	Taniwha	-38.1475888	175.1723	1790350	5775580	2700540	6337233
	SIGNIFICANT SITE 13	Parianiwaniwa urupā	-38.2452452	175.0943	1783270	5764900	2693447.7	6326564.2
	SIGNIFICANT SITE 14	Ruakuri cave	-38.2340827	175.0886	1782800	5766150	2692979.4	6327814.6
	SIGNIFICANT SITE 15	Burial caves	-38.3201771	175.0661	1780615	5756640	2690783	6318309
	SIGNIFICANT SITE 16	Patupaiarehe	-38.0724505	175.2505	1797405	5783755	2707604.2	6345396.6
	SIGNIFICANT SITE 17	Reserve - Te Kooti	-38.5356615	175.5363	1821070	5731700	2731197.4	6293329.7
	SIGNIFICANT SITE 18	Taniwha	-38.3145885	175.1217	1785490	5757150	2695657.7	6318813
	TAONGA SPECIES & MATERIALS 1	Kōkopu	-38.3923286	175.4183	1811195	5747885	2721344.5	6309519.9
	TAONGA SPECIES & MATERIALS 2	Miro	-38.370906	175.4259	1811925	5750245	2722077	6311878.2
	TAONGA SPECIES & MATERIALS 3	Mahi tītī	-38.3453055	175.4459	1813750	5753040	2723904.7	6314670
	TAONGA SPECIES & MATERIALS 4	Kōkopu	-38.4141457	175.4887	1817280	5745300	2727424.2	6306928.7
	TAONGA SPECIES & MATERIALS 5	Bird corridor	-38.4938485	175.5408	1821585	5736330	2731717.3	6297957.3

Colour	Map ID	Brief description	Lat	Long	NZTM East	NZTM North	NZMG East	NZMG North
	TAONGA SPECIES & MATERIALS 6	Pā harakeke	-38.2371954	175.0909	1782995	5765800	2693173.9	6327464.4
	TAONGA SPECIES & MATERIALS 7	Kererū, miro	-38.2305285	175.0833	1782340	5766555	2692520	6328220.1
	TAONGA SPECIES & MATERIALS 8	Paru used for dyeing piupiu and whariki	-38.0642517	175.2053	1793460	5784760	2703661.6	6346406.7
	TAONGA SPECIES & MATERIALS 9	Rongoā - kawakawa	-38.3567547	175.112	1784539.7	5752489.9	2694702	6314155
	TAONGA SPECIES & MATERIALS 10	Miro, cabbage tress	-38.5337957	175.5351	1820970	5731910	2731097.7	6293539.8
	PRESSURE 1	Oxidation ponds	-37.9948953	175.2909	1801160	5792275	2711370	6353909.1
	PRESSURE 2	Weir	-38.1892613	175.223	1794685	5770850	2704867.8	6332498.4
	PRESSURE 3	Flood control	-38.192315	175.2045	1793050	5770550	2703232.8	6332200.6
	PRESSURE 4	Flood control	-38.194238	175.2148	1793950	5770315	2704132.3	6331964.5
	PRESSURE 5	Flood control	-38.0516847	175.1688	1790290	5786230	2700494.3	6347880.7
	PRESSURE 6	Hillside subdivision	-37.9974824	175.1516	1788920	5792280	2699132.9	6353931.3
	PRESSURE 7	Flood control	-37.9794672	175.1902	1792360	5794200	2702574.9	6355846.1
	PRESSURE 8	Residential subdivisions, dairy farming	-38.0635879	175.2404	1796540	5784760	2706740.8	6346402.5
	PRESSURE 9	Flood control	-38.1802973	175.2014	1792815	5771890	2702999.6	6333540.6
	PRESSURE 10	Sewage 1960’s and early 70’s	-38.1805869	175.2028	1792935	5771855	2703119.5	6333505.5
	PRESSURE 11	Goldfish	-38.2988634	175.149	1787915	5758840	2698084.2	6320499.7
	PRESSURE 12	Algal blooms	-38.2997954	175.1497	1787980	5758735	2698149.1	6320394.6
	PRESSURE 13	Nutrients and nitrates	-38.4291344	175.4162	1810905	5743805	2721049.9	6305441.6
	PRESSURE 14	Nutrients and nitrates	-38.431545	175.3887	1808500	5743600	2718645.5	6305239.4
	PRESSURE 15	Sediment, P, deforestation, erosion	-38.4039438	175.3746	1807350	5746695	2717499.4	6308334.7
	PRESSURE 16	Gravel extraction	-38.1898757	175.212	1793715	5770805	2703898	6332454.7
	PRESSURE 17	Raupatu	-38.1856452	175.2021	1792865	5771295	2703048.8	6332945.7
	PRESSURE 18	Carp, farm runoff, gravel extraction	-38.0630048	175.2045	1793395	5784900	2703596.8	6346546.8
	PRESSURE 19	Water extraction, drought	-38.0307599	175.1353	1787410	5788620	2697618.1	6350274.2
	PRESSURE 20	Water extraction	-37.9858619	175.2711	1799450	5793320	2709662	6354956.3
	PRESSURE 21	Water extraction	-38.3375464	175.1696	1789615	5754505	2699778.6	6316163.6
	PRESSURE 22	Flood control	-38.1839018	175.211	1793645	5771470	2703828.8	6333119.6
	PRESSURE 23	Flood control	-38.3285999	175.1192	1785240	5755600	2695405.9	6317263.6
	PRESSURE 24	Sewage overflow	-38.3145056	175.151	1788050	5757100	2698217.1	6318759.9
	PRESSURE 25	Timberworks	-38.323943	175.1547	1788355	5756045	2698520.7	6317704.8
	PRESSURE 26	Forestry	-38.4314524	175.5469	1822310.1	5743240.3	2732450	6304864
	PRESSURE 27	Erosion - large slips	-38.3296045	175.3947	1809315	5754900	2719473.5	6316534.7
	PRESSURE 28	Sedimentation	-38.2288155	175.3027	1801550	5766290	2711725.1	6327930.9
	PRESSURE 29	Erosion - large events	-38.3958477	175.4027	1809825	5747530	2719974.6	6309166.6
	PRESSURE 30	Sediment	-38.2830001	175.3534	1805835	5760165	2716001.1	6321802.3
	PRESSURE 31	Piggery	-38.0731879	175.1779	1791035	5783825	2701235.8	6345475.3
	PRESSURE 32A	Erosion	-38.1422934	175.2074	1793440	5776095	2703629.9	6337743.8
	PRESSURE 32B	Erosion	-38.1474192	175.2127	1793895	5775515	2704084.1	6337163.3
	PRESSURE 33	Willow clearance	-38.1865672	175.201	1792765	5771195	2702948.7	6332845.8

