Introduction
Historically, Christchurch was a mosaic of swampland and meandering spring-fed streams (Dendy 1990). Its waterways have been subjected to three broad impacts typical of urban streams (as discussed in Paul and Meyer 2001):

1. Pollution (e.g., chemicals and sediments from stormwaters)
2. Altered hydrological regime (e.g., decreased water table, exaggerated flooding)
3. Changes in riparian and in-stream habitat (e.g., channelisation, removal of riparian vegetation, reduced in-stream habitat complexity/diversity)

Study objectives
1. To determine habitat, water quality and macroinvertebrate communities in the 1200 m long Okeover Stream.
2. To explore factors limiting macroinvertebrate recovery in this stream.

For sampling methods see Blakely et al. 2003.

What is the current macroinvertebrate community?

Invertebrate densities were highly variable among sites. The headwaters were almost entirely dominated by oligochaete worms (>95%), but a more diverse community, including amphipods, snails, dipterans, and other taxa, was present in very low numbers at site 2, and increased to seven taxa downstream.

What might be causing this longitudinal change in macroinvertebrates?

Invertebrate densities were highly variable among sites. The headwaters were almost entirely dominated by oligochaete worms (>95%), but a more diverse community, including amphipods, snails, dipterans, and other taxa, was present in very low numbers at site 2, and increased to seven taxa downstream.

Are habitat and water quality responsible for the longitudinal change in the macroinvertebrate community?

Water chemistry and physical conditions in November and December 2002, changed very little from headwaters to downstream. pH was circum-neutral, turbidity low, and water temperature and dissolved oxygen relatively constant in all sites.

Are oviposition substrates limiting larval recruitment?

Survey of natural substrates

Substrate additions

Substrate addition increased the number of caddisfly egg masses. However, upstream reaches still had significantly fewer egg masses on them (F = 15.92, P < 0.001). To investigate why this might be, boulders were added to the stream channel to provide suitable oviposition substrates for eggs laying hydrobiont flies.

Main Findings

- We found a distinct longitudinal change in the macroinvertebrate community, which could not be explained by water and habitat quality alone.
- Upon further investigation, oviposition substrates were found to be in short supply throughout Okeover Stream, and we found no difference in the amount of sediment on stone surfaces among sites. In contrast, there was significantly more periphyton biomass (Chlorophyll-a) upstream.
- This distribution pattern was mimicked by adult caddisflies, with fewer encountered upstream. Thus, this distribution pattern was mimicked by adult caddisflies, with fewer encountered upstream. Thus, we found a distinct longitudinal change in the macroinvertebrate community, which could not be explained by water and habitat quality alone.

Acknowledgements

We thank Mike Winterburn, Anga Mchikira, Hamish Greig, Leanne O’Byran and members of the Freshwater Ecology Research Group, University of Canterbury, for their helpful discussions. Thanks also to Fiona Blakely and Hamish Greig who helped in the field and Matt Walters who helped with graphics. TJB received a summer scholarship, provided by Rachel Barker and the Christchurch City Council.

References

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