

KAHUNGUNU KI WAIRARAPA

Cultural Perspective for the Research of the Effluent Process

A Wairarapa Perspective

Rawiri Smith

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Introduction

My name is Rawiri Smith and I am a resource consent officer for my iwi, Kahungunu Ki Wairarapa and have been asked to present an iwi view of the effluent process generally and about two specific research projects, a filter system that confronts perceptions of effluent treatment and a feasibility system that caters for municipal treated effluent.

Ngati Kahungunu is one of the two recognised iwi in the Wairarapa. The mandate was signed by hapu and marae in the document He Kawa Whakakotahi. I was the signee for Hurunuiorangi Marae. My tipuna, or ancestors include Whatahoro Jury, Tutawake, Namana and link strongly to the Whanau between Te Whiti and Hurunuiorangi. Uncle Kuki Rimene said of our whakapapa it reaches from the north to south and east to west in the Wairarapa boundaries set by Pehi Tutepakihirangi from the Manawatu River to Raukawa and from Tararua to Te Tai Rawhiti. Both my grandfather and grandmother taught me as an older mokopuna or grandchild why I belong to Kahungunu. They both taught me about our place and the traditions of our people in these places. They both taught the mana we should have in Whanau.

One of the issues not directly addressed in this analysis is the effects of taniwha. The perception of taniwha from the wider New Zealand community is fraught with stereotype based in another belief system, so I have outlined in appendix 3 why Maori have such a strong affinity with taniwha and their complex connection with water.

While we present a real life example based in our district and in our kainga, the process of gaining a cultural health monitoring is the more important part of this exercise because for each cultural entity throughout the motu, island, and in each rohe or district it will be different. Some of the process will seem contrived but as I tried to keep the character areas I wished to comment on from overlapping, an order and a process emerged. As a writer of Cultural Impact Assessments, I sometimes the level of cultural thought is mixed throughout. In this project, 4 levels of thought emerged, with the first three self explanatory, but the fourth character a little different. The Whakaaro Hou characteristic tried to satisfy the problems with the first three, but taking into account the order of importance, tohunga first, kaitiaki second and hokohoktanga third. I fully expect the learned people from other areas will do this more successfully than I. This separation also led to the four community well beings from the Local Government Act lining up with the characteristics, the first with cultural well being, the second with environmental well being, the third with economic well being and the fourth with social well being. It needs to be stated that Maori have a different way of seeing these well beings from the mainstream concepts. I hope it might be a framework for others.

Cultural Perspective on Effluent Process

Critical theorising is a school of thought emerging from Germany that challenged hegemonic thinking. Indigenous studies amongst Maori theorists like Graeme Smith examined what was needed for Maori research and came up with six principles that Maori research should include so that Maori might benefit from any research that they are involved in. The benefits needed to extend passed the conceptual to the transformative.

Kaupapa Maori Principles

1. transformative principle that seeks transformative action;
2. whanau principle that seeks benefit for all parts of the community
3. socio economic principle that acknowledges the difficulties whanau face
4. taonga tuku iho principle that acknowledges what we have been passed down to us
5. the ako principle that acknowledges the preferred way Maori want to transmit knowledge
6. The kaupapa principle of a collective vision from the people going forward

Transformative Principle that seeks transformative action

This key principle is the focus of this cultural perspective because Maori need to ensure that research is not just conceptual theorising, but can lead to transformational action. There is too much for Maori to do not to seek transformative action. The first stage is to identify iwi characteristics so actions can be assessed with respect to them. Iwi throughout the country are known generally for character traits that identify them as they want to be recognised. A broad principle of the treaty of Waitangi is iwi participating in the community in their own right. Four characteristics of Wairarapa Maori that this report will concentrate on are tohungatanga, kaitiakitanga, whakaaro hou and hokohokotanga.

Characteristic 1: Tohungatanga

While many areas are well known for their tohunga, Wairarapa Maori stressed the importance of matauranga Maori by asking that this tertiary level of thinking be recorded for future generations. Spiritual rituals led by the tohunga like the tohi ceremony with some similarities to blessings of children were associated with water. The concept of mauri is associated with water too, both mauri ora and mauri mate. Quality measures of water relate to the life bearing ability in the following descriptors:

- a. Waiora: Life giving water, both physically and spiritually
- b. Waitapu: Sacred water like waitohi, water used for tohi rites
- c. Waimaori: Normal water used for routine activities like a source for drinking water
- d. Waikino: Bad water like floodwaters or a stretch of water where someone drowned. Often a temporary state that can return to waimaori
- e. Waimate: Water that leads to sickness and/or death
- f. Waitai: Salt water including brackish water that supports different fauna and flora

Each grade of wai or water has a spiritual component. Other markers of spiritual significance are taniwha, pou rahui, waiata, whakatauki and oriori. All are important as tohunga deal with essential elements of being tangata whenua. A concrete example of this is that fathers would fetch their daughters to give birth to their children even though the daughters had moved to their husband's whenua so the tohi rite could occur on the whenua of the patriarch. The pito, or umbilical chord and the whenua or after birth burying ritual would further connect a child to the whenua. All rituals were overseen by a tohunga.

Characteristic 2: Kaitiakitanga

Again this aspect is not solely found in Wairarapa, but the extent of the examples of kaitiakitanga implies the great significance it had for Wairarapa Maori. The size of the kumara gardens remains extends from Palliser Bay to Te Unuunu indicates that extensive rather than intensive agriculture was practiced. The stewardship here was to ensure gardens were developed in a sustainable manner. The soil profiles in the gardens were adjusted for better growing conditions. Transplanting of karaka trees from their coastal habitat into interior lands was performed again sustainably in the ngahere. Pou rahui, a pole to signify the temporary closure of an area from use was mentioned with spiritual rites, but is also put in place when there were physical concerns like poor water quality. Ensuring that different elements are kept in their own space like the separation of human elements from the food chain is part of tikanga Maori, Maori truths.

Characteristic 3: Hokohokotanga

Trade was an important characteristic for Wairarapa Maori and again the extent of internal and external trade was such a scale and such a part of the thinking that the first contact with Captain Cook was about trade. Wairarapa Maori were made aware through its communication networks that Cook had nails. There was no record of Wairarapa Maori going through any ceremony, but went aboard the Endeavour to offer koura or crayfish for nails. The context for pre-European trade was Maori being in a gifting economy. The extent of the aquaculture with respect to trade of eels was larger than commercial levels today. Trade though was a lot larger than the commercial exchange where relationships were forged, peace maintained, status levels acknowledged, superior technology gained and the process of travel through rohe facilitated. Hokohokotanga was not risked by perceptions of inferior products, much like the Fonterra standards are trying to overcome.

Characteristic 4: Whakaaro Hou

Innovation is a characteristic of Wairarapa Maori because it was a necessity for a group of Maori with smaller populations than other tribes, not having some of the natural resources for stoneage technology. Again the evidence for this characteristic comes from the extent to which innovation was used in Wairarapa. A large technological step was taken by Wairarapa Maori when European settlement brought so many new technological advances. Wairarapa Maori took up economic thinking like leasing opportunities, communication skills including the production of newspapers, political thinking including the development of a Maori parliament and as mentioned above the development of an extensive agriculture. The development of pa tuna, or eel traps was

an innovation in the waterways. The transformative action for Maori can come as tino rangatiratanga for specific rohe by allowing Maori to participate in their own right. While Maori have aspirations we recognise that we have limited autonomy and as such we want to work with mainstream developments in priority areas outlined in characteristics of each iwi or each rohe or area. The rest of the kaupapa Maori approach again will be viewed in terms of these rohe characteristics.

The wastewater treatment systems being researched need to be measured in demographic stages. The various parts of the community will be investigated in other kaupapa Maori principles.

The different demographic stages are:

1. Uri: How are descendants affected by the range of treatment systems?
2. Pepe: How are babies affected by the range of treatment systems?
3. Tamariki: How are children affected by the range of treatment systems?
4. Rangatahi: How are youth affected by the range of treatment systems?
5. Pakeke: How are adults affected by the range of treatment systems?
6. Kaumatua: How are the elderly affected by the range of treatment systems?
7. Tipuna: How are our ancestors affected by the range of treatment systems?

Broad questions to answer for all demographic stages are:

1. How will the collection of human waste affect each whanau stage?
2. How will the treatment of human waste affect each whanau stage?
3. How will the treated human effluent in terms of human content affect each whanau stage?
4. How will the treated human effluent in terms of nutrient affect each whanau stage?
5. How will the discharge to water of the treated human effluent in terms of human content affect each whanau stage?
6. How will the discharge to water of the treated human effluent in terms of nutrients affect each whanau stage?
7. How will the discharge to land of the treated human effluent in terms of human content affect each whanau stage?
8. How will the discharge to land of the treated human effluent in terms of nutrients affect each whanau stage?
9. How will the various irrigation methods of the treated human effluent in terms of nutrients affect each whanau stage?

This whanau principle is demonstrated in Appendix One when demographic sections are viewed separately with respect to water resources. In reality these false sections are much more integrated from tipuna our past generations to uri, the future generations.

*Socio Economic principle that acknowledges
the difficulties whanau face*

This principle means that a Maori researcher should understand how whanau need to take account of the economic constraints placed on whanau

The expense related to all parts of the process involved in effluent treatment for majority of Maori occurs in the public domain.

- a. For home owners district council rates cover the effluent process
- b. For rental properties the expense of rates is covered in higher rental
- c. Cheaper effluent systems might not cost in financial terms but the environment is left to pay
- d. Restraints placed on public recreation like not using swimming holes because of the poor quality of water
- e. Maori like other parts of the community are kept from the environment because it is polluted so the community is kept from realising the real price they are paying to maintain a “flush and forget” mentality

The deferred income also affects whanau Maori

1. Polluted water does not allow subsistent aquaculture for the unemployed to gather kai from water bodies that support indigenous flora and fauna.
2. Whanau that want to supplement their under employment by continuing their customary practice of gaining food resources are not able to because pollution from human sources in the waterways
3. Whanau businesses are kept from a traditional economic base by treated effluent because of its effect on primary production like tuna or eels are limited by poor habitat; the large base of wetlands could have been another treatment as a filter of treated effluent and a base for a weaving business in different types of harakeke including raupo; contemporary business like a range of farming opportunities can be an opportunity with treated effluent's nutrients transforming into vegetation
4. Export business opportunity from increasing the quality of treated effluent needs to be considered to fit with the marketing image and the aspiration of Maori to be economically advantaged by enhancing the environment as responsible kaitiaki
5. Eco tourism has an opportunity in Wairarapa as Wellington's hinterland, but needs the raising of standards in aspects like the quality of treated effluent

Taonga Tuku Iho Principle that acknowledges

what has been passed down to us

The fear for Maori is the polluting of the water infrastructure, natural and man made because it could become too difficult to recover from.

1. The enhancement of the water infrastructure: surface waterways – awa, manga me roto, groundwater, springs – puna, water supply, wastewater, dams in all their sizes, storm water, water races, drains including tile drains.
2. While man-made structures are not taonga tuku iho, they can affect, directly, the natural resources that are our taonga
3. The fear that whenua will be contaminated is like taking a treasure and burdening future generations with the misuse and undervaluing of the taonga
4. Valuing indigenous flora and indigenous fauna can be a part of our limiting the effects of treated effluent.
5. Valuing our matauranga (all types of knowledge especially spiritual knowledge Maori as an asset to use in the enhancement of our environment

The Ako Principle that acknowledges the preferred way Maori want to transmit knowledge

The examination of how the range of issues being research affects the cultural landscape at a conceptual level is discussed in this report. The matrix set up for measuring the cultural effects in a physical sense of the issues being researched can be found at the end of this report. This section will set out the reasoning behind a cultural approach to research. The choice of what to monitor as cultural health indices looks at indicative features from a cultural habitat that aligns with cultural choices. How to monitor, when to monitor and what expertise might be needed to monitor cultural indices will be outlined with respect to each part of the effluent process like the matrix immediately below.