Colour	Map ID	Brief description	Lat	Long	NZTM East	NZTM North	NZMG East	NZMG North
	PRESSURE 34	Gravel extraction	-38.2072447	175.2674	1798525	5768760	2708704.1	6330404
	PRESSURE 35	Rubbish, pollution, flow, pest fish	-38.3338386	175.1678	1789475	5754920	2699639.1	6316578.7
	PRESSURE 36	Sediment, algae, oxygen weed, willows, erosion, flooding	-38.0497997	175.1609	1789600.3	5786455.4	2699805	6348107
	PRESSURE 37	Dairy farming, riparian removal	-38.266104	175.1978	1792275	5762375	2702447.6	6324028.5
	PRESSURE 38	Quarry	-38.2918482	175.18	1790645	5759555	2700814.5	6321211.2
	PRESSURE 39*	Quarry	-38.3385972	175.0742	1781275	5754580	2691440.4	6316248.6
	PRESSURE 41*	Wetland drainage, farm runoff	-38.0831043	175.2705	1799130	5782530	2709327.1	6344169.6
	PRESSURE 42	Erosion, sediment, rubbish, wastewater	-38.2587602	175.0994	1783685	5763390	2693860.7	6325054
	PRESSURE 43	Commercial eeling	-38.2075987	175.153	1788500	5768960	2698681.8	6330616.8
	PRESSURE 44	Willow management	-38.3340331	175.1002	1783565	5755035	2693730.5	6316700.8
	PRESSURE 45	Pump station, enforcement	-38.3322152	175.1061	1784085	5755225	2694250.7	6316890.1

*, PRESSURE 40 not in use.

Appendix E Decision Explorer Analyses

As mentioned previously (see Section 2.3) once the concept map was developed, different types of analyses are undertaken to identify common themes and priorities (i.e., across all knowledge sources). Three analytical tools (domain, centrality and cluster analysis) enabled the identification of the priority catchment pressures and issues captured in the concept maps that, if addressed, are likely to deliver the outcomes sought by Maniapoto whānau, hapū and iwi. The detailed results of each of the analyses are provided below. A summary of these results (i.e., that pulls the domain, centrality, and cluster analyses together) is presented in the main body of the report (Section 3.2).

7.1.1 Domain Analysis

For this analysis the program calculates how many concepts in the map are immediately related to it, i.e., it only looks at one level of links around a concept. This enables us to identify which concepts are the best elaborated or have a high density of links around them. This provides us with an idea of the concepts that are key and warrant further investigation. This analysis revealed the following outcomes sought by whānau, the pressures and issues that need to be addressed and the catchments where action is a priority (Table E-1). The priorities and possible responses are further discussed in Section 4.

