Excerpt from a Resource Inventory for the Ruamahanga Catchment, Wairarapa, NZ

Conclusions and Recommendations by Leila Chrystall, 2007

16. Conclusions and Recommendations

16.1. Conclusions

The Ruamahanga Catchment is a highly valued resource to the people of the Wairarapa. The Ruamahanga River and tributaries host a wide variety of values including recreational, aesthetic, ecological and economic values. There is potential for the catchment to maintain and enhance these values associated with the rivers in the future. However this potential is being compromised to some extent by current land use practices and discharges of waste directly to the river. The people of the Wairarapa have the opportunity to be proactive in restoring the state of the waterways in the catchment ensuring the future sustainability of the resource and enhancement of its values.

The quantity of the water in the catchment is directly related to the climatic regime and human demands. Due to the topographical profile of the catchment, the western ranges receive a more consistent and larger volume of rainfall annually, when compared to the eastern hill country. This difference in rainfall directly translates to the variation in the river flows on either side of the catchment. The eastern tributaries have the lowest mean and median flow rates, and are smaller in size. However, these tributaries can still inflict severe flood damage on the catchment, with the potential to contribute large volumes of water to the Ruamahanga River during storm events. At the same time, some parts of the Ruamahanga Catchment are prone to severe droughts, due to the large variability in rainfall that can occur on the valley floor and on the eastern side of the catchment.

Over the past decade, land use change in the Ruamahanga Catchment has been significant. Sheep and beef farming has been replaced with dairy farming in many places. This land use intensification has been accompanied by a large increase in the demand for water. This in turn has generated problems for the catchment, with some surface water management zones near full allocation and several groundwater sub zones fully allocated. The Wairarapa Regional Irrigation Trust has proposed a regional water storage and distribution irrigation project to overcome the lack of water availability in the catchment and allow for land intensification.

Water quality in the Ruamahanga Catchment varies. Generally the tributaries on the western side of the catchment are cleaner than those on the eastern side. However, two central tributaries - the Mangatarere River and the Parkvale Stream - both have very poor water quality due to both point source and diffuse discharges. Water quality in the Ruamahanga River is only marginally better than the water in the Manawatu River, even though the Manawatu River drains a more heavily populated catchment.

On its southward journey, the water quality in the Ruamahanga River deteriorates soon after it moves out of the forested land (near Mt Bruce) and into the pastoral land. Nutrient

loadings increase, clarity decreases and the incidence of high levels of *E.coli* increases. This deterioration is noticeable before the river reaches Masterton and the first major discharge of municipal effluent. Between the Ruamahanga River's monitoring sites at Te Ore Ore and Gladstone, there is a sharp increase in the load of DRP in the river, increasing from 6,550 kg/year of DPR to 33,000 kg/year of DRP. Once the DRP contributed by the upstream tributaries had been accounted for, it was found that around 14,000 kg/year of DRP was added in this section of Ruamahanga River. This equates to around a 27 percent increase of DRP load in this section of the river. More than three quarters of this DRP load increase is likely to have been generated from the Masterton Sewage Treatment Plant, with the remaining quarter coming from direct land runoff. Between these same monitoring points, a significant increase in the loading of NH_4-N was also found. However, the increase in Total Nitrogen between these points was not significant compared to background levels already in the river.

Downstream of Gladstone, nutrient loads continue to increase in the Ruamahanga River. This is consistent with the findings of Watts & Perrie (2007). Municipal effluent from Carterton (via the Mangatarere River in the winter months only), Greytown (via the Papawai Stream), Featherston (via Donald's Creek and Lake Wairarapa) and Martinborough (directly into the Ruamahanga River) enters the Ruamahanga River. However, it was difficult to measure the changes in the DRP load in the river as a result of these discharges.

Land use practices also place significant pressure on the waterways. Nutrient runoff from farmed land, unfenced waterways, and point discharges from farms and industry all contribute to the state of the rivers. Furthermore, they can have an impact on groundwater quality. Many aquifers in the Ruamahanga Catchment are already contaminated by NO_3-N and SO_4^{2-} - particularly around Masterton and Martinborough.

The water quality in Lake Wairarapa is poor, and it was suggested that it was unlikely to improve with the current land use and projected land use intensification around its shores. Since the lake is effectively an 'artificial' system, (once the flood control scheme was erected) the lake has been unable to 'flush' itself out. This has caused some concern amongst members of the local community including iwi. Tangata Whenua are also deeply concerned about the continued discharge of human sewage into the waterways. Not only is it diminishing the quality of the waterways, it is also extremely offensive.