A part of the Process: **eg an environment to discharge treated effluent to:**

Wetland

The Wairarapa Characteristics, Wairarapa Maori want to either keep developing or start developing

Tohungatanga Hokohokotanga Kaitiakitanga Whakaaro Hou

These are the values that have been transformative for Wairarapa Maori in the past as they have participated in relationships with other iwi; with the settlers before being colonised. A decolonised culture in a post treaty settlement era has the opportunity to take up their traditional characteristics all of which set the culture to be strong participants in the modern economy.

Wairarapa Maori choices for each section being considered in Cultural Health Monitoring

1. Cultural Health Indices
2. Cultural Health Measurements
3. How often monitored
4. Expected monitoring results
5. Cultural Technical Expertise needed

The cultural perspective of the effluent process is looking to be measured in scientific methodology as defined Maori. There will be some cultural perspectives that will be defined

A collective Maori vision for the environment is not an orthodox environmental position. The Wairarapa characteristics as defined in the first principle, transformative principle has been a collective vision in the past when Wairarapa Maori were successfully participating in their own right.

1. Tohungatanga (Educated experts)

The recordings about the whare wananga are more important than establishing the education process of Maori, it establishes the extent of the education, tertiary level of thinking. Understanding the whare wananga has been sourced from Wairarapa amongst other places.

2. Kaitiakitanga (Stewards of the environment)

This characteristic is set in the RMA as a characteristic that should be accounted for in any developments affecting natural resources. Maori recognised the need for development and affected their whenua, but preferred to think in terms of extensive development rather than intensive development. This was of course a luxury afforded iwi that could live together and/or rohe that were sparsely populated.

3. Hokohokotanga (Trading relationships)

A less acknowledged aspect of Wairarapa Maori, but it has been a way that Wairarapa Maori have related with other iwi and within the rohe.

4. Whakaaro Hou (Innovators)

For Maori the idea that behaviour and standard operating processes for all aspects of life were set in tikanga are concepts that are not totally correct. Tikanga was and in some cases still is a strong determinant of action, but as other cultures appreciate, necessity is the mother of invention. Some of iwi's greatest leaders were innovators who knew how to bring new thinking to tikanga. These innovators would inspire the people as a collective to achieve their aspirations.

Even as Wairarapa Maori were being actively marginalised through colonisation and assimilation, oppression could have been lifted if traditional Wairarapa Maori characteristics were allowed to emerge.

The influent

- Human effluent
- Trade waste
- Stormwater
- Inflow and infiltration

The treatment

- Milliscreening
- Natural UV treatment
- Heavy metal settling
- Tertiary treatment

Quality of treated effluent

- Human element
- Nutrient rich effluent
- Algae build up
- Suspended solids
- Biological Oxygen Deficiency

Cultural Perspective of the Influent

Human Effluent

The human component in this form should be set in its own place, but it is set to affect other components it will come into contact with in its original form. The reason to set the human element apart is because it can infect other things through pathogens, viruses and hormones. While this level of detail was understood in varying degrees in the past, the principle that human waste will lower the spiritual and physical quality of other elements it will come into.

Trade waste

Where trade waste does not contain human waste it is a pollutant that affects what it comes in contact to a lesser degree than human waste. In terms of transmittable pathogens it seems the danger is less, but the nutrients can be greater, while the metals from trade waste can also prove to be problematic in contaminating natural receiving bodies. The Wairarapa Maori view is to again keep the range of pollutants in their own place and with greater volumes to have extensive use in a sustainable manner rather than intensive use and unsustainable disposal of by products.

Stormwater

Stormwater too picks up metals and oils that are harder to break down than most other elements and as such have the capacity to linger longer in sludge. While the piping system transports all of these influents, the effects of stormwater can be lessened. Decreasing the amount of stormwater and improving the quality of stormwater, through a public education programme can be one initiative to lessen the effects of stormwater. Maori perspectives above apply to stormwater too and the use of natural stormwater traps like significant wetlands and significant ngahere or woodlands are more permeable surfaces for stormwater.

Inflow and infiltration

The inflow and infiltration of groundwater into the sewage pipelines needs to be accounted for, not for its quality, but its quantity. The quantity of water affects the time allowed for treatment, but also the opportunity that water taken through inefficiency has to add to an accounting of water use. The Maori perspective of water inflow and water infiltration is that water is too important to be used inefficiently.

A Cultural Perspective of the Treatment

Milliscreening

The most basic step of the treatment process is to take out larger suspended solids and floating debris. Separation of sizeable effluent to allow a better UV process is sensible. A Maori perspective of this process is that it will aid in a natural break down of the remaining effluent. While some of the filtered off effluent can be ground down to continue breakdown in the treatment ponds, the effluent that remains should be disposed of in a responsible manner, kept away from making contact with other environments.

Natural UV treatment

A Maori perspective would prefer a natural process, with the condition that there is enough time to complete the treatment process so that human element is completely broken down and the nutrients are discharged responsibly to a place where it can be used in a sustainable manner. Where the treatment does not reach this standard there should be further treatment until it does reach this standard.

The use of water as a part of the collection process is not a Maori perspective because keeping elements within their sphere would discount water as the environment for breaking down human effluent. Water does however break down vegetative elements, especially as some indigenous fauna relied on vegetation as its source of food.

Waitapu became tapu for a range of reasons, but in a small amount of cases it was because individuals were buried in waterways. In most of the recorded waitapu places there are a number of accessible alternatives for water that the hapu could use for different purposes like basic water supply for drinking. Some waitapu sites associated with burials lead into caves where ko iwi or human bones are safe from desecration.

Heavy metal settling

This stage of treatment is often included in the primary pond treatment where natural UV processes are being used. The settling of heavy metals on to the bottom of the ponds will be processed when the pond sludge is finally treated.

Tertiary treatment

When there is not enough time to complete the treatment process so that human element is completely broken down and the nutrients are discharged responsibly to a place where it can be used in a sustainable manner, tertiary treatment could be used. There are many options for tertiary processes and Wairarapa Maori are interested in any drivers that would complete the process including using treated effluent that is nutrient rich as a marketable commodity. Treated effluent that falls short of the standard stated above even after tertiary treatment will be associated with adverse environmental effects.

The quality of treated effluent is important to Maori because the likely discharge is into water and this is only considered because the state of the water environment is as bad, in a scientific sense as the treated effluent. Discharging treated effluent can be adverse to the environment if the quality of that effluent is not good enough.

Human element

There are many concerns for Maori with human elements in the treated effluent as stated above. The human element discharged to water can compromise the spiritual value of water; can be physically dangerous to people through transmittable pathogens; can physically affect indigenous fauna negatively; and is a perception that many cultures find abhorrent.

The mechanical UV treatment of human element seeks to remove the human pathogens from the effluent. Testing of effluent that is treated by mechanical UV for the removal of human elements is the main standard that most public wastewater treatment plants are aiming for. The main driver for this type of treatment is meeting the public health standard measured in ecoli quantities. While this standard can be met, the nutrients broken down from human element can be perceived as human if they are not transformed further into vegetative states through irrigation.

Nutrient rich effluent

For Maori nutrients in the form of human effluent have all the spiritual effects mentioned above. The mauri of the waterway can be transformed by the disposal of nutrients from a mauri ora state, or a life giving entity, to a mauri mate state, or a life threatening state not just for people, but also for indigenous fauna. While the legal situation allows for discharge that crudely does not change the state of mauri, where a waterway might already start in a state of mauri mate this does not align with kaitiakitanga. The role of kaitiaki has been defined by law, but this does not align squarely with the cultural understanding of kaitiaki. As kaitiaki of waterways, Maori could not agree to discharging material that would continue the mauri mate state of the waterway.

Algae build up

The algae build up is sometimes from conditions that encourage algae growth like increased water temperatures usually in shallow unshaded water like the conditions that might exist in ponds and in rivers. This water is not good for indigenous fauna and suggests the absence of indigenous flora that could give shade. In sewage treatment ponds the build up of algae needs to be broken up so that uv is not blocked by algae. Algae build up would for my whanau be a sign of an unhealthy river and an unhealthy pond. Discharging the algae into the river would be passing

on this growth to grow in the river, a sign of mauri mate, a degraded environment and a habitat that does not encourage growth.

Suspended solids

The health of tuna habitats and the strength of each stage in the life cycle of iconic species like long fin tuna are indicators of how the mauri of habitats is functioning. Turbidity because of suspended solids from discharges is an indicator the end point is not delivering a high enough quality of effluent. Another reason for knowing that the high count of suspended solids is not health is because the treatment in the sewage ponds is being interrupted. Suspended solids can shield effluent from the breakdown by uv thus making treatment ineffective.

Biological Oxygen Deficiency

Determining the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material is important but is understood in the breakdown of chemical elements. While this is an important measure to understand the degree of pollution with standards that can be measured against, the indicators above that are similar to those proposed by Tipa and Tierney are the ones that Maori relate to. Please see appendix 2 for an analysis of Models of Cultural Health.

The research to be undertaken will look at a range of inputs that are the results of the differing treatment processes; the effects on the receiving body of the effluent. The difference for Maori between whenua or land and indirectly groundwater then compared to water bodies is not as clear as other cultures' differences.

The similarities for Maori, between the mauri of land and the mauri of water, means that a preference for a receiving body is not a matter of sacrificing land to be contaminated because this would consign the mauri of the land to mauri mate.

The concentration levels of nutrients can be seen differently from the human content of hormones and pathogens. Land in its variations has different degrees of coping with nutrient loadings and can be seen as a living filter. The life of a filter can be infected by human elements like those discussed above. Free draining soils might be able to cope with deficit irrigation because excess water can drain easier. The most basic unit for Maori is whanau and the multi generational aspect of whanau is the range that can be met by developments.

Identified Maori Issues

Standard Issue 1: Separation of Different Elements

The Maori concept that every entity has its own realm and that when realms connect it should be done when it benefits both realms. When the mixing of two entities degrades one entity, the mixing should be avoided. An example is that a towel used for cleaning the floor should not be used for drying dishes even when the towel used for cleaning floors is washed, it should stay with cleaning floors. An environmental example is when two rivers meet, the mauri of two entities comes together and enhances each other creating a waitapu place that has two mauri. In the treatment of effluent, keeping the effluent in its own space so it does not pollute other spaces like the river or aquifers or springs or even the land is important. Also removing the opportunity for the treated effluent to go through the groundwater and then being a non-point discharge into a waterway is important too so pollution does not infect other environments. Given this imperative the best form of irrigation that keeps the treated effluent separate is deficit irrigation.

When to mix the treated effluent back into the environment is important because the reintroduction needs to be done safely. There are findings in Wairarapa of the mixing of soils, specifically sand with stonier coastal soils to grow kumara to show again that entities can enhance each other.

The Water Reuse Feasibility Study

The treatment of the effluent in the primary stages is kept separate and while the storage of the treated effluent can offer further treatment it is far from complete. Please see Appendix 1 for a fuller discussion about the separation of elements.

The Living Filter AGMARDT Study

The use of treated effluent through a pumice filter keeps the treated effluent in the confines of the treatment area. The initial result of the treated effluent indicates most of the elements have been stripped so the resultant liquid is safe to reintroduce back into the environment including water. The separation of nutrient laden pumice will at some time need to be replaced because it is fully charged. When the soil in the filter proves not to have any pathogen or ecoli and is safe, it could be used as fertiliser where the nitrogen and phosphorus can transform into a vegetative state.