Table E-1: Results of the Decision Explorer® domain analysis using knowledge contributed by Maniapoto whānau. Domain analysis provides us with an idea of the concepts that are key and warrant further investigation.

Priority outcomes	Pressures that need to be addressed	Issues that need to be addressed	Priority catchments
1. Waters that are productive, clean, and able to be safely utilised by whānau (kai gathering, swimming, waka ama etc).	1. Farming.	1. Water quality.	1. Waipā.
2. Sites of significance protected.	2. Vegetation clearance.	2. Erosion, including high sediment inputs.	2. Waitomo.
3. Kai populations, abundant throughout their historic range, and being gathered by whānau.	3. Activities associated with river control.	3. Declining populations of species.	3. Mangaokewa.
		4. Loss of habitats.	4. Moakurarua
		5. Changing shape of the rivers.	5. Mangarapa
			6. Mangapū

7.1.2 Centrality Analysis

This analysis is similar to the domain analysis, but it calculates the results using more than one “level” (i.e., not just the concepts immediately linked to a specific concept) to include also those which link to and through them. In other words it **looks at the ripple effect** – i.e., multiple levels of knowledge and thus provides guidance in discovering the centrality of the concept to the whole concept map rather than just its immediate vicinity. Although the results of this analysis are the same as listed in Table 4 with the domain analysis, generally in most cases the order changes (Table E-2).

Table E-2: Results of the Decision Explorer® centrality analysis using knowledge contributed by Maniapoto whānau. Centrality analysis looks at the ripple effect and provides guidance in discovering the centrality of the concept to the whole concept map rather than just its immediate vicinity.

Priority outcomes	Pressures that need to be addressed	Issues that need to be addressed	Priority catchments
1. Waters that are productive, clean, and able to be safely utilised by whānau for a variety of cultural activities (e.g. kai gathering, swimming, rongoā, waka ama etc). 2. Kai populations, that are abundant, found throughout their historic range, and being gathered by whānau	1. Vegetation clearance 2. Farming; and 3. Activities associated with river control.	1. Water quality; 2. Erosion, including high sediment inputs; 3. Loss of habitats, including the loss of wetlands 4. Declining populations of species, and changes in the condition / quality of kai gathered; 5. Changing shape of the rivers	1. Waipā; 2. Waitomo; 3. Mangaokewa 4. Mangarapa 5. Mangapū 6. Moakurarua

7.1.3 Cluster Analysis

Cluster analysis or clustering is the task of grouping concepts in such a way that concepts in the same group (called a cluster) are more similar than to those in other groups (clusters). Because we are dealing with more than 100 concepts cluster analysis is a good way to know how many big groupings of issues need to be tackled. Clustering is a grouping of concepts rather than a prioritisation.

Four “big picture” themes were identified: 1) The waters of the catchment need to be the subject of restoration efforts; 2) Management of significant sites; 3) Restoring the rivers for non-kai uses such as waka ama, rongoā, swimming, etc; and 4) The rights of whānau to use their lands and resources.

Appendix F Implementation Strategy

The priority responses listed in this report generally recognise four different types of implementation, including: collaboration, regulation, restoration, communication and advocacy (see Section 4.1.1). In this appendix the project team suggest the types of strategies that could be used to implement each response.

Table F-1: Vegetation clearance pressures in the Waipā catchment.

Response	Implementation strategy
Protect the "remaining good stuff"	Regulate via policies and rules in regional and district plans
Prohibit any further clearance of indigenous vegetation	Regulate via policies and rules in regional and district plans
Support re-vegetation projects that "link" and provide ecological corridors	Collaborate to scope projects, then restore

Table F-2: Farming pressures in the Waipā catchment.

Response	Implementation strategy
Provide technical advice to farmers	Collaborate
Investigation of alternative land uses	Collaborate
Pilot innovations on some farms	Collaborate
Conduct riparian health assessments for Waipā waterways	Regulate role for cultural monitoring, collaborate with whānau to implement
Support investigation of "legacy" contamination on farms	Collaborate
Encourage protection of groundwater and improved management of current landfills	Communicate and advocate
Initiate a project to work with the governors and managers of Māori land blocks	Collaborate
MMTB to investigate a role in the development and monitoring farm management plans	Collaborate to define role, then regulate role
Increase effectiveness of effluent management	Communicate and advocate best practice, the collaborate to ensure implementation
Establish land refuse stations in rural areas	Regulate via policies and rules in regional and district plans

Table F-3: River control and sites of significance pressures in the Waipā catchment.