Water degradation, caused by point source discharges and land use practices, negatively impacts on other aspects of the catchment. The Ruamahanga River has a lower diversity of species, a lower Index of Biotic Integrity (IBI), and a lower MCI score than the average for the other catchments in the Wellington region. Furthermore, recreational and aesthetic values are also compromised. Three sites on the Ruamahanga River ('The Cliffs', 'Kokotau' and 'Waihenga') reached the alert recreation bathing water quality on several occasions last summer, and six of the seven bathing sites tested on the Ruamahanga River have been graded as having 'very poor' suitability for recreation. Periphyton growth can sometimes impact on recreational values in the Ruamahanga River, especially in the summer months, during times of low flow.

Some significant temporal trends in water quality in the Ruamahanga River were identified by Scarsbrook et al. (unpublished) cited in Milne & Perrie (2006). Of note was a 4.2 mg/m3 (0.0042 g/m3) increase in DRP concentration at Waihenga over the 14 years from 1989 to 2003. A similar increase in DRP concentration was identified upstream at Wardells over the same period.

16.2 Information Gaps and Limitations

The following information gaps and limitations have been identified:

• There is a limited number of water quality monitoring sites that have flow metres attached in the Ruamahanga Catchment. This limits the ability to calculate nutrient loading and accurately determine the source of the nutrients.

• Suspended sediment concentrations are not currently measured by GWRC, which limits the ability to assess which sub catchments are contributing the most sediment to the lower parts of the catchment.

• AgriBase was the primary database used in the land use chapter. Due to the large cost of obtaining the updated version, the 2001 version was used.

• Available statistical information on land use change was mostly defined according to territorial authority boundaries. This makes the data less accurate for the catchment boundary. Statistics New Zealand (and other information sources) uses a smaller unit (a mesh block) to define most data, but at this small scale the information is considered sensitive and is therefore not readily available.

• The land chapter relied heavily on the Land Resource Inventory (LRI). Although dated it was the most readily available database for several of the land characteristics e.g. physiography, soils and erosion, and the only database that provided full coverage of the Ruamahanga Catchment area.

• The LRI could only provide erosion for the time of mapping. Therefore this data is out of date and should be updated if required.

• The soils groups were updated from the generic nomenclature to the New Zealand Soil Classification using the New Zealand Soils Database (NZSD). Several of the soils groups in Heine's geological map of Wairarapa (1975) did not feature in the NZSD, so some conversions of the soils had to be estimated. Actual field work would ensure accuracy.

• Further analysis of the climatical regime of the catchment can be carried out with New Zealand's National Climate Database (CliDB) which since writing this document has become freely available on the Internet.

16.3. Recommendations

16.3.1 Recommendations to improve data in this report

Water flow monitors should be installed at water quality monitoring sites so that nutrient loading can be more accurately determined and the relationship between flow and water quality determined.

A suspended sediment sampling monitoring program should be initiated to generate calibration curves between turbidity and suspended sediment concentration. This would allow the identification of those sub catchments that contribute the most sediment, and add value to the large database of turbidity measurements.

Local iwi should make amendments and additions to the Māori Culture chapter of this report as required.

The Cultural Health Index (CHI) should be incorporated into the freshwater monitoring program.

The 2003 and 2007 agricultural production statistics should be compared to obtain a more accurate picture of land use change occurring in the catchment (at the time of writing the 2007 statistics had not been released).

16.3.2 Recommendations for the future

This report has identified that parts of the Ruamahanga Catchment have a less diverse range and abundance of freshwater species than other parts of the Wellington region. Chemical and biological measures indicated that water quality is degraded, and in some parts is not much better than the water quality in the Manawatu River. It is interesting to note that Horizons Regional Council is proposing quite drastic policy measures to address these water quality issues in the Manawatu Catchment.

One cause of the degraded water quality in the Ruamahanga Catchment is the elevated level of DRP. This study suggests that this DRP originates from both rural land use and municipal discharge. On-going land intensification and possible increases in occupied dwellings will almost certainly exacerbate this problem in the future unless corrective action is taken.

This report will provide a starting point for stakeholders to engage in discussion of future management of the catchment. In saying this, the outcomes of Horizon Regional Council's One Plan should be observed, and future freshwater management plans should be tailored with the success and failures of the One Plan in mind.