

Whangawehi Stream Catchment Management Plan Stage I



Whangawehi Stream

Catchment Management Plan

Stage I

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Report prepared for Hawke's Bay Regional Council:

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Acknowledgments to:

- Tuahuru Marae Trustees;
- Kaiuku Marae Committee;
- Landowners of the Whangawehi Catchment: George Ormond, Pat and Sue O'Brien, Len Symes, Andrew Ormond, Jack Bowen and the Coop Brothers;
- Dr. Adam Uytendaal and Shane Gilmer, Hawke's Bay Regional Council;
- Jamie Cox and Neil Cook, Wairoa District Council;
- Campbell Leckie, Hawke's Bay Regional Council;
- Department of Conservation.

“The awa is sacred to us

and we would like to see the Kaimoana come back so we can harvest it”

Kathleen Mato

Chairperson, Tuahuru Marae.

FOREWORD

The Whangawehi Catchment Management Plan was a recommendation by the environment court in 2011 as per the granting of the resource consent for the Mahia Beach Community Waste Water Scheme.

Tangata whenua were concerned that the awa would be contaminated from seepage, leakage and run off from the sewerage ponds.

Tangata whenua requested that a Memorandum of Understanding be developed and signed with Wairoa District Council, Hawkes Bay Regional Council, Landowners/Farmers and the Marae of Rongomaiwahine of Mahia.

Tangata whenua were active participants in the development of MOU with ninety nine percent of the content of the document being recommendations from us.

Whangawehi is the only significant river on the Peninsula.

Nga uri o Rongomaiwahine consider the Whangawehi Stream as our scared river it being our kapata kai “ki roto.” We refer to the Whangawehi Stream when we recite our pepeha. “Ko whangawehi te awa” At the mouth of the river on into the moana is where we fish for nga ika o Tangaroa. We harvest our kaimoana “nga tamaraki o tangaroa” east and west of the river mouth, we bathe in the river during summer.

The signing of the MOU took place on the 16th of July 2011 at Tuahuru Marae.

This agreement between all the above parties is new beginning for Rongomaiwahine marae, hapu and land owners as it has enabled us to work together and develop a CMP that will benefit all in the catchment including fresh water fisheries, water quality, stabilise the whenua within the catchment and provides an opportunity to create a riparian strip with plantings of native trees.

The positives are that through the signing of the MOU we are assured that no contamination from the waste water ponds will affect the water quality or our kaimoana beds, fresh water fisheries or recreational activities.

Being a decision maker at the table with the other parties means we are fully aware of all plans, projects, effects, benefits being made to safe guard and improve the awa and all the living fresh and salt water species.

To date two tangata whenua have been employed, one water testing, the other sourcing young seedlings from the kinikini native reserve and else where. The Mahia and Nuhaka school children will be involved in the planting of the native trees once the riparian strip has been fenced.

Further positions of employment will be created for fencing and spraying, pest and stock. Assessment of the fresh water fisheries will be collated identifying species, habitat, condition, health and spawning.

The community and schools will be involved in this project in an environmental educational aspect.

The CMP is community driven.

Monthly meetings are open to all the community and take place on a marae.

The community is involved and consulted throughout the development of this project . Two hui a Iwi have taken place at Tuahuru Marae to keep the people informed of the progress taking place.

Tangata whenua ideas and korero are included in the CMP and used where relevant.

Four members from the maraes are members of the committee and report back to their marae.

The minutes of all our meetings are on the Wairoa District Council web site for anyone to access.

Outcomes

Healthier fresh water fisheries, increase in numbers, species and sizes, creation of better habitat and spawning environment.

Improved water quality.

Safe water quality for recreational purpose.

Community and school children will have gained sufficient knowledge and skills to better manage and care for the catchment, awa and freshwater fisheries in Mahia.

Kathleen Mato

Chairperson: Tuahuru Marae

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1. Introduction

The Whangawehi catchment is the largest catchment of the Mahia Peninsula. This document sets out an initial Catchment Management Plan (CMP) for the Whangawehi catchment. Its inception stems from the desire for a better environmental outcome for the catchment, shared by the signatories of a Memorandum of Understanding between Tangata Whenua of Mahia, landowners of the Whangawehi catchment, the Wairoa District Council and Hawke's Bay Regional Council. It presents progress achieved during an 18 month period of active stakeholder and community engagement and scientific monitoring.

1.1. Setting the scene

In December 2009, the Wairoa District Council lodged a series of resource consent applications with the Environment Court for the building and operation of a wastewater collection and treatment scheme for the Mahia Beach Community.

The Scheme will replace septic tanks and will provide a much more advanced degree of treatment for the community wastewater. The treated wastewater will be discharged to forestry land, allowing further treatment and uptake by the trees. The consent was granted in April 2011. The environment court decision recognises the values of the Whangawehi Stream, and sets a number of consent conditions relative to the management of the activity and land and water monitoring.

The site selected for the construction of the oxidation ponds and the irrigation of wastewater to land is located near the headwaters of the Whangawehi Stream. The consultation process undertaken in relation to the resource consent applications identified deep concerns from the local community about the potential effects of the Scheme on the cultural, historical, recreational and ecological values of the Whangawehi Stream and its catchment. At the same time, the different parties involved also identified a shared desire to create a better management of the natural, physical, cultural and spiritual resources of the Whangawehi catchment as a whole, and resolved to enter into a Memorandum of Understanding.

The Memorandum of Understanding between the Wairoa District Council, the Hawke's Bay Regional Council, Tangata Whenua of Mahia, represented by:

- Kaiuku Marae Trustees,
- Tuahuru Marae Trustees;
- Ruawharo Marae Trustees
- Mahanga Marae Trustees;
- Mahia Maori Committee;

and Landowners in the Whangawehi Catchment was signed in July 2011. It outlines the cultural and historical importance Tangata Whenua place on the proposed wastewater treatment and irrigation area and the wish for the parties to engage in a respectful, meaningful, balanced, enduring, and mutually beneficial decision making process.