Standard Issue 2: The Removal of the Human Element

In order for effluent to be safe for reintroduction into the environment traces of human element needs to be removed. Those from a science background argue that the focus on the human element is a perception because animal effluent and decaying vegetable component contain the same elements. The perception though is powerful and is the reason for stringent standards throughout the world including a Maori worldview. The recent difficulties with ecoli in European agriculture transferring to infect people might have been sourced from animals, but human effluent might also have been the source too.

The Water Reuse Feasibility Study

The human element still exists in the source material, the treated effluent from the Masterton Waste Water Treatment plant. The human element can be treated in two stages, storage and the transformation of nutrients to a vegetative state through irrigation. The killing off of the human element in terms of pathogens can happen in winter, but summer storage might not leave enough time for treatment to occur. The option to use another treatment like mechanical UV will add to cost, but might be necessary to meet the standard of making the treated effluent a marketable commodity, i.e. produce a resource that farmers will use.

The Living Filter AGMARDT Study

The preliminary results show that most of the human element has been eliminated. Nitrogen can be further treated through irrigation, transforming this element into a vegetative state. The perception that the human element can be removed naturally is a difficult concept for many cultures including Maori to accept because many examples of pollution not being managed exist around us. Confidence in science has been eroded because the hype associated around technological solutions has not usually been sustainable and in sewage partial solutions have not been satisfactory. Natural processes have had at least cautious support with the hope that by products of natural processes are natural products.

Standard Issue 3: Mauri Ora or Mauri Mate

Mauri is difficult to give a comprehensive definition, even the normal standard that mauri is the essence of life, even the connectivity between elements and natural entities is short of full meaning of mauri. Other Maori experts like Tamati Kruger see components of mauri being ihi, wehi and wana. These components are about the vibrancy of life in emotional terms rather than a physical definition of life. The mauri of a river can be characterised in physical terms, it can be further characterised by aspects that include emotional terms, spiritual terms and conceptual terms. In each aspect or collection of aspects that promotes life in these contexts is known as mauri ora. The degradation of life in all or any of these aspects is mauri mate.

A measure of when treatment has met a Maori worldview standard is when the water has moved from a mauri mate state in raw sewage that still exists in treated effluent until the treatment produces fluid that is a source of life. The normal mauri response around sewage is a physical aspect of life and can be measured this way, but the Maori response with mauri at its core can include wider ideas. An example of this is that a stream named Makoura that receives treated effluent can be seen in physical terms can extend to the habitat of koura or freshwater crayfish, but struggles to define the quality of the human contact with that stream. Again the perception is an important component to understanding how effluent is processed from start to end.

The Water Reuse Feasibility Study

A critical point for this study is when the treated effluent can be used in another environment. This critical point in a commercial reality is when the treated effluent meets a standard where it can be used to make money. The critical point in a Maori worldview can differ from other interests and the mauri concept looks at when the effluent is a life giving resource solely without being a life degrading substance.

The Living Filter AGMARDT Study

The critical point when what was mauri mate transforms into mauri ora in physical terms can be at the end of the treatment if the initial results continue. The perception component of mauri referred to above is another aspect of the trial as the reproduction of a process that occurs in nature can give comfort that the treatment in the right quantity will take care of all the elements. The quantity issue applies to when the soil filter is moved into another environment. A natural process here too can be another aspect of mauri ora. This treatment trial covers more aspects of mauri than Maori are used to looking at with effluent treatment trials and is why it can be advanced.

Standard Issue 4: Habitat Focus

In supporting the mauri of a place, the mauri of a habitat for indigenous fauna is important in terms of being kaitiaki. The habitat of course for indigenous fauna is best catered for by indigenous flora, a natural fit. Some natural habitats like wetlands have been drained away and even worse the waterways that remain are so modified as to directly compromise the living conditions of the freshwater fish. The treated effluent with a significant loading of nutrients when discharged to water threatens the habitats of indigenous fauna, including threatened species like the long fin eel and the giant kokopu. While it may be argued that the condition of the waterways is already compromised, the human element, the direct point discharge, the inflexibility of debt laden treatment plants and difficulties with algae produced in the treatment ponds are direct threats that in the Maori worldview compromises the quality of indigenous habitats even further. Rather than breaking habitats down into elementary parts, Maori prefer to see habitat holistically.

The Water Reuse Feasibility Study

The main aim of this study is to understand whether an option to discharge treated effluent to land is feasible as part of an irrigation initiative. Keeping the treated effluent out of the water habitats including eliminating the risk of non point discharge and any flow into aquifers by using deficit irrigation techniques is a likely outcome of the feasibility study. While this study is addressing the municipal effluent the AGMARDT trial could address other discharges into the habitats discussed above.

The Living Filter AGMARDT Study

The use of a pumice filter like the one giving initial positive results in the AGMARDT trial for farming operations could mean that non point discharges from these sources can initially be reduced and eventually eliminated. This possible long term scenario will be so beneficial for habitat that studying this filter further is a recommendation Maori would make to the current funders. When habitat is viewed alongside lifecycle of fauna the case for further investigation is strengthened.

Standard Issue 5: Lifecycle of Indigenous Fauna

While the habitat that indigenous fauna live in for most of its life is important, the quality of life for indigenous fauna is also concerned with the total lifecycle. The migratory component of that lifecycle is important for reproduction and the maintenance of fauna including threatened species like long fin eel and giant kokopu. The suspected barriers to migration are chemical components in waterways especially at intense levels. The responsibility of being kaitiaki means that concern about healthy lifecycles for indigenous fauna is essential to continuing the endangered species. A species of indigenous fauna like tuna is an important part of a Maori worldview because of the traditional relationship that often defines a rohe. The total health of a species throughout its lifecycle has long been an indicator of the health of the environment. The warnings of environmental degradation can be indicated by negative disruptions to a species at any point in its lifecycle.

The Water Reuse Feasibility Study

The halting of discharging the treated effluent to water, that currently makes up the point discharge to water from the municipal sewage treatment plant, if the halting is feasible, could remove a significant chemical barrier that might hinder the migration of indigenous fish. If smaller amounts of chemical deter migration the trial referred to next could resolve that problem.

The Living Filter AGMARDT Study

The current pumice filter trial has not addressed specific quantities of effluent, but conceptually the development of the system could work with small entities like life stylers through to farming operations and even on to municipal sewage treatment. The opportunity to remove non point discharges means that streams that have high levels of nutrients and normally pathogens can be restored and be a part of the lifecycle of fish

Standard Issue 6: Intensive Agriculture or Extensive Agriculture

Traditionally Maori were able to work in an extensive manner because they had plenty of land to operate in, but they could still have used intensive methods too, so why didn't Maori operate that way. Maori did in terms of quantity operate intensively in tuna fishing, but the process of tuna fishing in Wairarapa was extensive. It was just that the width and length of the Ruamahanga catchment is what brought eels from an extensive area to the Wairarapa Moana, both Lake Wairarapa and Lake Onoke. In the irrigation of crops, using an intensification system makes a lot of sense commercially because reducing the cost of the piping by taking greater quantity over smaller distances makes delivers intensification. The risks associated with intensification are commercial imperatives encourages farmers to push the limits of fertile soils and/or fertiliser to maximise production that in turn maximises profit. The response seems to pay for infrastructure, but if the risk is the overflow of treated effluent passing on to polluting the environment in terms of land, groundwater or indirectly through to waterways then the risk is too much. A simple balance that limits intensification is the deficit irrigation methodology then in order to use the treated effluent has limits.

The Water Reuse Feasibility Study

A limiting factor for this study is the limit that the costs of piping and the dam is on maximising profits so that the return on investment happens as quickly as possible. Managing these limits through deficit irrigation, but not limited by the supply of treated effluent because the dam could have its supply supported by water. This added water might need to be needed to fulfil any contract that requires supply and ensues the payment of the infrastructure. This aspect will be covered in more detail in the next section.

The Living Filter AGMARDT Study

The next generation of treated effluent that is the result of this treatment if the initial trial results are maintained can mean that extensive agriculture occurs. Through not being reliant on piping the system can be located throughout the district, the province or the region. The quality of the treated effluent means that intensive application can pass the discharge safely through the range of environments.

Specific Issue: Adding supplementary water to the dam

Difficulties included in the matrix about the separation principle with respect to The Water Reuse Feasibility Study as outlined in appendix one includes a line about possible difficulties that a specific option is “Adding supplementary water to the dam” has for Maori includes:

1. The water added from the rivers is not keeping the waters separate and the existing human element degrades other waters
2. The water being put into the dam has the mauri of the river it comes from and the possibility of having two mauri from the confluence
3. The mixing of the environments of the river with the storage of effluent directly would be sacrificing fresher water for effluent
4. The potential compromising of water based opportunities from water take is balanced against a marketable commodity
5. The separation of waters while refining treated effluent like the opportunities in the AGMARDT research could be a solution

Additional considerations with respect to “Adding supplementary water to the dam” should include:

1. limiting the competition for the summer quantity of treated effluent, so more treated effluent will be placed in the dam, therefore less need to add supplementary water
2. eliminating the competition for the summer quantity of treated effluent, so all treated effluent will be placed in the dam, therefore less need to add supplementary water
3. the inability to take water because of the minimum level in the river
4. the risk of not securing the supply for irrigation over the whole of the growing season because of minimum flows and competition
5. taking water at the most competitive period of the year
6. paying for water when water is already a part of the water allocation system
7. extra treatment applied to water makes some treatments inefficient
8. removing an extra water allocation incentive for treated effluent users

These considerations might lead to reconsidering the “Adding supplementary water to the dam” or at least reducing the amount of supplementary water to the dam.

Many Maori individuals and entities seek tino rangatiratanga in a relatively autonomous space. The most that these entities can hope for in this space is the Transfer of Powers as outlined below in section 33 of the Resource Management Act. There is plenty of work iwi need to do before the community will have the confidence to transfer powers and iwi realize this. Working relationships in research initiatives like these are ways Maori can understand other perspectives while creating space for their own perspective to be understood. The transfer of powers below is an aspiration for Maori entities that operate within legal frameworks.

33 Transfer of powers

(1) A local authority may transfer any 1 or more of its functions, powers, or duties under this Act, except this power of transfer, to another public authority in accordance with this section.

(2) For the purposes of this section, public authority includes any local authority, iwi authority, board of a foreshore and seabed reserve, government department, statutory authority, and joint committee set up for the purposes of section 80.

(3) Repealed.

(4) A local authority shall not transfer any of its functions, powers, or duties under this section unless---

(a) it has used the special consultative procedure set out in section 83 of the Local Government Act 2002; and

(b) before using that special consultative procedure it serves notice on the Minister of its proposal to transfer the function, power, or duty; and

(c) both authorities agree that the transfer is desirable on all of the following grounds:

(i) the authority to which the transfer is made represents the appropriate community of interest relating to the exercise or performance of the function, power, or duty:

(ii) efficiency:

(iii) technical or special capability or expertise.

(5) Repealed.

(6) A transfer of functions, powers, or duties under this section shall be made by agreement between the authorities concerned and on such terms and conditions as are agreed.

(7) A public authority to which any function, power, or duty is transferred under this section may accept such transfer, unless expressly forbidden to do so by the terms of any Act by or under which it is constituted; and upon any such transfer, its functions, powers, and duties shall be deemed to be extended in such manner as may be necessary to enable it to undertake, exercise, and perform the function, power, or duty.

(8) A local authority which has transferred any function, power, or duty under this section may change or revoke the transfer at any time by notice to the transferee.