Response	Implementation strategy
Secure targeted funding from central government to enable these issues to be addressed	Advocate at national level
Review the flood risk to marae and agree on mitigation strategies with whānau	Collaborate with Council, scientists, engineers, and affected whānau
Raise awareness within the community of the need for sustainable financing of infrastructure	Communicate and advocate
Influence central government to provide long-term funding programmes accessible to smaller rural communities to enable upgrades of infrastructure	Advocate at national level
Review stopbanks along the river to identify instances of "informal stopbanking". Whānau can identify examples where informal and ad-hoc construction adds to erosion problems	Collaborate with Council, scientists, engineers, and affected whānau
Review permitted activity status for drainage activities	Collaborate for the review, regulate changes via rules in regional plans
Areas or sites of significance to Maniapoto whānau are protected and included in monitoring programmes	Regulate via policies and rules in regional and district plans

Table F-4: Water quality issues in the Waipā catchment.

Response	Implementation strategy
Identify areas where development activities should be prohibited to protect water resource values	Regulate via policies and rules in regional and district plans
Review current regulations in statutory plans and policies	Regulate via policies and rules in regional and district plans
Develop and implement guidelines for instream, upstream or upslope development activities	Collaborate and then regulate where necessary to give effect to the guidelines
Develop a study/programme across the catchment that monitors the use and quality of water supplies for communities and marae (e.g., using surface and groundwaters (e.g., puna) in the catchment as the main source of water for washing and drinking	Collaborate
Eliminate sewage inputs from Te Kūiti, Ōtorohanga and Te Awamutu directly into waterways. In the interim MMTB to determine whether rock passage at the Ōtorohanga and Te Awamutu WWTPs is acceptable to whānau in terms of providing cleansing contact with the land	Regulate via policies and rules in regional and district plans, and consent conditions.

Table F-5: Erosion and high sediment load issues in the Waipā catchment.

Response	Implementation strategy
Establish an extensive planting regime, especially along the river banks that have no vegetation at all	Collaborate if necessary to develop plans, then restore
Investigate the feasibility of retirement and afforestation of steep dry stock farmland in the Waipā	Collaborate and then regulate where necessary to implement initiatives
Identify areas that are eroding badly and where localised engineering works are required to stabilise major earthflows and river bends	Collaborate and then regulate where necessary to implement initiatives, then restore
Review the willow management programme	Collaborate with Council, scientists, engineers, and whānau
Work with the harbourmaster to address issues of water users entering the navigable part of the Waipā	Collaborate

Table F-6: Loss of habitat issues (including puna, wetlands and changing shape of the river) in the Waipā catchment.

Response	Implementation Strategy
Identify wetland areas and puna within the rohe, at the strategic and landscape scales, where development activities should be prohibited to protect water resource values	Regulate via policies and rules in regional and district plans
Review current regulations and guidelines in place to protect riparian areas and freshwater resources	Collaborate and then regulate where necessary to give effect to the guidelines
Improve communication about the protection of fish habitat and riparian areas	Communicate and advocate
Support local whānau groups in their restoration initiatives	Restore
Restore stream habitats, create/restore lowland ponds and retrofit structures that are a barrier to passage	Restore
Investigate the levels of wetlands and security of water supply to wetlands	Collaborate during the investigative phase, regulate to protect levels if necessary, restore if needed

Table F-7: Declining populations of species issues in the Waipā catchment.

Response	Implementation Strategy
Describe preferred habitat and environmental conditions for taonga and kai species throughout their life cycle	Collaborate with Council, scientists and whānau
Assess fish habitat and water quality limitations in the Waipā	Collaborate with Council, scientists and whānau
Investigate contaminants in kai species	Collaborate with scientists and whānau
Identify priorities to maintain and improve fish passage and connectivity	Collaborate with Council, scientists, and whānau, restore where necessary
Develop, implement and monitor species-specific restoration projects	Collaborate during development phase, restore
Improve fisheries habitat by fencing riparian areas to stabilise banks and planting native vegetation	Restore, regulate if necessary
Improve knowledge and importance of lamprey, locate and protect spawning areas	Collaborate during knowledge collection phase, then regulate where necessary to give effect to protection requirement.
Develop, evaluate, implement methods for introducing adults and/or juveniles into areas	Collaborate
Support projects to control key predators / competitors	Restore
Investigate new technologies like fish farming/ranching	Collaborate during investigation phase
Identify areas within the rohe where development activities should be prohibited	Regulate via policies and rules in regional and district plans
Identify a mosaic of areas within the rohe at the strategic scale where development activities are restricted	Regulate via policies and rules in regional and district plans
Require site level assessments prior to any development activity	Regulate via policies and rules in regional and district plans
Prohibit development or disturbance in any area adjacent to or within fish habitats	Regulate via policies and rules in regional and district plans
Identify and pursue capacity building initiatives	Collaborate
Restoring or creating new adult tuna habitat	Collaborate during development of initiatives, then restore
Revise tuna catch regulations	Regulate