In addition to actions directly related to the operation of the proposed wastewater treatment and irrigation scheme, the MoU identifies that the Wairoa District Council and the Hawke's Bay Regional Council will engage and consult with Tangata Whenua and Landowners for the development of a Catchment Management Plan for the whole of the Whangawehi Stream catchment.

The aim of the Catchment Management Plan is to obtain better and more sustainable environmental outcomes through the cooperation of Hawke's Bay Regional Council, Tangata Whenua, Landowners, Wairoa District Council and all interested stakeholders.

The development of the MoU is to be supported by further stream monitoring, in addition to the monitoring and management requirements imposed by resource consent conditions. This monitoring is to

be undertaken by Wairoa District Council and Hawke's Bay Regional Council, in conjunction with Tangata Whenua and Landowners.

1.2. Scope of this document

The aim of this document is to present the process followed and the progress achieved so far in the development of a full Catchment Management Plan for the Whangawehi Stream.

A fully developed CMP should contain a full implementation plan, which identifies a detailed action plan, as well as human and financial resources. The information available to date does not allow the development of these two essential components. This document is thus not a fully developed CMP, rather it should be seen as a stepping stone towards a full catchment management plan.

1.1. The process so far

This document presents the outcomes of a strong community engagement and scientific monitoring process over an 18 month period.

Monthly meetings have been held at the Tuahuru and Kaiuku Maraes involving all the signatories of the MoU, to discuss progress with the Wastewater Scheme, the Whangawehi CMP, and wider topics/issues raised by the community.

In addition, two Huis were held involving Tangata Whenua of Mahia, Landowners, Regional Council, and District Council representatives, and external consultants. The results of the April 2011 stream monitoring were presented at the first of the two Huis, held on 2nd June 2011 at the Tuahuru Marae. The second Hui was also held at the Tuahuru Marae, on 2nd September 2011. This Hui was specifically held to help develop a vision for the Whangawehi CMP, including:

- Inventory the values that the community associate with the Whangawehi stream and its catchment, and
- Identify the outcomes of the catchment management plan sought by the community.

The community values and outcomes identified that day are an essential foundation of the Whangawehi CMP, and are presented in detail in the following sections 2.2 and 3.1.

2. The Whangawehi catchment

2.1. Physical attributes

The Mahia Peninsula is located in Northern Hawke's Bay, on the East Coast of the North Island of New Zealand. At 3,588 hectares, the Whangawehi Stream catchment is the largest of the Mahia peninsula.

The Whangawehi Stream takes its source near the northern end of the Mahia Peninsula, between the Mahia Beach (western side of the peninsula) and the Mahia settlements (Eastern side of the peninsula) (Figure 1). It flows into the Pacific Ocean at Whangawehi, after a course of approximately 13.3 km. It receives three main tributaries from the Southern part of the catchment: the unnamed tributary that drains the Department of Conservation bush reserve (this tributary is referred to as the "Bush Reserve Stream" in this document), the Urumatui Stream and the Mangatupae Stream.

2.2. Community values

As explained earlier, a Hui was held at the Tuahuru Marae in September 2011 to progress the development of the Whangawehi CMP. It included a workshop session during which the participants were asked to list the values that they associate with the Whangawehi Stream and its catchment. The following is a direct transcription of the day's findings:

- Cultural and historical values:
 - Mauri, Wairua, Waiu, Waiora, Wai Maori;
 - Healing – Cultural – Historical – Kaitiaki - Whakapapa: Stream and Land
 - Kai (stream): Whitebait, Tuna
 - Kai (estuary): flounder, kahawai, kingfish, mullet, cockles, whetiko, sole, skate, pipi, papaka;
 - Land as a food source
 - Urupa
- Ecological values
 - Stream health: healthy awa! – Improve habitat, spawning
 - Fishes: flounder, kahawai, mullet (lower stream); Inanga, kokopu, koura, shrimp, eels, freshwater mussels;
 - Land as habitat for birds, animals, kiwi – improve habitat
- Recreational values
 - Safe swimming
 - Safe seafood
 - Visual quality of habitat
- Economic and development values
 - Maintain the productive/economic value of the land;
 - Forestry and farming
 - Education/ knowledge.

2.3. Monitoring sites

Figure 2 shows the nine sites where stream flow, water quality and stream ecology were monitored in April 2011. Five of these sites were on the Whangawehi Stream itself, and four on its main tributaries, in order to provide a comprehensive “snapshot” of the whole catchment (Figure 2). A summary description of the monitoring sites is provided in Table 1. Site photographs are presented in Appendix A.

It is anticipated that further monitoring runs will be undertaken at the same sites to provide further “snapshots” under various stream flow and season conditions.

Table 1: Summary of stream flow, water quality and ecology monitoring sites for the April 2011 “snapshot” survey.

Site Number	Site name	Description
1	Whangawehi at MBWS	Whangawehi Stream where it leaves the proposed wastewater treatment and irrigation area
2	Whangawehi at Cattleyards	Monitoring site as per resource consent conditions
3	Whangawehi above confluence	Whangawehi Stream above the confluence with the Bush Reserve Stream
4	Bush Stream	Bush Reserve Stream above its confluence with the Whangawehi Stream
5	Urumatui Stream	Urumatui Stream above its confluence with the Whangawehi Stream
6	Andrew's Stream	Unnamed Tributary above its confluence with the Whangawehi Stream
7	Whangawehi at Pat O'Brien's	Whangawehi Stream above its confluence with the Mangatupae Stream
8	Mangatupae Stream	Mangatupae Stream above its confluence with the Whangawehi Stream
9	Whangawehi Stream at Mamangu	Whangawehi Stream at Mamangu – waterfalls which mark the upstream of the tidal influence.