(9) A public authority to which any function, power, or duty has been transferred under this section, may relinquish the transfer in accordance with the transfer agreement.

Two Acts deal directly with Maori issues in the environment being the Resource Management Act and the Local Government Act. An understanding of each is essential to press forward the findings of this study.

Connecting The Maori Report To The Local Government Act

The construction of this section of the research has been done so at the end of this Maori process the implications in the law are discussed. While the section discussed above is an aspiration of Maori, what follows below is a process of achieving that aspiration and it is also the place many Maori entities work in now.

Local Government Act

The local government has important responsibilities that when iwi concerns and issues align, local government entities can be lobbied to take responsibility.

Subpart 1---Purpose of local government

10 Purpose of local government

The purpose of local government is---

(b) to promote the social, economic, environmental, and cultural well-being of communities, in the present and for the future.

The four characteristics as shown in appendix 2 line up well with the four well beings

Tohungatanga	<i>cultural well-being</i>
Kaitiakitanga	<i>environmental well-being</i>
Hokohokotanga	<i>economic well-being</i>
Whakaaro Hou	<i>social well-being</i>

Each of these sections from the colour matrix in appendix 1 then are able to be applied to the various local government sub committees. As annual plans and long term plans are established with these objectives Maori viewpoints can be proactive submissions, or even better part of the decision making for these plans and even better again, be proactive in the agenda setting with local government agencies. Maori then have three opportunities to contribute to Local Government thinking and these will be addressed below. These opportunities are:

- Setting the agenda
- Part of decision making
- Part of consultation

Agenda Setting

While much of the agenda for local government authorities are regulatory in nature, the non regulatory components of the local government business are an area that ideas can be placed in front of the community through local government. These ideas like both the research areas we are involved in can be a part of the non regulatory approach Maori have an involvement in. The separation of the regulatory responsibilities from non-regulatory responsibilities as outlined in section 39 of the Local Government Act below can bring innovation to initiatives and as the community sets demands these initiatives can set the agenda.

39 Governance principles

(c) a local authority should ensure that, so far as is practicable, responsibility and processes for decision-making in relation to regulatory responsibilities is separated from responsibility and processes for decision-making for non-regulatory responsibilities;

Decision Making

The role for Maori in decision making is outlined in section 81 of the Local Government Act. In outlining our area of interest for local government entities using matrices like those in appendix 1 on Maori characteristics can inform them in greater depth. The real aim here is to educate and in this research we can do this as a part of the opportunities afforded Maori in this section 81. The objective here is to have local government approach decision making with Maori with a wider perspective. While local government determine the parameters of the Maori involvement as outlined in subsection 2 there is an expectation of reasonableness and relevancy

81 Contributions to decision-making processes by Maori

(1) A local authority must---

(a) establish and maintain processes to provide opportunities for Maori to contribute to the decision-making processes of the local authority; and

(b) consider ways in which it may foster the development of Maori capacity to contribute to the decision-making processes of the local authority; and

(c) provide relevant information to Maori for the purposes of paragraphs (a) and (b).

(2) A local authority, in exercising its responsibility to make judgments about the manner in which subsection (1) is to be complied with, must have regard to---

(a) the role of the local authority, as set out in section 11; and

(b) such other matters as the local authority considers on reasonable grounds to be relevant to those judgments.

Consultation

Many of our people are involved in a variety of consultations and it is with some relief that the consultation with local government entities has section 82 of the Local Government Act to stipulate how that consultation should be carried out. While there is an expectation that the consultation will be honest and clear, there is no expectation that local government entities need to follow the answers given by those being consulted. Maori have documented the many occasions their answers have not been listened to and so become hoha with this process. The options for engaging with local government entities as outlined above are better ways of moving initiatives to be considered especially when they are built on good relationships.

82 Principles of consultation

(1) Consultation that a local authority undertakes in relation to any decision or other matter must be undertaken, subject to subsections (3) to (5), in accordance with the following principles:

(a) that persons who will or may be affected by, or have an interest in, the decision or matter should be provided by the local authority with reasonable access to relevant information in a manner and format that is appropriate to the preferences and needs of those persons:

(b) that persons who will or may be affected by, or have an interest in, the decision or matter should be encouraged by the local authority to present their views to the local authority:

(c) that persons who are invited or encouraged to present their views to the local authority should be given clear information by the local authority concerning the purpose of the consultation and the scope of the decisions to be taken following the consideration of views presented:

(d) that persons who wish to have their views on the decision or matter considered by the local authority should be provided by the local authority with a reasonable opportunity to present those views to the local authority in a manner and format that is appropriate to the preferences and needs of those persons:

(e) that the views presented to the local authority should be received by the local authority with an open mind and should be given by the local authority, in making a decision, due consideration:

(f) that persons who present views to the local authority should be provided by the local authority with information concerning both the relevant decisions and the reasons for those decisions.

(2) A local authority must ensure that it has in place processes for consulting with Maori in accordance with subsection (1).

(3) The principles set out in subsection (1) are, subject to subsections (4) and (5), to be observed by a local authority in such manner as the local authority considers, in its discretion, to be appropriate in any particular instance.

(4) A local authority must, in exercising its discretion under subsection (3), have regard to---

(a) the requirements of section 78; and

(b) the extent to which the current views and preferences of persons who will or may be affected by, or have an interest in, the decision or matter are known to the local authority; and

(c) the nature and significance of the decision or matter, including its likely impact from the perspective of the persons who will or may be affected by, or have an interest in, the decision or matter; and

(d) the provisions of Part 1 of the Local Government Official Information and Meetings Act 1987 (which Part, among other things, sets out the circumstances in which there is good reason for withholding local authority information); and

(e) the costs and benefits of any consultation process or procedure.

(5) Where a local authority is authorised or required by this Act or any other enactment to undertake consultation in relation to any decision or matter and the procedure in respect of that consultation is prescribed by this Act or any other enactment, such of the provisions of the principles set out in

subsection (1) as are inconsistent with specific requirements of the procedure so prescribed are not to be observed by the local authority in respect of that consultation.

Connecting The Maori Report To The Resource Management Act

Often the act that is perceived as maintaining standards with respect to development, especially sewage is the Resource Management Act. The four well beings as discussed above in the Local Government Act again appear in the Purpose of the RMA. The needs of the future is an aspect of the perspective presented in appendix 1 in the colour matrices when the Whanau is discussed. The Act does consider strongly the effects of development, but sustainable management should consider protection and managing the use alongside development. The active protection as an aspect of safe guarding are principles that are in line with the Treaty principles as outlined in section 8 of the RMA

Resource Management Act 1991 (Reprint as at 28 March 2007)

5 Purpose

(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while---

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The cultural perspective here allows for the traditional connection Maori entities have with the land and waters to be accounted as an aspect to be recognized and provided for. In this report, from the concrete examples in appendix 1, this connection is presented from four spheres of thinking that are aligned with the characteristics that are a part of defining the iwi of Wairarapa. While the other parts of section 6 do not specify Maori, many of these subsections are aspects of the traditional relationship Maori have with their environment.

6 Matters of national importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

- (b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
- (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
- (d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- (e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*
- (f) the protection of historic heritage from inappropriate subdivision, use, and development:*
- (g) the protection of recognised customary activities.*

Kaitiaki is a characteristic I have chosen to concentrate on for the concrete examples and so many ideas about Kaitiakitanga are in that section. It should be recognized that kaitiaki in a cultural context is different from the legal definition of this concept, but in this act there are some ideas that are similar but not given the significance they deserve. One of these in section 7 is subsection f where the enhancement of the quality of an environment, in the context of the four well beings referred to in section 5 of the RMA and section 10 of the LGA

7 Other matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to---

- (a) kaitiakitanga:*
- (aa) the ethic of stewardship:*
- (b) the efficient use and development of natural and physical resources:*
- (ba) the efficiency of the end use of energy:*
- (c) the maintenance and enhancement of amenity values:*
- (d) intrinsic values of ecosystems:*
- (f) maintenance and enhancement of the quality of the environment:*
- (g) any finite characteristics of natural and physical resources:*

(h) the protection of the habitat of trout and salmon:

(i) the effects of climate change:

(j) the benefits to be derived from the use and development of renewable energy.

Appendix 1

The following pages are Cultural Health Monitoring with respect to the system above

The Living Filter

A disposal system that is on site and can produce the nutrient resource for fertilizer that is sourced from an effluent treatment system can also meet many Maori requirements as outlined below.

	Effects	Tohunga (Cultural Wellbeing)	Kaitiaki (Environmental Wellbeing)	Hokohoko (Economic Wellbeing)	Whakaarohou (Social Wellbeing)
The use of a living filter	The reality of a natural process is that by-products are natural	The reality of a natural process can be balanced and the mauri is intact	Natural elements can keep the treated effluent safe to be in another environment	The pumice and finding an incline makes the option affordable	Testing other material to see other benefits
The angle of movement	The angle to move effluent thru the filter to maximise the process	Reducing the pooling of effluent in reality will decrease the amount of mauri degraded	Can avoid the pooling of effluent that degrades the environment when it becomes a reality	The efficient movement of effluent can make the filter function at a premium	Further research relating the angle with the soil properties to be the most efficient filter.
Pathogen removal	The removal of pathogens will negate the risk to public health	Reducing the mauri mate components will be better for the disposal place	The elimination of health risk for the receiving environment will be an asset	A health approval for the eventual disposal place will not be a cost	The removal process of pathogens here could transfer to other uses
Nutrient removal	The removal of nutrients will mean that disposal to water is an option	Reducing the mauri mate components will be better for the disposal place	If the disposal place is water the reduced nutrient would mean a safe effluent transfer	The nutrient removal from effluent to the pumice filter can make the soil a fertiliser	The nutrient removal can be safe when passed through a wetland that uses the nutrient
Filter removal	If the soil filter works as well as the initial results then the safe removal of the filter is essential	Safe removal of by-products from the filter so it does not degrade the mauri of the treatment area	Safe removal of by-products with the filter so it does not degrade the environment	Ensuring the pathogens have had time to die off before transformation to fertiliser is complete	The use of a natural filter for hazardous waste could be a variation here
Other uses coastal homes	The containment and transformation of sewage that is affordable in an area that often has water supply problems	The mauri of the inshore fishery, the estuaries are fragile and this type of treatment could fit this environment	The coastal environments need not be degraded because this system could reduce effluent effects	A marketing of this idea for coastal homes could compete well with other flawed effluent disposal systems	Other types of effluent that occurs on the coast like fish processing waste could have specialised filters
Other uses dairy farms	The containment and transformation of sewage that is affordable can alleviate non-point discharge problems	The mauri of the environment on a dairy farm can be seen in environmental award winners, mauri safeguarded	With a sewage system the downstream effects can be huge and even the by product can be used responsibly	A marketing of this idea for dairy farms could compete well with other flawed effluent disposal systems	The how to book could start with how to keep the effluent out of waterways
Other uses: Life Stylers	The effect on mauri of a river from many people thinking that a small poorly treated effluent is acceptable	Many life stylers are attracted to the mauri of a place is actively protected	Keeping environment safe seems to be part of the reason for life stylers, but the degradation from within can be	A marketing of this idea for life stylers could compete with other flawed effluent disposal systems	The responsible life style can bring leadership for a community so that the economic capital and the cultural

	would be significant		overcome by this initiative		capital values life style
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TIKANGA VALUE OF SEPARATION

In a Maori world view everything has its place, so the act of separating different components into different places is a matter of safety. It affected even the everyday living practices. In today's world, many Maori parents teach their children that the cloth to wipe the floor is not the same cloth to wipe the dishes. Interestingly this concept is an important development in Kaipapa Maori health centres. This concept used in the production of food can align practice with slogan, "a clean green" production area. The effluent laden waterways need to be restored from at least wai kino to wai ora. The treatment of water from the effluent that most pollutes our waterways in the perception of the many markets or perhaps in Maori terms our manuhiri is human effluent. While the simplistic answer is not to pollute our waterways with human effluent, the challenge is how to break that effluent down so the human element is transformed into a vegetative state as naturally as we can. When the treated effluent has been treated wholly in isolation then released to another environment it is not able to degrade what it comes in contact with. The initial orthodox treatment can be better and the matrix below suggests how it meets the multiple levels of Maori experiences. All of these characteristics helped to define Wairarapa Maori in the past and is the opportunity we want to be a part of in a post settlement era.

