

# **COMMUNITY WASTEWATER PROJECTS AS A CATALYST FOR DEVELOPING CATCHMENT MANAGEMENT ENHANCEMENT PROGRAMMES**

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## **Abstract**

Community wastewater discharges to water are often seen as being significant contributors to nutrient and pathogen loads in a much larger catchment, typically as a result of the scrutiny during resource consent public engagement processes; this is something that the catchment as a whole is not subject to.

In order to provide the needed information for the engagement process, considerable homework is often undertaken to demonstrate the effects of the community discharge, and in many cases this highlights the relative contributions made to the catchment's river system from land use in general and specific discharges. This information can then be used to initiate a community discussion as to where effort should be placed, particularly a discussion about key values; being cultural, economic, financial and recreational/social values.

Surface water discharges are often considered by communities to be undesirable and the major contributor to poor water quality, which must be addressed. However, in many cases there is potentially much greater environmental, recreational, financial and cultural benefit to be gained by investing in the health of waterways rather than investing in further treatment of wastewater, or completely changing the treatment or discharge system.

Recent work has shown that the cost per kilogram of nitrogen removal for a wastewater treatment plant could be tens to hundreds of times more expensive than initiating rural catchment improvements such as good farm management practices to achieve similar overall results. With many rural communities being fiscally constrained, and recognition that everyone has to do their part, it is clear that a holistic catchment approach offers benefits.

The ensuring debate of prioritisation of effort, when it is well informed, assists with balancing aspirational targets (which in some cases are expensive if technically achievable at all) with what is best for communities that have limited resources.

Initiation of catchment management programmes driven by wastewater discharge consenting processes in three communities; Whangawehi, Mahia Peninsula; Waiwiri, Horowhenua; and Wairoa, Hawke's Bay will be discussed in this paper. These three catchment programmes give an outline of the different stages of catchment management and reflect the importance of community engagement.

While seen as being complex and often considered in isolation, the need to consent community wastewater discharges has shown itself to be a valuable catalyst for initiating and supporting catchment management enhancement programmes.

## **Key Words**

Surface water discharges, Land Treatment, Municipal Effluent, Wastewater, Catchment Management, Community Consultation.

## **Introduction**

A resource consenting process provides much wider opportunities compared to seeking a consent for a specified activity. Catchment management programmes involving many activities have and can be initiated from the process of gaining resource consent for the managing of a municipal wastewater discharge.

The resource consenting process includes several stages before an acceptable consent and a set of conditions results. This process starts with technical investigations that result in a description of the circumstances of the discharge, effects of the discharge and what else is happening in the catchment. This information helps to support an informed discussion with all stakeholders, including the community itself. The outcome from this discussion with the larger audience stimulates ideas and motivation for projects beyond the consenting process.

## **Resource Consenting**

The resource consenting programme required for municipal wastewater discharges starts with an investigation of the current treatment site and sometimes consideration of new sites. A collation of current data determines what is known and what else needs to be found out. This often involves consideration of the impacts of the current discharge and identification of a range of alternatives. Typically, there are groundwater, surface water, soil, ecological, archaeological and cultural investigations. Early public consultation may highlight important concerns and so stimulate targeted investigations, such as fish surveys and recreational assessments of the area.

The results of the investigations are then typically presented to the community, with ideally a chance for the community to consider how they want to manage THEIR waste; and done so in a way that has no preconceived solutions. One outcome that is usually made clear from the data is that the wastewater discharge is only one of many sources contributing to the catchment environmental condition, and in particular contributing to water body health.

## **Community wastewater reality versus perception**

Public perception is that community wastewater is unsafe, and it is a primary and sometimes only contributor to the poor quality in the water ways. Often public perception is that wastewater is a raw unprocessed product that will always cause contamination. In reality it is typically highly treated and contains nutrients and pathogen (in some cases) less than discharges and drainage from agricultural and industrial operations.

When considered as part of the nutrient load from the wider catchment, the mass of contaminants can be a small contributor; however, the fact can't be taken away that both water and land discharges of wastewater can still contribute significantly to the wider catchment's total mass loading.

## **What does the community want**

Public engagement provides the opportunity to present different perspectives to the community, and to see what matters to them. The impacts from the management of wastewater can affect the community environmentally, recreationally, financially and culturally. Each one of these value sets requires discussion and debate to determine acceptable solutions. The range

of solutions will have both positives and negatives and it should be the community deciding what balance of costs, cultural values, recreational benefits or environmental impacts are most important.