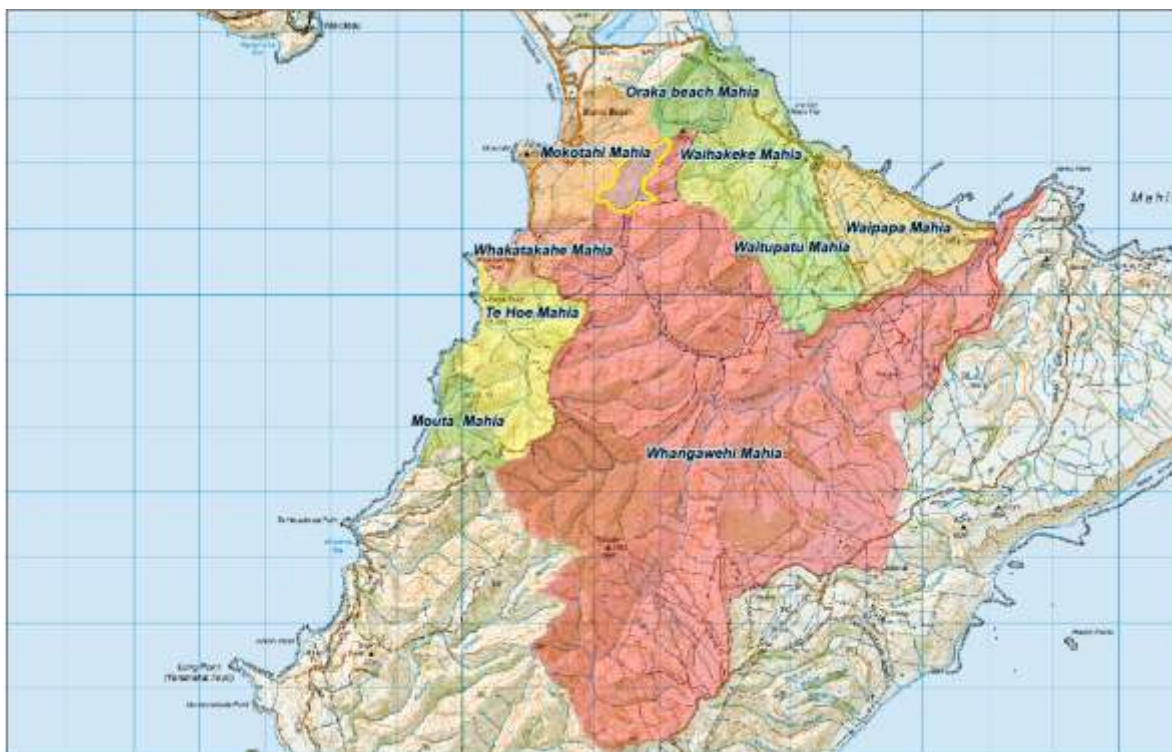


Figure 1: Whangawehi Stream catchment outline. The area for the proposed treated wastewater irrigation is outlined in yellow.

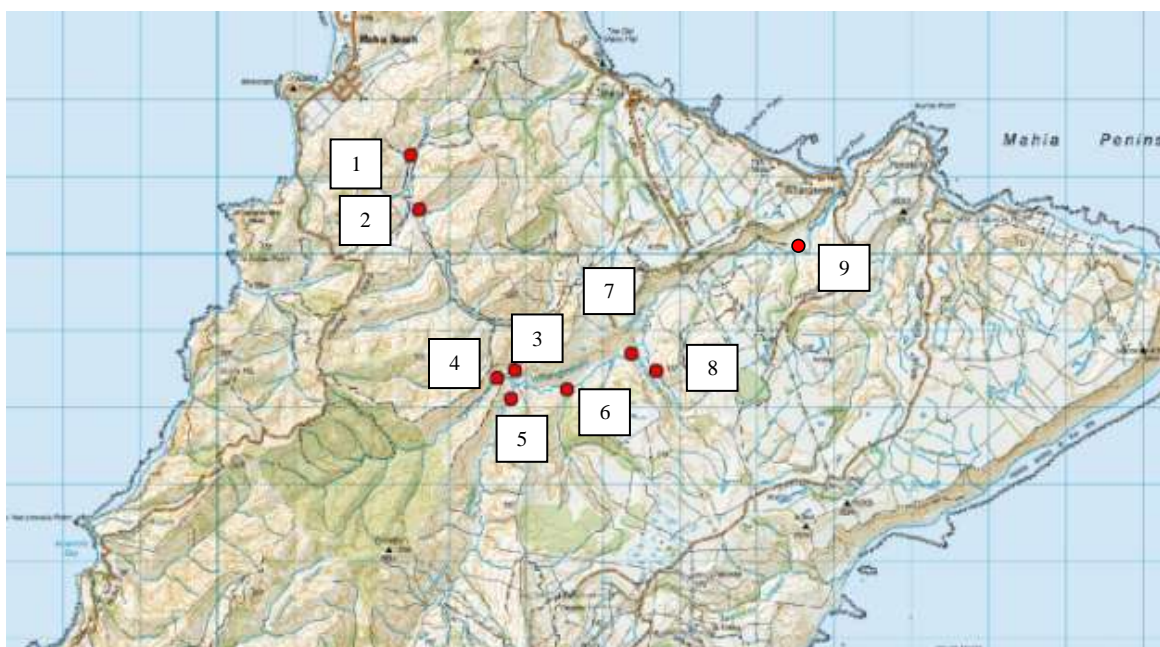


Figure 2: Whangawehi catchment water quality, ecology and flow monitoring sites (April 2011).

2.4. Stream flows

Stream flow gaugings were undertaken at all nine monitoring sites. Flow gaugings measure the water depth and velocity (speed) at a number of points along a straight line across the stream (transects) to provide an estimate of stream discharge, or flow, i.e. the volume of water that flows through that section of stream in a given time.