	Effects	Tohunga	Kaitiaki	Hokohoko	Whakaarohou
Collection Place	The places where municipal sewage is collected from is not only inputting effluent but also freshwater that gets into the piping system denying the place of freshwater.	The place is affected by being a moumou wai, a waster of water	Waiora can be used for different environments including wetlands	The input of water into commercial opportunities on the land and in the waterways in the collection area is unrealized.	The keeping of the water in urban parks and wetlands could direct waiora to better use in the communities like growing harakeke
Collection Process	The effect of the process is that water seems to be following the labyrinth of drains and taking away waiora	Waiora is mixing with waimate and therefore wasting the opportunity to use waiora for its spiritual values	Waiora mixing with waimate through an unsecured system has the risk of sewage pipes overflowing and not maintain-ing separation	The treatment of effluent is compromised by shorter treatment periods and poorer quality effluent downstream affecting commercial opportunities	The prevention of water types mixing can give the opportunity for permeable material to be used in pathways an different piping that is more secure
Primary Treatment Place	The future treatment ponds are separating effluent, but there is a risk of mixing with other area	The future treatment ponds are separate but close to a waitohi place.	The future treatment ponds are still close to a floodplain, but higher than the river, so it is separate	The future treatment ponds have better security so might be perceived as not affecting as many businesses	The future treatment ponds is close to other possible users
Primary Treatment	The effect of the primary natural uv treatment is that is partial	Partial treatment does not satisfy the quality of water needed	The initial uv treatment is kept separate from other environ.s	The cost of the treatment to rate payers is producing a	The opportunity exists for adding ideas to assist natural uv treatment

Process	treatment that with further separation could gain a better result	for a waitohi	but is not good enough for future mixing	partial solution only.	
Secondary Treatment Process	The need for future treatment in maturation ponds improves the quality of effluent but not enough	Better quality effluent and if it can remain separate as it goes to further treatment it is at least better for the next stage	The Maturation ponds seek to ensure the effluent is treated for a minimum amount of time and be set for the next environment	The savings from the maturation pond won't be measured in costs but in the momentum gained by restoring our rivers	There are other pond processes that can further treat the effluent and as technology makes this cheaper, we can get better quality effluent

TIKANGA VALUE OF SEPARATION

The feasibility study of having winter storage to dispose to land through responsible irrigation and in Wairarapa that is planned for a specific place is what has been undertaken by associates who have challenged each other to achieve our ultimate goal. The lofty aspiration is to remove treated effluent disposal to water. To treat effluent to such a degree that it can be used in responsible agriculture. Application of the treated effluent by a deficit irrigation method is a process that can enhance our waterways and enhance the agricultural production

(The keeping of the effluent separate by storing the total is an imperative)	Effects	Tohunga (Cultural Wellbeing)	Kaitiaki (Environmental Wellbeing)	Hokohoko (Economic Wellbeing)	Whakaarohou (Social Wellbeing)
Winter Storage Dam	The treated effluent is being kept separate in a clay lined dam, but the Dam seems to be on a floodplain	The dam is in the junction of two rivers so the meeting place of two significant mauri	The dam is keeping the effluent secure from other environments	The dam is an expense and there are many opportunities to ensure it does not come back on struggling whanau	The place of the dam could be of benefit to irrigating buffer zones in the river passage way, especially wetlands
Winter Storage Dam Process Over time	The effects of the ongoing treatment process in a dam can bring further treatment to further breakdown pathogens in a separate place	The elimination of pathogens in a separate place is good, but further human elements need to be broken down further	Further processing the effluent in a separate place keeps the human element together away from other environments	The cheap part of the process produces results in the winter, but treatment in the summer could mean further expense	The opportunity of adding treatment to the storage process other than what naturally occurs is a place for research
Winter Storage Dam Process Water added	The water added from the rivers is not keeping the waters separate and the existing human element degrades other waters	The water being put into the dam has the mauri of the river it comes from and the possibility of having two mauri from the confluence	The mixing of the environments of the river with the storage of effluent directly would be sacrificing fresher water for effluent	The potential compromising of water based opportunities from water take is balanced against a marketable commodity	The separation of waters while refining treated effluent like the opportunities in the AGMARDT research could be a solution
Irrigation Places (Is it safe to mix the treated effluent?)	The place that is proposed for irrigation has a clay base in the soil profile so effluent can be separate from aquifers	There is risk if intensification or overloading builds up from the clay strata and contaminates the soil, the mauri of the land is degraded	The treated effluent might just have nutrients that can be transformed in a cropping environment	The treated effluent can be a responsible resource that can ensure the security of supply.	The innovation here for testing could be an advantage
Irrigation: Deficit Application	Deficit application ensures that what is applied will be used in terms of water	When water has been saved from effluent disposal and the land disposal is used in a way	The transferring of effluent from a separated environment to another environment, the new environment	The opportunity to enhance manufacturing through the security of supply can	The research to take even the perception of the human element from a transformed effluent can aid

	and nutrient. Intensification with a conscience	that nutrients are being transformed to plant matter it is good	can be enhanced	enhance commercial opportunities for everyone	people internationally
Irrigation: Excess Application	Using slightly more than is needed treated effluent on soil with an impervious strata has risks of degrading the soil with a buildup of excess nutrient	While the risk is manageable there is no need to risk degrading the mauri of the land when the above option is able to be delivered	The exposure of a new environment to the risk of excess nutrients is how many non point discharges are contaminating our waterways and lands	Hokohoko leaves the giver and the receiver better off at the end of the process, there is no need to risk that	There is the possibility that there might be more than one use for excess irrigation with respect to downstream benefits
Irrigation: Dumping Application	The effect of using a quantity of treated effluent well over the quantity needed on soil that has an impervious layer is to have contaminated land eventuate.	To knowingly affect a living filter with eventual contamination is to consign mauri to a state of mauri mate not a tika or true state	The effect on the receiving environment while gradual will take a long time to restore	The cost of the land in production terms is a loss of potential income while the opportunity for ongoing income is lost	The opportunity for other parts of the community to benefit like native stands of forest, the support of wetlands are options for excess treated effluent to be used

TIKANGA VALUE OF SEPARATION

When treated effluent is put into agriculture	Effects	Tohunga	Kaitiaki	Hokohoko	Whakaarohou
Intensive Agriculture	The commercial needs for the agriculture to pay for the infrastructure and the profit in farming means that the methods maximise irrigation to risk levels	The risk of contamination in a system that pushes the limits for a financial return means the land or waterways pays when failure eventuates	The non productive environments often pay for cost under runs, sometimes called savings, but in the long run damage to lifestyle carries the burden	Costs of restoring contaminated land need to be accounted for in the true value of trade	Intensive organic farming puts the costs in front of production rather than doing patch up jobs after the damage is done.
Extensive Agriculture	The community model needs to be incenti-vised so that more people take the treated effluent to use in a responsible way	Extensive agriculture has been a part of traditional processes because integration with other parts of the environment is real sustainability	Leaving the environ-ment in a better state for future generations means that environments that enhance each other have a place.	The market has a place for elements that work together and separation allows for the rebalancing until elements can enhance the environment they enter	The larger market place still has a place for quality and com-munities still have places for better processes to treat effluent as naturally as possible
Primary Food	The effect of using treated effluent on primary food crops is to risk ecoli and other contamination	The risk of contam-ination in the mauri of food is to take away its life supporting princi-ples for life limiting effects	The risk that the by- products from infected foods remain to con- taminare the land compromises the land's future products	The risk of bad product returning to tarnish our reputation as a host, as a producer is something to avoid	The requirement to act with maanaki will help us understand how to develop positive relationships and not risk offending our guests
Secondary Food	While the perception is better for crops to be transferred to another source before it becomes food, if that food is used for babies the perception is that it is too risky	Removing the human element from the life cycle of food ensures the most basic elements of life are preserved	While the use of transformed effluent can take a responsible production in the agri-cultural environment the responsible thinking should remain	The message of how treated effluent is transformed should be told with the wider products eg fresh-water fish, tourism, recreation	The extensive agriculture can mean that the secondary food level is not wholly from treated effluent, but just one of the irrigation strategies
Non Food Crops	The crops while being out of the higher risk area of food consumption is still not in a separate situation and the byproducts for crops like fuel crops are still affecting us	The mauri of all things including non food crops should not be put at risk. A clear effluent transformation process needs to be outlined	The environments including non food crops should not be put at risk. A clear effluent transformation process needs to be outlined	A clear effluent trans-formation process needs to be ready to counteract perceptions even in "safe crops"	The safest area for transformed effluent use needs to be researched more fully to give farmers more options

ASSESSMENT MODELS FOR CULTURAL HEALTH

Contemporary development of cultural health indicators and ecological assessment toolkits has been recognised as a positive, scientifically robust and supportive element to current resource management decision-making processes (Tipa and Teirney 2003, Young et al. 2008; Rickard & Swales 2009). The development of these cultural health indicators and environmental outcomes was due to the concern that Mātauranga Māori in research, resource management, environmental management, sustainable management and monitoring is „tacked-on“ after the research. For example, research is already underway and the framework for management is already confirmed (Kennedy & Jefferies 2005). This coopting of Mātauranga Māori sees it being reshaped in order to fit into a totally different western research/management framework thus, removing and/or distorting the holistic, fundamental connections and patterns within Mātauranga Māori (Kennedy and Jefferies 2005).

When setting out to develop and research a Māori outcomes and environmental indicators framework to test the hypothesis that implementation of the RMA has resulted in sustainable management of the environment, Jefferies and Kennedy (2009) considered three theoretical models to inform the approach. They are: Ngā wa model, Ngā Atua model and Ngā tikanga/kaupapa model. Described and reviewed in detail by Kennedy and Jefferies (2005), concluded that the tikanga/kaupapa model was to be used, due to model having less complexity to follow and would allow for close interpretation of key terms and concepts already being used for environmental management.

Before examples of current assessment models of cultural health are discussed (see below), a number of issues or caveats were identified in the development of these models or in acquiring/using Mātauranga Māori. They fall under the following themes:

- Environmental or resource management is not Mātauranga Māori resource management. The current approach is anthropocentric (humanity is separate from the environment – human needs are the starting point, the centre of attention) which underpins sustainable management in New Zealand, principally under the RMA; versus traditional Māori ideology of sustainable management, biocentric (humans are part of nature where all life is equal).
- Māori values to be included effectively in resource management process must recognise: access and control of intellectual property, preventing the misuse of Māori values in culturally inappropriate ways; enabling iwi/hapū to participate fully in development of information tools.
- Avoid co-opting Mātauranga Māori by building a body of knowledge together with iwi/hapū. Search for better relationships between human communities and the natural world must be gained (Blackhurst et al. 2003; Whangapirita et al. 2004).
- Placing a dollar value on indigenous values is why iwi/hapū are reluctant to share their indigenous knowledge. Indigenous knowledge should not be valued against/with other western knowledge when evaluating resource allocation in the current New Zealand resource and environmental management paradigm (Awatere 2009).
- Importance of kaupapa Māori research to be conceived, developed and conducted by Māori and the outcomes benefit Māori (Jefferies & Kennedy 2009a).
- A true kaupapa Māori environmental indicators and outcomes framework is limited when developed in English rather than Te Reo Māori. Mātauranga Māori encapsulates knowledge, cultural, language, beliefs, and values which are expressed in language.