Typically, most debates come down to financial affordability. Wastewater can be treated to such a high level that it becomes drinking water, but at a cost. It is at this point when the efficacy of investing in wastewater treatment is evaluated, and there is an opportunity to consider the bigger picture of where the best return for the community as a whole may rest. There will be a minimum level of treatment, but there comes a point when the additional costs for extra treatment has a marginal gain in terms of environmental improvement or recreational benefit; this is typically due to the fact that the background environment has a mass loading that renders any wastewater improvement indistinguishable.

Further, the typically limited financial resources of rural communities are better placed in catchment improvements and not additional wastewater treatment. For example, wastewater treatment plants set up to remove nitrogen may cost \$200,000 per tonne of nitrogen (assuming a one-off capital cost). Alternatively, catchment improvements such as riparian planting, may see an equivalent nitrogen tonnage removal for an investment of \$2,000 to \$8,000.

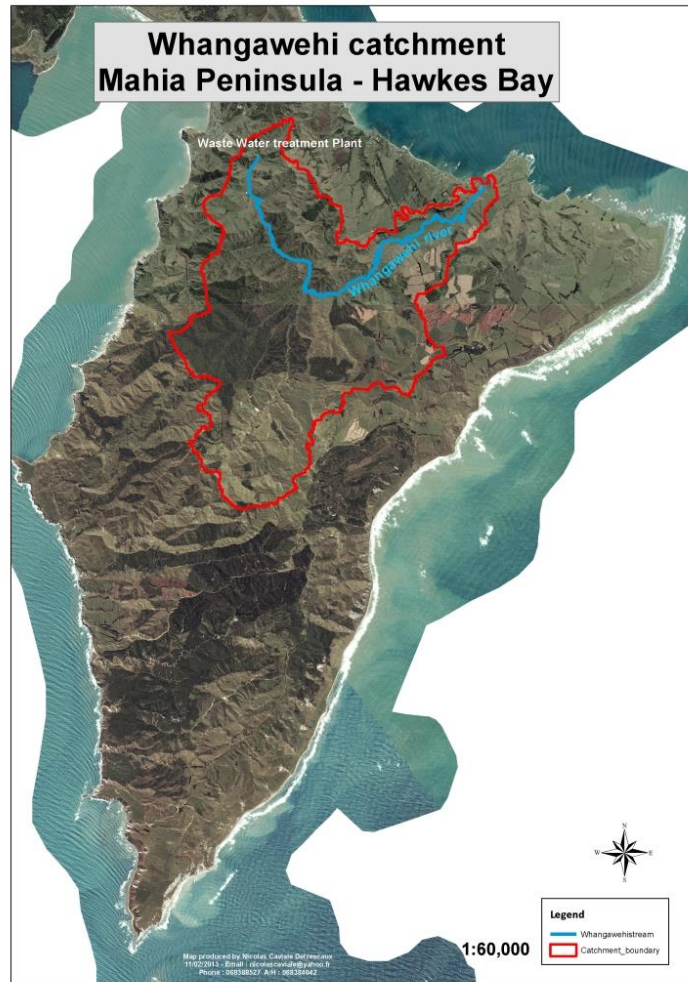
Public engagement provides a platform for informing preconceived ideas, through to debating where best to spend the money. Visions for the catchment that include environmental, recreational, financial and cultural can be prioritised based on well informed debate. The good thing about this debate is that it can draw out aspirational targets (which in some cases are expensive if technically achievable at all) and allow creative solutions to evolve that are best for communities that have limited resources.

### **Catchment Management Programmes**

Examples of where catchment management programmes have been initiated by wastewater discharge consenting processes have occurred in three communities; Whangawehi, Mahia Peninsula; Waiwiri, Horowhenua; and Wairoa, Hawke's Bay. These three catchment programmes introduce different stages of catchment management and reflect the importance of community engagement.

#### ***Whangawehi Stream, Mahia, Hawkes Bay***

The Whangawehi Catchment Management Group Inc. (WCMGI) started in 2011. Although largely forgotten, this group was initiated during the resource consenting process when Mahia Beach had a new reticulated wastewater system installed that included 100 % of the discharge being applied to land. The process drew attention to the Whangawehi Stream and the effect the land treatment could have on it. Amongst the debate it also drew attention to the effects of the surrounding land management. The WCMGI group started with the objective of raising awareness of the impact surrounding activities were having on the waterway; and from there the group's aspirations to restore the Whangawehi as a food source with a healthy estuarine environment at the river mouth were developed. The catchment of the Whangawehi Stream is shown in Figure 1.