The results, presented in Figure 3, show that the Whangawehi Stream where it exits the proposed irrigation area is still very small (4 l/s) and made a relatively minimal contribution (1.7 %) to the total flow near the stream mouth (234 l/s) on the day of monitoring. Catchment contributions increased the stream flow to 10 l/s at the “Cattleyards” site (site N.2), then to 27 l/s above the confluence with the bush Stream (site N.3). The Urumatui Stream is the largest tributary, and contributed approximately one third of the total stream flow. The unnamed tributary from Andrew Ormond’s land was the second largest tributary (site N. 6), and contributed approximately 20% of the total stream flow. The Bush Stream and the Mangatupae Stream had much lower flow, and together contributed approximately 15% of the total stream flow.

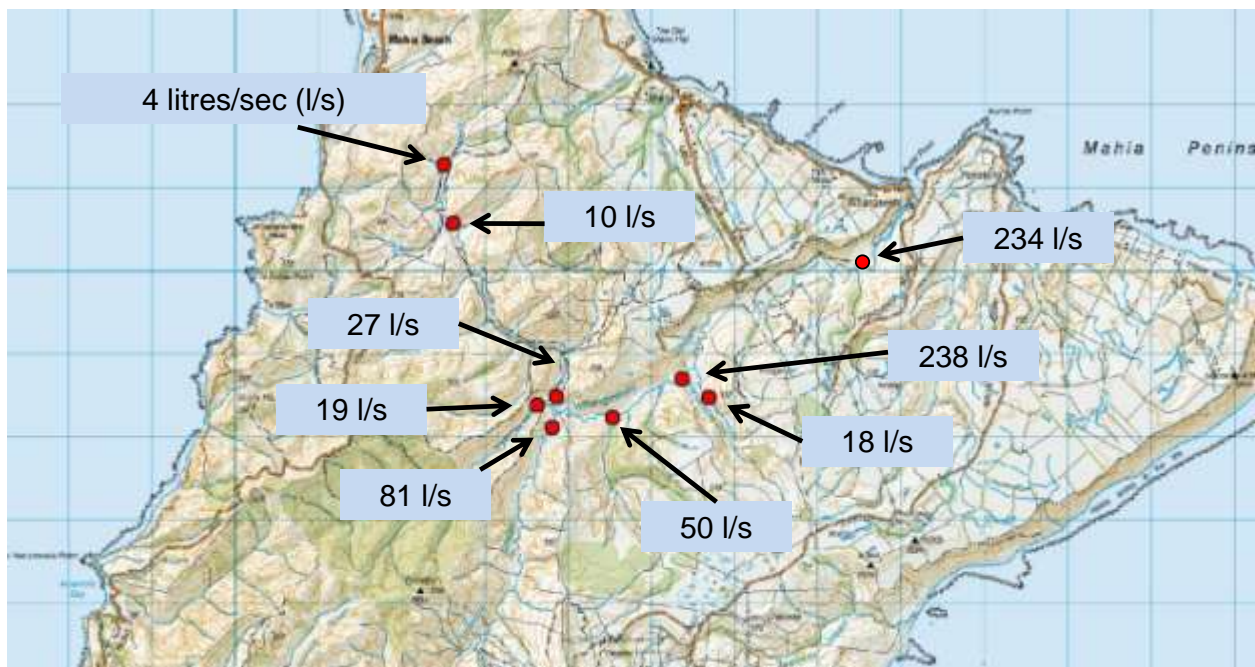


Figure 3: Measured Stream flows during the April 2011 “snapshot” survey.

2.5. Stream water quality, habitat and ecology

A comprehensive suite of water quality determinand was measured or analysed for during the April 2011 “snapshot”. The aim of this section of the document is not to present all the results of this survey; rather it is to provide an overall summary of key results in order to identify likely issues or threats facing the stream health. All results and comments are based on the information available, and are subject to being confirmed or otherwise by further monitoring.

2.5.1. Microbiological water quality - stream

The 2002 microbiological guidelines for recreational waters recommend the use of the indicator bacteria *Escherichia coli* (*E. coli*) as indicator of health risk in freshwaters (MfE/MoH, 2002). The guidelines define a three-mode management system for recreational freshwaters: Acceptable/Green mode (*E. coli* < 260/100mL), Alert/Amber mode (*E. coli* < 550/100mL) and Action/Red mode (*E. coli* > 550/100mL). The green mode indicates a low level of health risk, the Amber mode is indicative of a slightly more elevated, although still acceptable, health risk, and the red mode indicates the health risk to swimmers is unacceptable and the site/ beach is unsuitable for swimming.

All sites complied with the higher threshold, meaning that, on 19-20th April 2011, the health risk to swimmers would have been acceptable (Figure 4). However, four sites including two on tributaries of the Whangawehi Stream and the two sites on the lower Whangawehi Stream mainstem presented *E. coli* counts exceeding 400/100mL, i.e. would have been in the Alert /Amber mode, and were close to the Action/Red mode threshold (*E. coli* > 550/100mL).