Traditional Māori indicators, or tohu, of environmental “health” have been used for hundreds of years and enable Kaitiaki to both interpret and care for the natural environment (Young et

al. 2008, Jefferies and Kennedy 2009). Tohu continue to be used today, such as alignment indicators (Table 1), where one event in nature aligns/occurs with another.

Table 1. Past and present seasonal indicators, tohu, used for harvesting kaimoana from the Kaipara

by Te Uri o Hau hapū (Environs Holdings Ltd 2009).

Plant Cycle Maramataka

(Month)

Kaimoana Harvested Season

Kowhai November Snapper, stingrays Spring

Pohutukawa December Kingfish, Mullet Summer

Algal Bloom Mullet

February Tuna/Eel

Heather Toheroa (fattest)

Māori have been observing, interacting and acquiring knowledge about the natural world for centuries (Young et al. 2008, Te Rūnanga o Ngāi Tahu 2004, Environs Holdings Ltd 2007), operating within a holistic framework that was/is guided by system of ritenga (rules) and tikanga. The wellbeing, regulation and sustainability of people, communities and the natural world were guided by particular values of kaitiakitanga, tapu, rahui, mauri, wairua, noa and mana, whereby strong, spiritual relationships were established with a given area, catchment or region (Young et al. 2008).

There is a need for the development of monitoring frameworks founded on the Māori worldview and Mātauranga Māori and some examples are provided below. The reasons behind their development were summarised by Young et al. (2008) as:

- Kaitiakitanga – the responsibility to carry out and practice kaitiakitanga, whakapapa, tikanga and environmental monitoring is an opportunity to apply their responsibilities and knowledge and obtain particular cultural aspirations.
- Undertake grass(flax)-roots action on a particular issue that is significant to their cultural well-being, such as contamination, cultural heritage, water quality, declining fish stocks. Undertaking cultural monitoring programs of the natural resources can provide iwi/hapū with a measure or detection of change that require long-term monitoring strategies and/or policy/rule development.
- Legislative or statutory obligation – particularly under the RMA, Treaty of Waitangi, Treaty Settlement Acts and Deed of Settlement. Giving effect to these obligations and responsibilities that require monitoring.

Jollands & Harmsworth (2007) discuss the advantages and necessities of using cultural approaches, knowledge (worldview) and techniques in monitoring sustainable development. However, it is important to note that initiation of the cultural health monitoring program must be with the iwi/hapū, an example of which is discussed below: the State of the Takiwā program initiated by Ngāi Tahu. A summary this case studies is also provided in Table 3.

CASE STUDY 1: CULTURAL HEALTH INDEX FOR STREAMS AND WATERWAYS

Tipa and Teirney (2003) developed the Cultural Health Index (CHI) based on Māori knowledge. Initially developed on the Taieri and Kakaunui rivers in the South Island, the CHI can be used confidently by any iwi/hapū at sites on streams of any size or river type – iwi/hapū groups in the Motueka catchment have adapted and applied the CHI (Young et al. 2008). The Motueka cultural health index stratifies the landscape into Atua domains (a Māori cultural framework). They are Tangaroa, Tane Mhuata, Haumietiketike, Rongomatane, Tumatauenga and Tawhiri Matea.

The CHI allows iwi/hapū to assess the cultural and biological health of a stream or catchment of their choosing. The development of the CHI was directed from the national Ministry for the Environment's Environmental Performance Indicators (EPI) Program. It was important that the tool be consistent with the directions prescribed at the national level. Using mahinga kai was agreed by all kaumatua as the abundance, diversity and health of the life supported by the river is an indicator of its mauri (Tipa and Teirney 2003). From the beginning the use of the term „mauri“ in the CHI was difficult, primarily because of the intangible aspects of mauri that cannot be encompassed by an index. It was agreed that a mauri index would be demeaning to tikanga mauri concept. Therefore, the phrase cultural health index was chosen that addresses aspects of stream health and mahinga kai. Indicators were developed for sites located at the headwaters of the river to the lower reaches (streams). Mahinga kai indicators were obtained from interviews with kaumatua and Ngāi Tahu resource managers.

Application of CHI

The CHI has three components: (1) Site: Identify whether or not site is of traditional significance; would tangata whenua return to the site in future; (2) Mahinga Kai: assesses mahinga kai values of sites; (3) Cultural Stream Health: eight indicators – water quality, water clarity, flow & habitat variety, catchment landuse, riparian vegetation, riverbed condition/sediment, use of riparian margin, and channel modification.

A team of kaitiaki applies the CHI to their local stream, creek or river assessing its health in terms of Māori management principles.

A scoring system is used for each indicator resulting in an overall three-part Cultural Health Index, expressed as, for example A0/2.1/4.2. Where A identifies the site as traditional (versus B for non-traditional); 0 identifies that the site will not be used in the future (versus 1 for will be used); 2.1 is the mahinga kai score (15 scale and averaged); 4.2 is stream health score (15 scale and averaged).

CHI and mauri

The CHI recognises that the mauri is tangibly represented by the physical characteristics of a freshwater resource, including indigenous flora and fauna, the fitness for cultural usage and its productive capacity. Different to current resource management approaches which are very technical, rather than based on a holistic philosophy that Māori utilise to protect the mauri.

CASE STUDY 2: STATE OF THE TAKIWĀ – NGĀI TAHU

State of the Takiwā is defined as “an environmental monitoring and reporting approach that integrates Mātauranga Māori and western science to gather information about the environment and to establish a baseline for the creation of policy and improvement of environmental health. A program developed as an alternative to conventional state of the environment reporting used by the Ministry for the Environment, that takes into account tangata whenua values.” The State of the Takiwā (SoT) forms a component of the overarching Ngāi Tahu ki uta ki tai natural resources plan, where wananga mahinga kai, a resource inventory and GIS database will contribute also to deliver the plan.

Development

The demand for the development and reporting of SoT was for the need to address the lack of Ngāi Tahu Whānui and/or cultural values in Regional Council monitoring programs and reporting of air, land, water and coast. There were three overarching influences in the development of SoT. They are: (1) Mahinga Kai, (2) Mauri, mana, manaaki (hospitality), and (3) Mātauranga.

Mahinga kai (and whakapapa) is the main contributor with which Ngāi Tahu identify themselves with the whenua (land) and moana (sea) (Te Runanga o Ngai Tahu 2004). Mahinga kai (translated by Ngāi Tahu as „working for food”) customs underpin Ngāi Tahu and are central to their relationships with places, resources and their ongoing spiritual, economic, social and cultural wellbeing. Ngāi Tahu require that to undertake direct food gathering, rivers, beaches, oceans and forests must be in pristine condition and are “good enough to eat from” (Te Runanga o Ngāi Tahu 2004). It is vital that species and their habitats are maintained in pristine condition to fulfill this relationship.

Mauri, mana and manaaki are fundamental values that Ngāi Tahu required to be part of any environmental monitoring and reporting. Mauri is both a physical and metaphysical expression of environment health (Te Runanga o Ngāi Tahu 2004). The mauri in all living and non-living objects originates from the beginnings and is a value that is distinguished by qualities of health, abundance, vitality, the pristine and unpolluted. Mauri is a sacred taonga to Ngāi Tahu that is a integral to their whakapapa, which provides a spiritual link to the past, the present and to the future; hence Ngāi Tahu vision to “continue to provide for our people and our manuhiri (visitors), now and in the future mo tatou, a, mo ka uri a muri ake nei – for us and our children after us.” Upholding the mauri for Ngāi Tahu has a direct relationship to their ability as an iwi/hapū or whānau to provide manaaki to their manuhiri and in turn has an effect on their mana.

Mātauranga is traditional knowledge that has been gained through centuries of observation and the continued practice of mahinga kai customs for Ngāi Tahu (Te Runanga o Ngāi Tahu 2004). They have unique body of knowledge and experience that is important to understand and manage the natural environment, particularly the health and wellbeing of the mauri. This in turn provides Ngāi Tahu to provide historical accounts and knowledge of the past and changes that have occurred to the natural environment in their Takiwā.

Application of State of the Takiwā

The main components (Figure 3) of the SoT monitoring framework are:

□ Baseline Information – is collected from the past (interviews, manuscripts, literature) and present/current (provided from councils and Crown departments, CHI, SHMAK, national/regional monitoring data, interviews) information. This collection of information forms the core of the current state of the Takiwā. It was important for Ngāi Tahu to gather information on the past (1840 baseline) so they can understand the health of the environment as it was to their tupuna and the present baseline information provides an idea of what has happened since. Desktop research of written records, drawings, paintings, photographs was used to form a „state” of the

Takiwā at 1840.

- Monitoring – the design of the monitoring program depended on the sites (e.g. freshwater, lake, coast, marine), indicators and tools. Sites were chosen based on historical use, level of written and oral information, access, and relationship to existing monitoring sites (particularly local and regional council monitoring sites). Indicator type was determined for each monitoring program and determined from what the program was going to be reporting on, such as a resource (e.g., Tuna), issue (e.g., water pollution), or ecosystem (e.g., lake). The type of tools required will be dependent on the site and the indicator (e.g., SHMAK kit, Cultural Health Index tool). Te Rūnanga o Ngāi Tahu have completed several SoT baseline reports, such as, for the Avon-Heathcote estuary and catchment (Pauling et al. 2007a) and South Island freshwater waterways (Pauling 2007b).
 - Analysis – Ngāi Tahu recognised the importance of storing, accessing and analysing the information collected for the SoT program and have developed, with the support of the Ministry for the Environment, their own Takiwā 2.0 Database. A combination of hard copy literature, Microsoft Access databases and Geographic Information System (GIS) databases are utilised and stored. The Ngāi Tahu resource inventories and information databases are strongly integrated with the SoT and Ki Uta Ki Tai Plans where information gather through baseline studies, monitoring and reporting will be stored and organised.
 - Reporting/Policy Development – this is the final product of the monitoring program and includes baseline monitoring reports and annual/seasonal reports. These reports will inform policy direction and development for Te Rūnanga o Ngāi Tahu.
- Figure 5. Essential elements of Ngāi Tahu State of the Takiwā program. (Source: Te Rūnanga o Ngāi Tahu, 2004).

CASE STUDY 3: MĀORI ENVIRONMENTAL INDICATORS & OUTCOMES: MAURI OF WATERWAYS KETE

Jefferies and Kennedy (2009) developed a kete of environmental indicators and outcomes for mauri of waterways, mana whenua and waahi tapu as they relate to statutory plans. The Māori Outcomes and indicators framework and methodology kaupapa was developed over the past five years, to provide an effective suite of tools with which iwi/hapū can use to evaluate and assess the performance of councils in relation to their obligations under the RMA 1991 and Local Government Act 2002 from a Māori perspective. These were developed to align with environmental outcomes under the RMA and Local Government Act, and those of the wider community. Mauri of waterways also receives substantial attention under the RMA (Jefferies and Kennedy 2009).