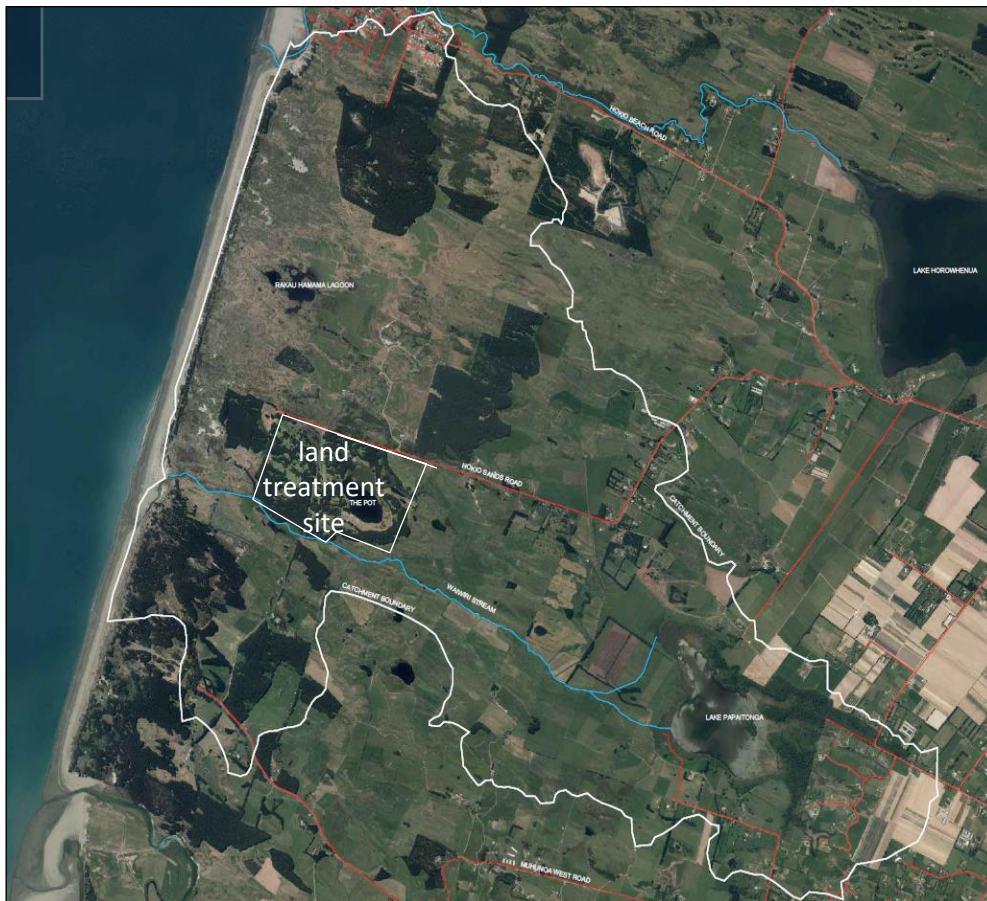
**Fig. 1:** Whangawehi Stream Catchment (catchment boundary - red, Whangawehi Stream - blue)(source: whangawehi.com, retrieved 2018)

Today the WCMGI have a collaborative approach and a memorandum of understanding with Wairoa District Council, Hawkes Bay Regional Council, Tangata Whenua of Mahia and with land owners. The group is autonomous with funding generated from various sources. Programmes managed by WCMGI include school activities, archaeological assessments, fencing, planting, pest control and monitoring of water, insects and birds. The website whangawehi.com displays the extent of this well-established community driven programme.

***Waiwiri Stream, Levin, Horowhenua***

The Levin community applies 100% of its wastewater to land, with the system starting in 1986. In 1990 the community won an environmental award for the state of the art wastewater discharge system using low impact sprinklers to distribute the wastewater. The resource consent for this site is due for renewal in 2018. The recently started re-consenting process has initiated investigations that have identified the effects of this land treatment system after 30 years of operation, with the technical results showing minimal environmental effects on the adjacent Waiwiri Stream; this is despite high wastewater application rates.

As part of the consenting process, engagement has presented technical investigations to the community. This work has shown that the land treatment system is impacting on the stream through increased nutrient concentrations; but is only one of many contributors to the nutrient load in the Waiwiri Stream. The work undertaken has shown that if the wastewater land treatment system was targeted for improvement in isolation, the Waiwiri Stream would still not meet National Policy targets or community aspirations, meaning that other sources of nutrient load in the catchment are limiting the health of the waterway. Figure 2 shows the land treatment area alongside the Waiwiri Stream and within the Waiwiri Catchment.