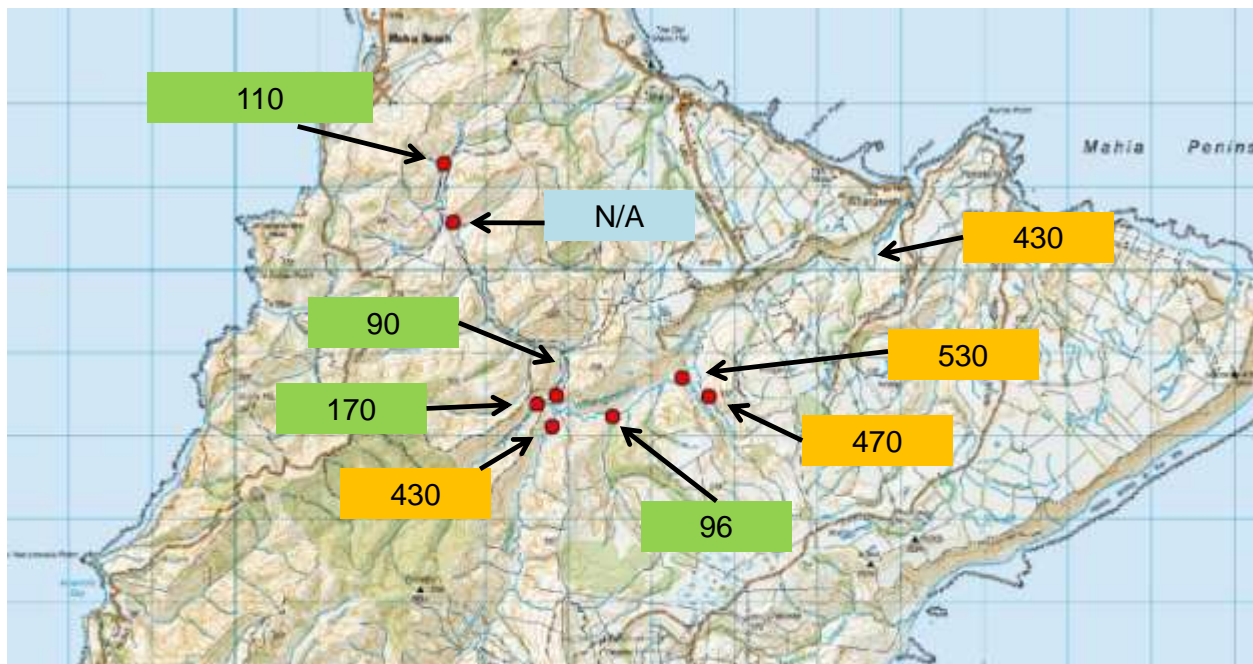


Figure 4: Summary of microbiological water quality during the April 2011 “snapshot” survey (*E. coli*/100mL). Colour grading is as per the 2002 MfE/MoH microbiological water quality guidelines.

2.5.2. Microbiological water quality – stream mouth

The microbiological guidelines for recreational waters recommend the use of the indicator bacteria *enterococci* as indicator of health risk in marine waters. Similarly to freshwaters, the guidelines define a three-mode management system: Acceptable/Green mode (*enterococci* < 140/100mL), Alert/Amber mode (*enterococci* < 280/100mL) and Action/Red mode (*enterococci* > 280/100mL). For shellfish gathering areas, the guidelines set a maximum median and 90th percentile faecal coliforms concentration of 14/100mL and 43/100mL respectively.

Weekly water quality monitoring undertaken by HBRC during the main bathing season near the Whangawehi Stream mouth shows that water quality is generally suitable for swimming (90% of results in the “green” category), although *enterococci* bacteria indicator counts are elevated on occasions (7% of samples in the “Red” category).

However, faecal coliform counts show that the site exceeds both the median and 90th percentile guidelines for shellfish gathering areas.

2.5.3. Nutrients and periphyton

Periphyton is the brown or green slime or filaments coating stones, wood or any other stable surfaces in streams and rivers. In some situations, periphyton can proliferate and form thick mats of green or brown filaments on the river bed. Excessive periphyton can affect a number of values associated with stream and rivers, including ecosystem health, recreational and aesthetic values, and trout fishery values.

The New Zealand periphyton guidelines define nuisance periphyton growth as a maximum periphyton cover of the visible river bed of 60% by diatom/cyanobacteria mats more than 3mm thick or 30% by filamentous algae more than 2cm long (Biggs, 2000).

Using the above criteria, excessive filamentous periphyton growths were measured at three sites in the Whangawehi Stream itself in April 2011: Whangawehi at Cattleyards (site N. 2), Whangawehi at Pat O’Brien’s (Site N. 7) and Whangawehi at Mamangu (Site N.9).

Periphyton growth is generally controlled by a number of physical (e.g. substrate, river flow, sunlight, temperature), chemical (e.g. bioavailable nutrients - phosphorus and nitrogen) and biological (e.g. grazing by invertebrates) phenomena (Biggs, 2000).

Dissolved Reactive Phosphorus (DRP- the phosphorus forms that are directly available to plants) concentrations were found to be low to moderate in the Whangawehi Stream and its tributaries. Interestingly, the highest concentration was recorded in the Bush Stream, which has most of its catchment in native vegetation. This indicates that there are probably natural sources of DRP in the catchment, presumably from naturally phosphorus-rich tertiary sedimentary geology which dominates the catchment, leading to naturally moderately elevated DRP concentrations. Given the likely naturally moderately elevated DRP concentrations, sources of dissolved inorganic nitrogen (the sum of ammonia, nitrate and nitrite-nitrogen) are essential to controlling periphyton growth. Nitrate—nitrogen concentrations were found to be generally low at most sites, except at two sites in the upper Whangawehi Stream: at Cattleyards (Site N.2) and, to a lesser extent, Whangawehi above confluence (Site N.3). DRP and nitrate-N results are summarised in Appendix B

The amount of sunlight reaching the stream bed is a key driver of periphyton growth, and the absence of riparian vegetation along most of the course of the lower stream probably contributed to the excessive periphyton growths observed in April 2011. Conversely, given the size of the stream, tall riparian vegetation would probably provide significant shading to the stream bed and limit periphyton growth.



Photograph 1: Heavy filamentous periphyton growth at the Whangawehi at Mamangu monitoring site - April 2011. Photograph Shane Gilmer, HBRC.



Photograph 2: Macroinvertebrate sampling in the Whangawehi catchment - April 2011. Photograph Shane Gilmer, HBRC.