As mentioned above, the maintenance, protection and restoration of mauri is a cultural and spiritual responsibility of kaitiaki Māori (Jefferies and Kennedy 2009a, b). The mauri of waterways outcomes and indicators kete (toolkit) was intended to provide tangata whenua a suite of tools to judge whether the mauri of waterways within their rohe is in good health; and to understand the contribution councils and Crown agencies make in achieving this goal. The Mauri of Waterways kete and other kete developed has a multi-level structure (Figure 6), comprised of:

Framework/Structure Explanation Example:

Kaupapa Overarching principle

Tikanga High-level principle/rule which must be obtained and upheld

Outcome A single expression of a group's ideal result for a particular tikanga

Indices A series of indicators grouped by theme

Indicators

The high-level enquiry for evaluating whether outcomes are being achieved

Measures Lower-level enquiry or method, several of which collectively provide the information required for an indicator.

Each measure is scored on a scale of 1 (best) to 5 (worst)

Trialing of the Mauri of Waterways kete, Mana Whenua Kete and Wahi Tapu Kete (not all outcomes and indicators from each) was carried out with Ngāti Maru in Hauraki, Ngāti Whanaunga in Hauraki, and Ngāti Awa in Whakatane. Matamata-Piako District Council and Environment Bay of Plenty also participated in the trial. The status of the use of these Māori environmental outcomes and indicator kete by tangata whenua in collaboration with councils and crown agencies in the Kaipara is unclear.

Mauri Kete

The outcome is the mauri of all waterways are in optimum health, which is measured through five indices and associated indicators. These have been developed to provide tangata whenua with a suite of tools to judge whether the mauri of waterways within their rohe are in good health and contribute to councils and Crown agencies moving towards that goal.

CASE STUDY 4: STREAM HEALTH MONITORING & ASSESSMENT (SHMAK) KIT FOR MĀORI

The Stream Health Monitoring and Assessment Kit (SHMAK) has been designed by NIWA in partnership with Federated Farmers of New Zealand, for farming families to monitor the “health” of the streams that flow across their land. The methodology can also be used by community groups, schools and regional councils, or anyone wishing to obtain an idea of general “health” of particular streams and freshwater waterways.

The SHMAK Kit philosophy defines “health” as the condition of the whole waterway, where water quality and ecology are measured. Like most monitoring long-term data trends are required to provide a robust and adequate picture of “health” using standard set of measurements and observations each sampling period.

The assessment part of the kit

4

involves assigning scores to each monitoring result which will inform an “overall” score for the condition of the stream. These scores are compared over time to see whether stream health is changing.

CASE STUDY 5: MARINE HEALTH INDEX

The Marine Health Index (MHI) is based on community knowledge and is a practical tool being developed by Te Tiaki Mahinga Kai (a national network of tangata kaitiaki, kaumatua, environmental managers, researchers, formed to improve management of mātaihai

5

,
taiapure

6

, temporary closures (rahui)) for Te Runanga o Ngāi Tahu. The MHI builds on the Cultural Health Index for streams and waterways (Tipa & Teirney 2003), and applies similar methodology to the rohe moana.

The key factor to its development is that the MHI is developed for and with a particular community of people. The MHI uses science and community knowledge. The vision of the project is for the MHI to become a tool for communities to judge the state of their mātaihai and taiapure themselves in an independent, inexpensive and scientifically robust manner. Key indicators that have been nominated include: continuation of traditional harvest practices, changes in the taste, smell and size of kai, and visual water pollution and litter. Te Tiaki Mahinga Kai are currently working with the Te Whaka A Te Werra mātaihai (Paterson Inlet, Rakiura, Stewart Island) and East Otago Taiapure at Karitane to develop the MHI.

4

Kit comprises of: a manual within monitoring forms, instructions and background information; identification

guides; monitoring equipment (water clarity measuring tube, conductivity meter, pH papers, thermometer, sample containers, magnifier).

5

Taiapure is a community reserve to support customary fishing.

6

Mataihai is a community reserve to support customary fishing.

CASE STUDY 6: IWI ESTUARINE MONITORING TOOL KIT (NGA WAIHOTANGA IHO)

The main objectives of the Nga Waihotanga Iho (what is left behind, lift up), the estuary monitoring toolkit for iwi, is to empower tangata whenua in the resource management decision-making process; provide easy-to-use inexpensive and robust tools for tangata whenua and community groups to monitoring environmental changes in their estuaries; and provide an educational resource for high-school students.

Estuaries are valued by tangata whenua: as a source of identity; to support mana and wairua of the iwi; for learning and custom, traditional knowledge; as Turangawaewae – a source of health; as a place of beauty and spirituality, connection with Tangaroa; as a source of kaimoana to share with guests and for special occasions; for recreation with hapū/whanau; for commercial value and employment (Richards & Swales 2009 – coastal society newsletter).

Like the SHMAK and CHI, the estuarine toolkit is founded on scientific principles and tangata whenua values. The toolkit is comprised of seven modules: habitat mapping, sediments, water and sediment quality, plants, fish, shellfish, and coastal management. This was to relate to the physical, chemical and biological aspects of estuaries. The toolkit manual provides step-by-step description of methods for each module. The toolkit was field trialed in February 2009 at Manaia estuary on the west coast of Coromandel Peninsula, working with participants from Ngāti Whanaunga, Ngāti Pukenga and Coromandel Area School. The participants underwent training with NIWA staff in order for them to conduct future assessments independently.

CASE STUDY 7: NGĀTI KERE METHODS & INDICATORS FOR MARINE PROTECTION

Ngāti Kere defined *tohu* to judge the health of the *rohe moana* such as observation by fishermen of size, form, colouring or amount of *kaimoana* from an area; Takapua rock is recognized rock for Karengo spores. If *karengo* is plentiful on the rock it provides an indication of the health of *karengo* in the *rohe moana*.

Ngāti Kere in the Hawkes Bay wanted an understanding from *whanau* of what modern marine management systems meant to them. Through a survey visions, values, species of importance and indicators of marine protection relevant to Ngāti Kere were identified (Wakefield & Walker 2005). Like *Te Uri o Hau* and Ngāti Whatua hapū, Ngāti Kere overarching principle is:

“to strive to sustain the *mauri* of the *rohe moana* through *Tikanga Māori* practices”

Ngāti Kere state:

“there is a *mauri* in the ocean. It is a thing we can’t see or hear so it is difficult for us to put it into words. When we go to the beach or river we are recognizing who we are. It is a spiritual and cultural source of solitude, sustenance and satisfaction.

When we go there we reconnect with the *mauri* of *Tangaroa*. We recognize that all the revering and respect of the *moana*, the looking after it, helps us to remember who we are and what our responsibility for management is. The *moana* is personified as an animate phenomenon.” (Wakefield & Walker 2005)

Through identifying species of importance, their values, and management systems Ngāti Kere wished to see the principles of *manaakitanga* and *whanaungatanga* applied to marine management. Many Ngāti Kere are lack understanding of modern management regulations and there is also a lack of understanding of the Ngāti Kere traditional management practices amongst authorities. Solutions included two-way discussions and information sharing within Ngāti Kere and also between Ngāti Kere and authorities. For example, a *wananga* with MFish so the learning can start and steps can be identified on how traditional and current management systems can be used to achieve the goals and objectives identified by Ngāti Kere.

CASE STUDY 8: TE ROROA IWI CULTURAL INDICATORS & MONITORING FRAMEWORK

Te Roroa iwi cultural indicators are based on a time when their tupuna managed resources under kaitiakitanga and the health of the environment was monitored under manaakitanga (Te Roroa Whatu Ora Trust 2008). Te Roroa iwi indicators were founded on Ngāti Raukawa's indicators identified under the Ngāti Raukawa Otaki River and Catchment Iwi Management Plan 2000. Monitoring of their environment must be fully integrated with monitoring the health of Te Roroa iwi as people and as a culture. Indicators have been developed under four themes:

1. Whenua/ngahere – number of kukupa sustainably harvested from our forests for cultural purposes. If there are enough kukupa in our forests that we can once again harvest them, then our forests are healthy.
2. Awa – number of rivers in our rohe that are classed as pristine. Waipoua River is classed as the most pristine river in Northland. Our rivers should all be that healthy.
3. Moana – number of people commercially employed sustainably harvesting toheroa. If we can improve our toheroa stocks and habitat to a point where we can once again commercially harvest them in a sustainable manner, then our foreshore is healthy.
 - number of marae able to provide sustainably harvested paua to manuhiri. If we have plentiful and healthy paua then our coasts are healthy.
4. Hapū – the ability of hapū to access materials and kai of cultural importance.

- the rate of change of consumption and preparation of traditional plant and animal foods and medicines by Te Roroa, including ceremonial/cultural use as well as daily household use;

- extent of practice or use of karakia, wananga, powhiri, whakatau, rahui, and other oral traditions related to the use of traditional foods and subsistence practices;

- preservation and continued use of te reo o Te Roroa, songs, stories and ceremonies, traditional names for places, sites, foods and processes (planting, hunting, gathering, harvesting, preparation) and the rate of change and factors affecting these practices;

- integrity of and access to sacred sites;

- rate of rural-to-urban or urban-to-rural migration of Te Roroa;

- number of occasions that Te Roroa whanau, hapū members and representatives are effectively involved in planning, decision-making, implementation and evaluation processes undertaken by local government, agencies or other entities and the extent to which cultural concerns are considered and addressed.

Implementation of Te Roroa cultural indicators and monitoring framework is underway.

CONCLUSIONS

Ngā rangatira state that mauri is unhealthy and disconnected. This is causing a tremendous loss of mana to the tribes. From an Mātauranga Māori perspective, natural resources are imbued with mauri, an intangible and intrinsic value. Ensuring the mauri of natural resources are maintained is an integral part in defining who Kaitiaki of natural resources are. Māori believed that small shifts in the mauri or life force of any part of the environment, for example through use or misuse, would cause shifts in the mauri of immediately related components, which could eventually affect the whole systems.

Particular reasons for this have been outlined in the previous discussions but generally due to disintegration from practicing kaitiakitanga, rangitiratanga, whanaungatanga and manaakitanga at the appropriate scale (i.e. whanau and/or hapū) and access to the natural world of Kaipara. It is clear that there is a need to develop monitoring frameworks founded on Māori worldview and knowledge for the world of Kaipara.

Eight assessment models of cultural health were evaluated. Case studies included: (1) Cultural Health Index for Streams and Waterways; (2) State of the Takiwā – Ngāi Tahu; (3) Māori environmental indicators and outcomes: Mauri of Waterways Kete; (4) Stream Health Monitoring and Assessment (SHMAK) Kit for Māori; (5) Marine Health Index; (6) Iwi Estuarine Monitoring Tool Kit (Ngā Waihotanga Iho); (7) Ngāti Kere Methods and Indicators for Marine Protection; (8) Te Roroa Iwi Cultural Indicators & Monitoring Framework. All have been developed to take into account tangata whenua values. Table 3 summarises the core features of the assessment tools from what particular ecosystem is targeted by the tool; what cultural indicator(s) are being understood; the scale of application and/or integration of the tool, for example, can the tool be applied into State of Environment reporting or across the takiwā. Another feature is the validation with western scientific Protecting methods to understand the “health” of mauri. The CHI, State of the Takiwā, and the Iwi Estuarine Monitoring Kit all involved western scientific methods to support and/or explain the status of the physical ecosystem. The Māori Indicators & Outcomes –Tikanga Mauri of Waterways Kete included a combination of measures to understand health of mauri. The kete includes measures of physical evidence that mauri is protected and evidence within agencies, wider community and tangata whenua organisations (e.g. provisions in planning documents designed to protect mauri). It is unclear what the scale of application or integration will be at this stage however, there is an opportunity for Kaipara hapū and/or the IKHMG to pilot the kete.

11.8 EVIDENCE THAT DESCRIBES THE STATUS OF MAURI

Being an intangible entity, of life-supporting value, utilising quantitative or scientific evidence to understand the status of the mauri is difficult.

