



Report 08.624
Date 14 October 2008
File ENV/05/11/01

Committee Regulatory Committee
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Key findings from Greater Wellington's riparian rehabilitation monitoring, 2002-07

1. Purpose

To report the key findings of monitoring undertaken as part of the riparian management pilot programme over 2002 to 2007¹.

2. Background

Riparian rehabilitation has become widely recognised as a way of improving aquatic ecosystem values of small streams. However, scientific documentation of the changes that occur in stream ecosystems as rehabilitation is carried out is limited.

In order to provide some baseline information for Greater Wellington's *Riparian Management Strategy*, a riparian management pilot programme was established in 2001. This programme involves rehabilitation and monitoring of reaches of three streams in the region; the Enaki Stream in the Wairarapa, the Karori Stream in Wellington City and the Kakariki Stream on the Kapiti Coast. Monitoring of riparian margins and stream health began in January 2002. The primary aim of this monitoring was to document the effects of riparian rehabilitation on stream ecosystems, with a particular focus on the first three environmental outcomes listed in the Riparian Management Strategy relating to water quality, aquatic habitat and healthier river ecosystems.

3. Monitoring variables

Monitoring was undertaken immediately upstream of and within each of the rehabilitated riparian reaches. This included an assessment of physical habitat (e.g., vegetation and shade cover, bank and channel stability, stream substrate type), water quality sampling (e.g., water temperature, dissolved oxygen,

¹ This report is a summary of the technical report: Perrie, A. 2008. *Riparian rehabilitation to improve aquatic environments in the Wellington region: Results from the riparian management pilot programme, 2002-07*. Greater Wellington Regional Council, Publication No. GW/EMI-T-08/80.

clarity, suspended sediment, nutrients, bacteria) and biological sampling (periphyton, invertebrates and fish).

4. Results and discussion

Riparian rehabilitation is a long-term process and many of the factors that contribute to diverse and healthy stream ecosystems may take many decades or even centuries to fully develop. Despite the relatively young age of the riparian rehabilitation in the three trial catchments (plantings range in age from approximately 6 to 9 years) and the limited extent of planting (generally a relatively small section in the lower catchment reaches), results for the 2002-07 reporting period are encouraging. Both the Enaki and Kakariki streams have shown some improvements in aspects of physical habitat quality and water quality that appear to be reflected in improvements in measures of stream health (e.g., changes in the invertebrate and fish communities). In contrast, no improvements in stream health could be attributed to the rehabilitation of the riparian zone along a section of the Karori Stream. This probably reflects the overriding impact of contaminants and habitat degradation associated with the urban land use that dominates the catchment upstream of the rehabilitation area.

Benefits observed within the riparian rehabilitation areas for the three study streams vary and reflect the different stream types and land use impacts in the upstream catchments. The principal benefits attributable to riparian rehabilitation observed during the report period were:

- improved aesthetic values (Enaki, Kakariki and Karori (see Figure 1) streams);
- increased vegetation cover and streambed shade (Enaki and Kakariki streams);
- increased bank stability (Enaki and Kakariki streams);
- improved aquatic habitat quality (Enaki and Kakariki streams); and
- reduced water temperatures (Enaki (see Figure 2) and Kakariki streams).



Figure 1: Riparian rehabilitation along a section of the Karori Stream has enhanced the aesthetic value of the stream.