**Fig. 2:** Land treatment site within the Waiwiri Catchment

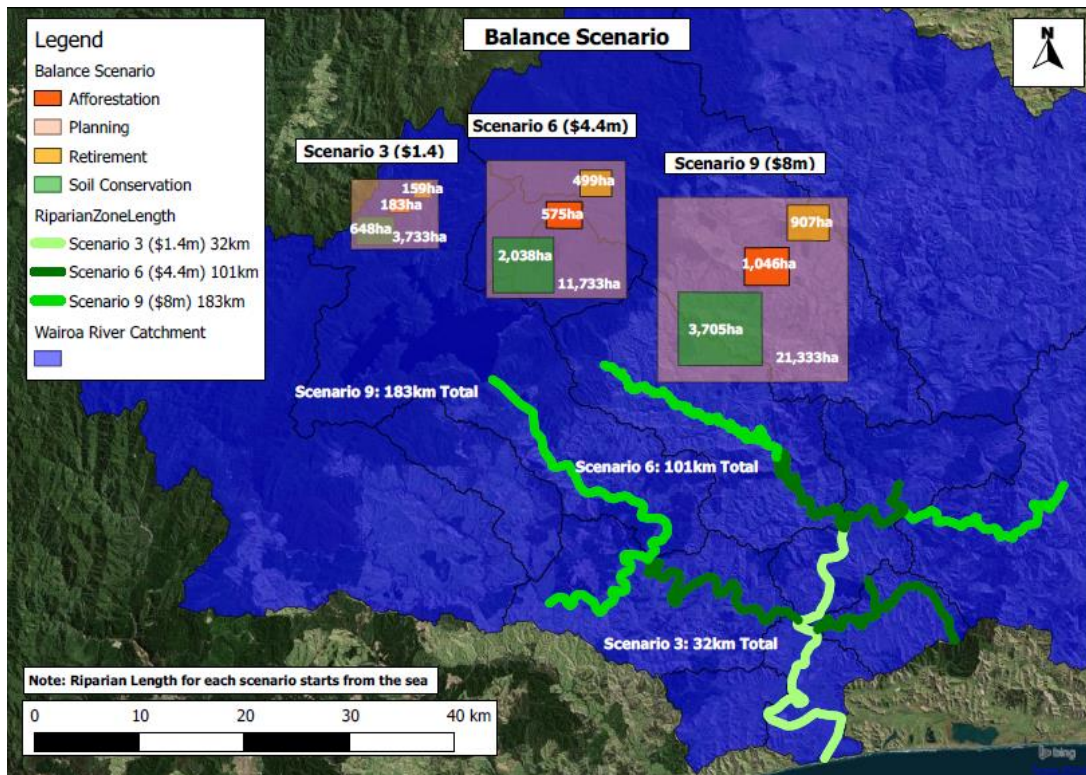
The outcome of realising that there is a wider catchment issue has been the formation of the Waiwiri Catchment Group. Funding of this project has been supported by the Department of Conservation (DOC) who are currently assisting with facilitating this group.

### ***Wairoa River, Wairoa, Hawkes Bay***

The Wairoa wastewater discharge consent is due to expire in 2019. To assist with decision making through the consenting process, a stakeholder group was formed in April 2017. The concerns from the stakeholders were initially the impact of the current discharge on the Wairoa River. However, once it was established that the complete removal of the wastewater discharge (at great cost) would not improve water quality, the focus for improvements shifted to water quality in the Wairoa River Catchment.

Currently the Wairoa District Council is about to contribute to establishing a catchment programme alongside a wastewater enhancement programme. The wastewater component will

ideally see a shift of wastewater from 100 % to the river to close to 100 % to land, but this will be done alongside investing and assisting with the development of catchment programmes. Preliminary costings of various catchment management scenarios and the size of the areas these would cover have been completed and are shown in Figure 3.



**Fig. 3: Wairoa Catchment Potential Scenarios**

## Conclusions

The re-consenting of several treated municipal wastewater discharge systems has provided examples where the process to consent the operation has stimulated much greater outcomes than just conditions for the discharge resource consents. The consenting process includes three important stages. First, a thorough investigation that clearly portrays the characteristics of the environment and the potential operation. Second, the community are engaged to understand the investigation outcomes and then contribute ideas. Finally, a design is prepared for the consent that embraces technical, social, environmental and economic outcomes.

An additional output from the three-stage resource consenting process has been independent community driven catchment management programmes. These programmes include long term commitments to activities such as community planting, school programmes, research and pest control.

While resource consenting is seen as being complex and often considered in isolation, the need to consent community wastewater discharges has shown itself to be a valuable catalyst for initiating and supporting catchment management enhancement programmes.