According to Barlow (1991):

“Everything has a mauri, including people, fish, animals, birds, forests, land, seas, and rivers: the mauri is that power which permits these living things to exist within their own realm and sphere. No one can control their own mauri or life-existence” [p. 83].

Māori ontology acknowledges the inherent or intrinsic values within an ecological system: encapsulated in the concept of mauri.

The Mauri was described by Kaipara kaitiaki as unhealthy causing tremendous loss of mana to the tribes. Historically, Kaipara Māori have witnessed significant changes in the characteristics of their rohe as a result of changing landuse and resource extraction. Te Uri o Hau, and other harbor hapū, consider the harbour and its ecosystem to have a mauri (Environs Holdings Ltd 2007) and as Kaitiaki of that mauri they have a cultural and spiritual responsibility to ensure it is maintained, protected and enhanced.

There are current activities that impact on the mauri of the Kaipara such as sandmining at Taporapora, commercial fishing, reclamation, foreshore and seabed structures, dumping, and pollution from wastewater treatment plants. Te Uri o Hau also believe such activities as the placement of marine turbines in the entrance of the Kaipara will have an impact and potential diminishing of the mauri of the harbour. Any resource activity that reduces or affects the flow of measureable energy will reduce or affect the mauri (Environs Holdings Ltd 2007):

“Mauri is intimately connected to the interrelationship and intertwining of all forces that make up an ecosystem – the physical and spiritual, the tangible and intangible, the past, present and future, human and non-human, individual components and interconnected wholes.”

TUOH Deed of Settlement 2002 statement of the cultural, spiritual, historic and traditional association with the Wairoa River:

“The mauri of the Wairoa River represents the essence that binds the physical and spiritual elements of all things together, generating and upholding life. All elements of the natural environment possess a life force and all forms of life are related. Mauri is critical element of the spiritual relationship for Te Uri o Hau.”

This statement is also made for the Kaipara Harbour coastal area, Ōtamatea, Ōruawharo, Ōtamatea, Arapaoa, Whakakei rivers.

Kaipara Māori hold numerous concerns for their mana. Mana is inter-generational. The historical degradation of the harbour over the past 200 years has already had significant adverse cultural effects on Kaipara Māori. All resource activities and development that have occurred in the Kaipara has seen resources extracted from Kaipara Māori rohe and given to others, most of whom are outside their rohe. Traditionally such exchanges are governed by strict tikanga – involving concepts of manaakitanga, muru and utu – all of which involve concepts of reciprocity (Environs Holdings Ltd 2007). Mana whenua are neither making decisions about the resource nor determining the manner and value of the exchange. Numerous issues arise from this effect.

Many assumptive decisions have been made by the Crown since European arrival into the Kaipara thus, mana whenua have not been wholly and directly involved in the use and management of the Kaipara for over 200 years. The Marine Department was established in 1866 to make decisions on shipping, harbours and harbour works. The legal assumption has been that beaches and the foreshore “belong” to the Crown (Murton, Chapter 3.4.3,

unpublished). Between 1866 and 1972, the Marine Department dealt with a range of activities relating to the foreshore: the approval and licensing of structures; the licensing of the right to pick oysters for commercial purposes; proposals to lease oyster beds; the leasing of the North Kaipara beaches to toheroa canners; the leasing of mudflats for reclamation purposes; the subdivision of the foreshore for oyster management purposes; oyster cultivation work; the licensing of the taking of sand, shell and shingle.

By 1879, Kaipara Māori lost control of most of the shoreline of the Kaipara through sale of the land above the mean spring high tide mark, but settlers, timber millers, gum diggers, and fishermen were flooding in. Kaipara rangitira did express their dissatisfaction about the inability of Pākehā and a government who did not care and acknowledge the rights of access and control.

The impact of this on the mauri is unknown. The spirituality surrounding this concept makes it even more difficult to restore. Should we measure its status since 1800's when alienation begun for Kaipara Māori? Or should it be measured from today's Kaitiaki?

A Bibliography for this Appendix

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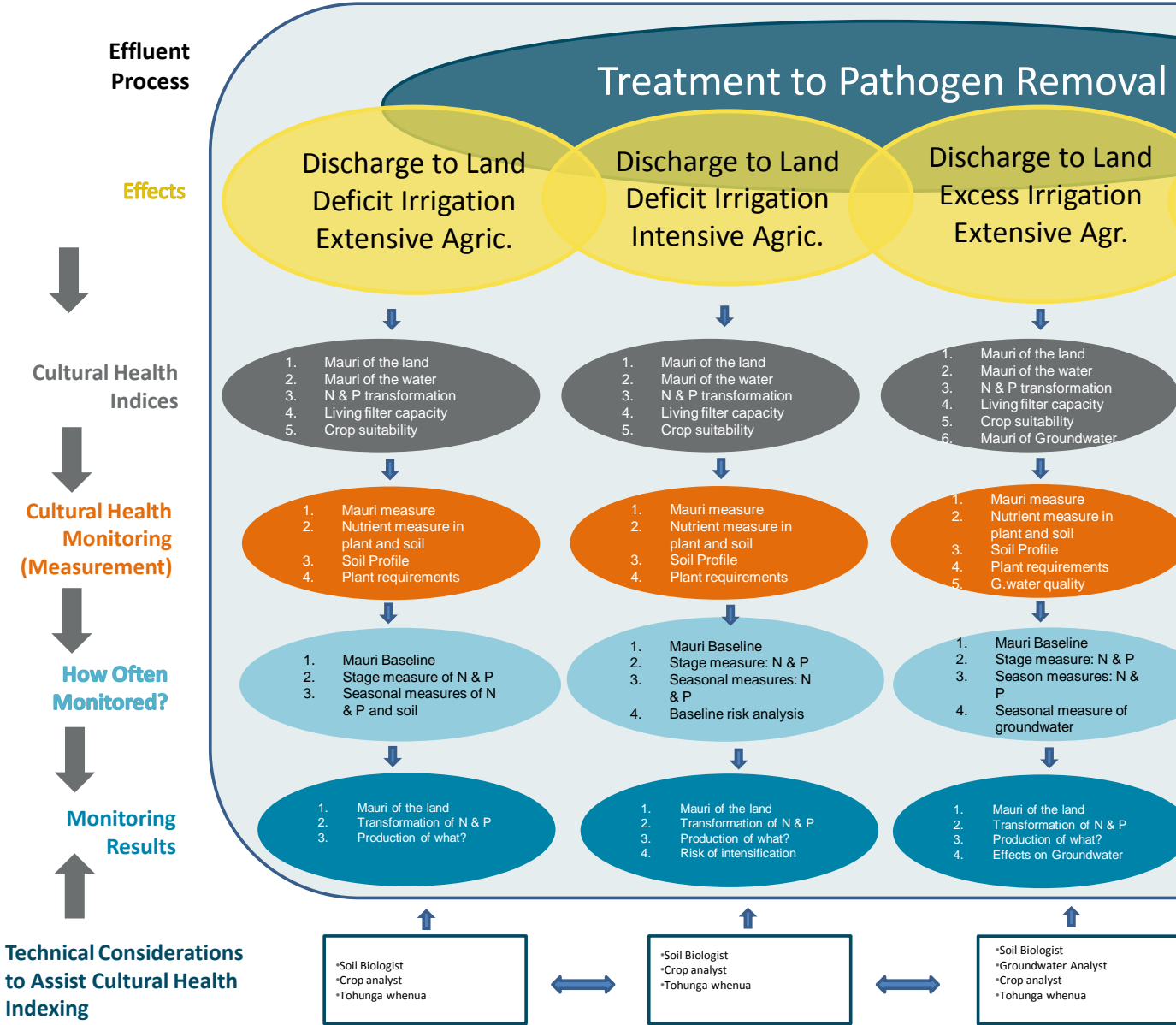
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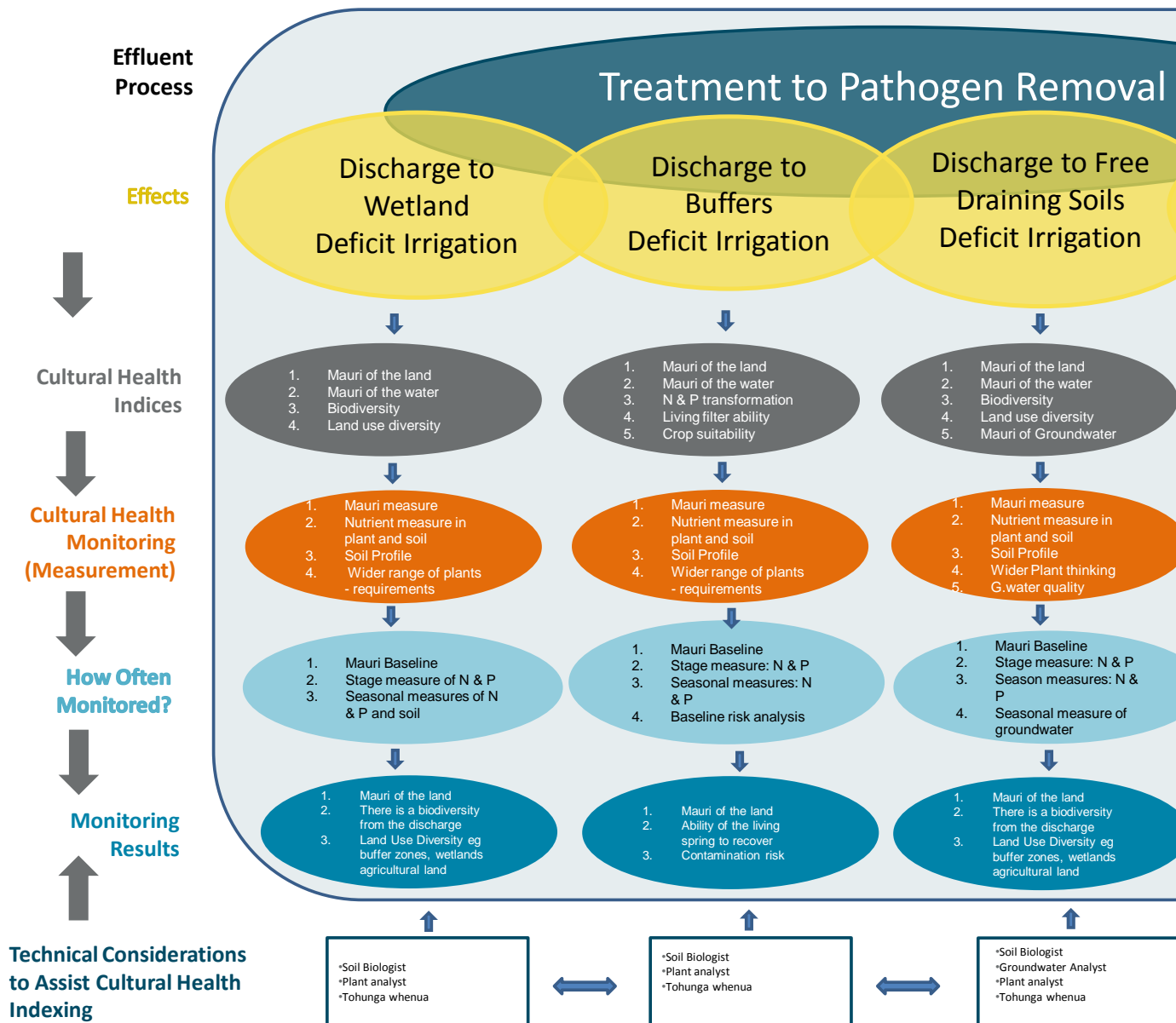
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Wairarapa Maori HOKOHOKOTANGA