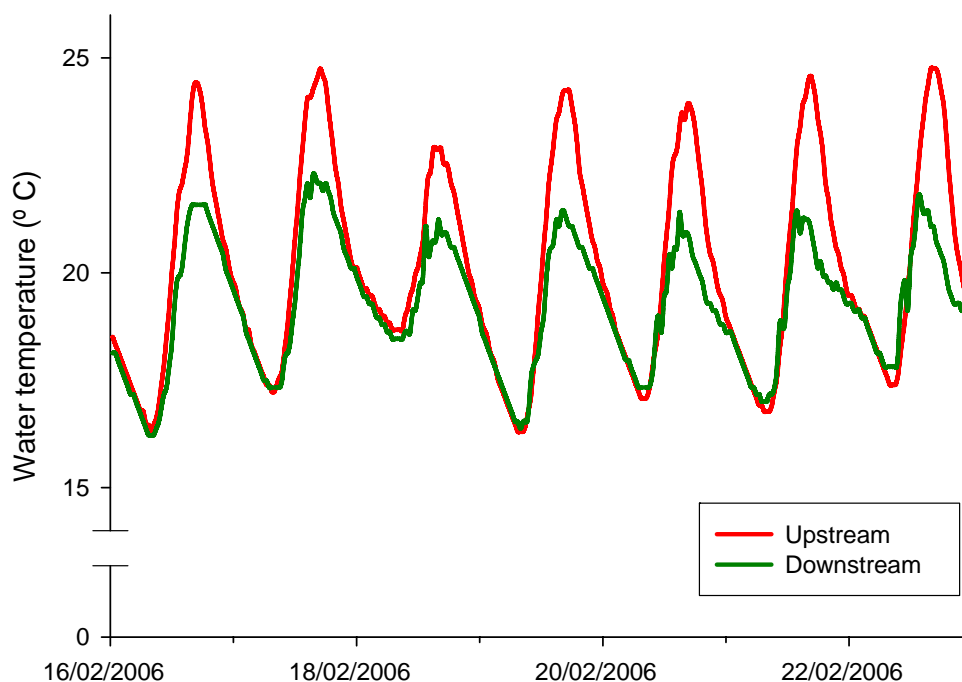


Figure 2: Daily variation in water temperatures upstream and downstream of a planted reach of the Enaki Stream (near Carterton) for a week during February 2006. Maximum water temperatures are generally two to three degrees cooler in the planted section (downstream) than the unplanted section (upstream). Cool water is important for fish and stream invertebrates as many species have upper thermal tolerances above which they become stressed and may even die.

Other benefits were observed at some sites, such as reduced instream plant growth (Enaki and Kakariki streams), lower nutrient concentrations and sediment inputs (Enaki Stream) and positive changes in macroinvertebrate (Enaki and Kakariki streams) and fish communities (Kakariki Stream). However, it was not always clear whether these particular improvements were directly linked with the rehabilitating riparian zones or with other factors. Nor was it always clear whether they resulted in any significant benefits to overall stream health.

Despite riparian rehabilitation leading to clear improvements in the Enaki and Kakariki streams, it is important to note that water quality and aquatic ecosystems in these two streams, as well as the Karori Stream, remain in a degraded state; faecal indicator bacteria and nutrient concentrations are elevated and invertebrate and fish communities are dominated by tolerant species indicative of degraded water quality and stream health overall. The full benefits of riparian rehabilitation along reaches of the Enaki, Kakariki and Karori streams will not become apparent until riparian vegetation matures and canopy closure is achieved; this will take many years. Furthermore, until improvements are made to upstream farming practices (preventing stock access to stream beds and eliminating effluent run-off) and stormwater management, and the whole catchment has riparian plantings, stream health will continue to be compromised.

5. Conclusion

Monitoring undertaken as part of the riparian management pilot programme has demonstrated that riparian rehabilitation can be a very useful tool to mitigate some of the degradation to stream health caused by agricultural and urban land use. However, riparian rehabilitation alone will not address all of the issues relating to poor stream health in the three pilot catchment areas; improvements are also needed in upstream farming practices and possibly stormwater management. Changes to plans and policies (e.g., stock access rules) may need to be developed to support this.

6. Communication

Copies of the technical report documenting the riparian management pilot programme monitoring results have been circulated internally and copies will be provided to the owners of the land on which the rehabilitation and monitoring took place. The technical report is also available on Greater Wellington's website.

7. Recommendations

It is recommended that the Committee:

1. ***Receives the report; and***
2. ***Notes the contents.***

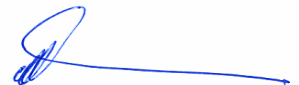
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