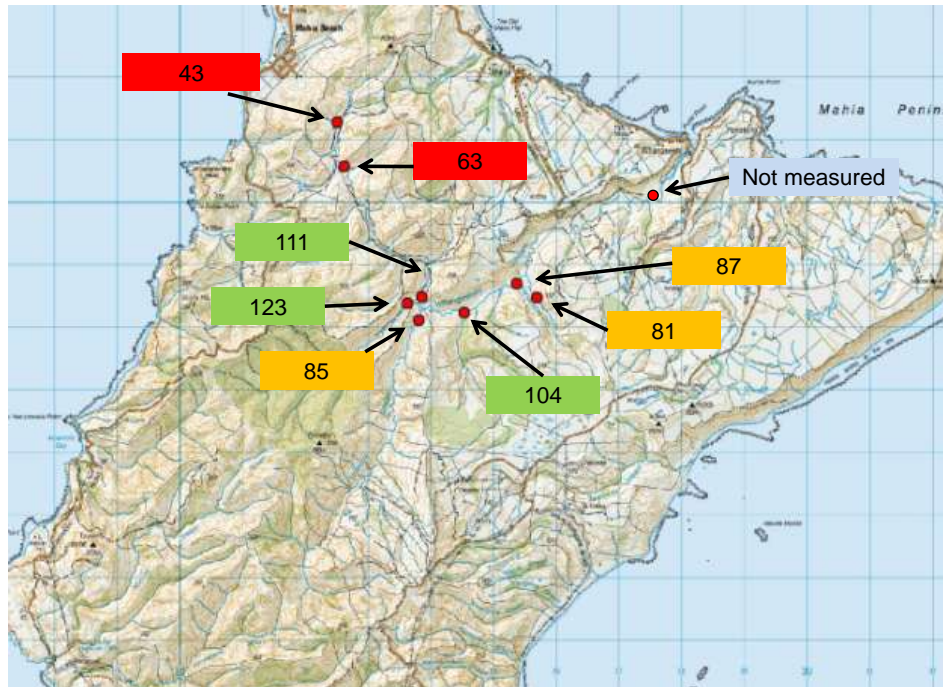


Figure 5: Macroinvertebrate community index (MCI) score measured in April 2011.

2.5.1. Macroinvertebrate communities

Macroinvertebrate communities (i.e. small animals such as insects, worms and shrimps that live in the stream) are commonly used as an indicator of water quality and ecosystem health. A macroinvertebrate community index (MCI) of 120 or more is considered excellent, a score of 100 to 120 is considered good, a score of 80 to 100 is considered moderate, and a score below 80 is considered poor. Macroinvertebrate communities are sampled by dislodging macroinvertebrates from the stream bed and capturing them in a fine meshed net placed immediately downstream (Photograph 2).

The two sites near the top of the Whangawehi Stream scored very poorly, with scores well below 80. The Urumatui Stream, the Mangatupae Stream and the Whangawehi at Pat O'Brien's presented moderate MCI scores of between 80 and 90. The Whangawehi above the confluence and the unnamed tributary had "good" scores, whilst the Bush Stream was the only site with an "excellent" score (Figure 5).

2.5.2. Riparian and in-stream habitat

A general observation made by the scientists and technicians undertaking the monitoring was that the in-stream habitat quality of the Whangawehi Stream is affected by excessive sedimentation (i.e. deposition of fine sediment on the stream bed) over most of its course. This is considered to be the most pervasive threat to stream health across the catchment. Sources of deposited fine sediment include the transport of material eroded from the land during storm events, but also the constant re-work of sediments to the stream active channel by stream bank erosion and slumping. Bank erosion and slumping is in turn accelerated by stock damage and the lack of riparian vegetation.

Riparian habitat was generally good in areas where direct stock access was prevented (e.g. sites N.3, 4 and 5), but much poorer where livestock had direct access to stream banks (e.g. Sites N. 1 and 6 to 9)

2.5.3. Fish

Although a comprehensive fish survey is still to be conducted by HBRC, a one off night-time survey (spotlighting) showed the presence of inanga (*Galaxias maculatus*), bullies (*Gobiomorphus sp.*) and eels (*Anguilla sp.*) in the Whangawehi Stream. Koura (freshwater crayfish) and large numbers of the freshwater shrimp *Paratya curvirostris* were also observed.



Photograph 3: Stock damage to riparian margins and stream bed – upper Whangawehi Stream June 2011. Photograph Olivier Ausseil.



Photograph 4: The freshwater shrimp *Paratya curvirostris* was observed in large numbers in the Whangawehi Stream in April 2011. Photograph Olivier Ausseil.

3. Towards a Whangawehi Catchment Management Plan

3.1. Objectives/Vision

The core objective for the Whangawehi CMP, as defined at the September 2011 Hui, is to:

“maintain or improve the different cultural, ecological, recreational and economical values of the Whangawehi catchment identified by the community, in short, maintain or improve a healthy Awa!”.

The development of the Whangawehi CMP is seen as an opportunity to involve the whole of the community and provide extra knowledge and education. It is also clear to all that both the landowners and Tangata Whenua must be willing to fully participate if concrete management actions are to occur on the ground. It is envisioned that the CMP development process will be an encompassing one, with a continued active involvement of the local community and landowners.

Another clear message from the community is that although there is a strong sense of community involvement and commitment to the development and implementation of the CMP, it should not cause direct financial costs to the community.

3.1.1. Key issues and management actions

Table 2 summarises the different values and outcomes sought by the community, and lists the likely causes and threats to each value/outcome, the key management actions required, and the information required for the development of an implementation plan. These information requirements generally involve assessments or inventories, which will provide the basis for a robust assessment of the likely “size” and costs of the different management actions.

Importantly, most management actions will provide benefits to several values/outcomes. For example, land erosion is identified as a threat to retaining the land’s productive capacity. Soil/sediment lost from the land ends up in the stream, where it causes turbid water and excessive sedimentation, which in turn has an adverse impact on in-stream macroinvertebrate and fish communities. Sediment will ultimately be transported to the coast, where it can impact on the shellfish stocks and cause poor water clarity. Improved land erosion management within the catchment would thus have benefits in terms of both the land’s economic value and the cultural (Kai), ecological and recreational (visual) values of the stream and its estuary.

Similarly, fencing of streams and wetlands would reduce faecal contamination of the stream, reduce stream bank erosion/slumping, improve stream and terrestrial habitat and reduce algal growth (by shading), and would therefore provide benefits in relation to a wide range of community values.

However, riparian planting may also provide a stronghold for plant and/or animal pests, and a robust pest management programme would be an essential component of the CMP.

A detailed inventory of cultural and historical values within the Whangawehi catchment is also recommended to ensure that these values are properly identified, preserved, or where possible restored so they can be passed on to the future generations. The development of the Whangawehi CMP is also seen as an opportunity to provide for further education and knowledge about the stream and its catchment. This should be provided by holding practical workshops and field days, where experienced practitioners could demonstrate monitoring (e.g. water quality sampling, electric fishing) or restoration (erosion control, riparian planting) techniques.

Direct involvement and buy-in of all key stakeholders (Landowners, Tangata Whenua, district and regional council) was also identified by the community as a key requirement, but also as the best guarantee of success for the CMP.

Table 2: Summary of community values and outcomes, key issues and threats, recommended management actions and further information requirements for the Whangawehi CMP. Values and outcomes are in no specific order.

Community values and outcomes	Issues /causes	Key management actions	Further information required for implementation plan
<ul style="list-style-type: none"> The water is safe for swimming The seafood is safe for consumption 	<ul style="list-style-type: none"> Poor microbiological water quality in estuary Poor microbiological water quality in some stream reaches The primary contamination source is probably from livestock excreta 	<ul style="list-style-type: none"> Prevent direct stock access to streams and wetlands; Minimise surface runoff from areas heavily used by livestock Riparian fencing and planting 	<ul style="list-style-type: none"> Inventory of riparian fencing/livestock access to streams On-farm assessment of faecal contamination sources Continued monitoring
<ul style="list-style-type: none"> Record and maintain historical and cultural values Provide an opportunity for knowledge and education 	<ul style="list-style-type: none"> Historical knowledge may be lost if not recorded; The process needs to involve the community 	<ul style="list-style-type: none"> Undertake an inventory of the catchment's historical and cultural values Ensure community participation Workshops/ field days 	<ul style="list-style-type: none"> Inventory of the catchment's historical and cultural values
<ul style="list-style-type: none"> Maintain/ improve Stream ecosystem Maintain/ improve the visual values of aquatic and terrestrial habitat Healthy native fish populations Healthy shellfish population in the estuary 	<ul style="list-style-type: none"> In-stream sedimentation and water clarity Excessive periphyton growth in lower stream Poor macroinvertebrate communities Poor riparian and aquatic habitat where stock have access to the stream/banks 	<ul style="list-style-type: none"> Prevent direct stock access to streams and wetlands; Prevent stock access to Inanga spawning grounds during the spawning season; Riparian vegetation/buffers Erosion control Nutrient management? 	<ul style="list-style-type: none"> Assessment of erosion/erosion risk Inventory of riparian fencing/livestock access to streams/riparian vegetation Inventory of wetlands/forest remnants and their condition/threats Further water quality and biological monitoring
<ul style="list-style-type: none"> Maintain/ improve land ecosystem values/ habitat for birds and other animals 	<ul style="list-style-type: none"> Scarcity and fragmentation of native wetland and forest habitat; Animal and plant pests. 	<ul style="list-style-type: none"> Wetland fencing and restoration Forest remnant fencing and restoration Pest control Riparian vegetation as corridors to reconnect fragmented habitat 	<ul style="list-style-type: none"> Assessment of erosion/erosion risk Inventory of riparian fencing/livestock access to streams Inventory of wetlands/forest remnants Assessment of plant/animal pest risk
<ul style="list-style-type: none"> Maintain/ improve land productive value 	<ul style="list-style-type: none"> Land erosion Animal and plant pests Loss of access to stock drinking water and stream crossing if streams are fully fenced off 	<ul style="list-style-type: none"> Erosion control Stream, wetland and forest remnant fencing Pest control Provide stock drinking water and stream crossing 	<ul style="list-style-type: none"> Assessment of erosion/erosion risk Inventory of riparian fencing/livestock access to streams Inventory of wetlands/forest remnants Assessment of plant/animal pest risk Assessment of on-farm stream crossing/ drinking water

3.1.2. Further monitoring information required

A number of information requirements have been identified.

An inventory of a number of the catchment's historical and physical resources is required to enable a robust "sizing" of the key management actions identified above, including:

- Inventory of historical/cultural values;
- Inventory of wetland areas
- Riparian condition inventory
- Land inventory in relation to erosion

Further water quality/ecology monitoring is also strongly recommended to refine our understanding of the state of water quality and aquatic ecology before the implementation of the CMP, but also to establish a baseline so that progress towards the achievement of the community outcomes can be measured.

3.1.3. Where to from here?

The development of a fully fledged CMP involves a number of essential steps and tasks, as summarised in Table 3. A number of these tasks have already been completed thanks to a joint effort and commitment from the Tangata Whenua and landowners of Mahia and the district and regional councils. Community and landowner involvement were initiated over 18 months ago and will remain ongoing for the duration of the development and implementation of the CMP.

The Wairoa District Council and the Hawke's Bay Regional Council have carried out or funded the stream monitoring undertaken so far, as well as the contribution of external consultants to the two hui at Tuahuru Marae. The production of this document was funded by the Hawke's Bay Regional Council.

A number of tasks now require completion, in particular the undertaking of land and stream assessments/inventories, the development of an implementation plan and of course the actual implementation of the CMP itself.

As identified above, these tasks will only be made possible by the buy-in and active participation of landowner and local community. They will also require the involvement of specialised professionals, and ultimately will only be made possible if adequate support and funding are secured.

Wairoa District Council will continue to monitor stream water quality and ecology at the proposed wastewater treatment and irrigation site. It is anticipated that the 2012 part of this monitoring will be undertaken concurrently with (and thus form part of) a second catchment-wide stream water quality, ecology and flow "snapshot" survey, which HBRC have committed to undertaking. HBRC will also undertake an assessment of native fish populations in the Whangawehi Stream and its tributaries.

The Hawke's Bay Regional Council will fund the work of a full time Catchment Coordinator for a full year, to be selected and appointed in consultation with the community. It is anticipated that a full time catchment coordinator will provide and maintain the necessary positive energy for the development and progression of the CMP. Key responsibilities for this role will be to coordinate the development of a full CMP in conjunction with the local community and the district and regional councils, and identify and seek sources of external funding.

External funding will be required to complete some of the actions identified in Table 3 for the preparation of a full CMP, such as:

- Some of the inventories/assessments will require specialist input, which will need to be outsourced;
- Analytical costs for the recommended on-going water quality monitoring;
- The budgeting and preparation of the full CMP will be primarily undertaken by the Catchment Coordinator, but will likely require specialised external input.

At this stage it is estimated that approximately \$17 to \$22K of external funding will be required to complete the preparation of a full CMP for the Whangawehi catchment, in addition to the commitments HBRC and WDC have already made to the project.

A full budget for the implementation of the Whangawehi CMP will require the additional information identified in Table 2 and will be included in the final CMP.



Table 3: Summary of tasks leading to the full implementation of the Whangawehi CMP. Costs are estimates. TBC: to be confirmed. HBRC: Hawke's Bay Regional Council. WDC: Wairoa District Council. Costs do not include in-kind time and facilities contributions by the different parties.



Task	Status	Notes	Cost Estimate (includes GST)
Formally secure stakeholders involvement and commitment to developing the Whangawehi CMP	Completed	MoU dated 16 th July 2011	N/A
Initial monitoring to enable early identification of catchment issues and threats	Completed	<ul style="list-style-type: none"> Catchment wide monitoring snapshot (April 2011) 	<ul style="list-style-type: none"> \$10K (WDC) \$7K (HBRC)
Annual swimming season monitoring	Ongoing	<ul style="list-style-type: none"> Annual weekly monitoring (stream mouth) during the swimming season 	Years 1-3 <ul style="list-style-type: none"> \$6,900 (HBRC)
Identify community values for the catchment	Completed	Hui 2 nd September 2011	\$2K (HBRC)
Develop a vision/ outcomes for the CMP	Completed	Hui 2 nd September 2011	
Continue community engagement	Ongoing	Monthly meetings since early 2010	N/A
Produce a "Stage 1" document with stakeholder input to support further CMP development	Completed	This document	\$3K (HBRC)
Secure human and financial resources for CMP development	To be appointed	HBRC has committed to supporting the appointment of a catchment coordinator in the following manner: 1. Recruitment costs 2. Contribution to funding a catchment coordinator in Year 1 External funding will be required to fund the remainder of the remuneration for the catchment coordinator	Year 1: <ul style="list-style-type: none"> 1: \$3,450 (HBRC) 2: \$11,500 (HBRC) \$28,750 (external) Years 2 & 3: <ul style="list-style-type: none"> \$40,250 (external)
Catchment inventories and assessments 1. Additional catchment-wide water quality and flow snapshot; 2. Erosion assessment; 3. Riparian condition/fencing inventory 4. Freshwater fish inventory 5. Historical/cultural survey	By November 2012	<ul style="list-style-type: none"> 1 and 4 to be cost shared 50:50 between HBRC and WDC 2 and 3 to be undertaken by catchment coordinator 5 to be undertaken by community appointed consultant 	<ul style="list-style-type: none"> 1 and 4: \$11,500 (HBRC); \$11,500 (WDC) 5: \$11,500 (external)
Develop Implementation Plan and full CMP	By March 2013	Including an inventory of required tasks, sizing, scheduling and costing. To be undertaken by catchment coordinator with specialist support (external) HBRC has committed to contribute funding and in-kind support	<ul style="list-style-type: none"> \$8,635 (external) \$5,000 (HBRC) \$14,375 in-kind (HBRC)

Task	Status	Notes	Cost Estimate (includes GST)
Secure ongoing human and financial resources for CMP implementation	By March 2013	To be undertaken by catchment coordinator	<ul style="list-style-type: none"> Catchment coordinator
CMP implementation: <ol style="list-style-type: none"> Riparian fencing/planting Erosion management; Pest control Wetland/forest fencing/restoration Continued stream monitoring Stream/catchment education workshops/field days 	June 2013-June 2018	HBRC has committed to contributing financial and in-kind support for the implementation of the CMP. Additional funding for on-ground works may be available through HBRC's Landcare Scheme or the biosecurity site specific Biodiversity Programme. On-ground actions will necessitate landowner's participation Joint effort by all stakeholders	Year 1: <ul style="list-style-type: none"> \$5,000 (HBRC) \$14, 375 in-kind (HBRC) Year 2: <ul style="list-style-type: none"> \$14, 375 in-kind (HBRC)



APPENDICES


Appendix A: Stream monitoring sites

Site Number	Site name	Photograph
1	Whangawehi at MBWS	 A photograph showing a stream flowing through a grassy area. The stream is surrounded by tall, dry grasses and green vegetation. In the background, there is a hillside covered in similar vegetation under a clear blue sky.
2	Whangawehi at Cattleyards	 A photograph showing a stream flowing through a grassy area. The stream is surrounded by tall, dry grasses and green vegetation. In the background, there is a hillside covered in similar vegetation under a clear blue sky.

Site Number	Site name	Photograph
3	Whangawehi above confluence	
4	Bush Stream	

Site Number	Site name	Photograph
5	Urumatui Stream	
6	Andrew's Stream	

Site Number	Site name	Photograph
7	Whangawehi at Pat O'Brien's	
8	Mangatupae Stream	

Site Number	Site name	Photograph
9	Whangawehi Stream at Manangu	

Appendix B: Summary of DRP and nitrate-N results – April 2011 snapshot survey.

