



Meaning and design of nature for the urban built environment

24 – 26 August, 2005

Lincoln University

Habitat potential of aquatic systems in the built environment: A Christchurch perspective

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One of the important community outcomes highlighted in the City Council's recently released Long Term Community Consultation Plan (LTCCP) is the maintenance of a "Sustainable natural environment". While this goal is laudable, it raises the question as to whether urban environments can support healthy aquatic ecosystems, and whether we can maintain biodiversity as rural rivers become urbanised. Changes observed in the aquatic invertebrate fauna of Christchurch's two main Rivers, the Avon and Heathcote, over a 25-year period imply that urban development and the protection of aquatic fauna are not complimentary. Within this time, invertebrates characteristic of clean, healthy waterways such as mayflies and many caddisflies have disappeared from these two rivers. Loss of these animals is a pattern mirrored worldwide in urban streams, and is now referred to as the Urban Stream Syndrome. This syndrome is characterised by absence of sensitive invertebrates, and a community dominated by the few animals that can tolerate conditions characteristic of urban streams.

Reasons for the loss of sensitive taxa are usually attributed to physical changes that have historically occurred with the onset of urbanisation, including loss of habitat, extremes of high and low flow, and increased sedimentation. However, restoration efforts designed to remedy these factors have generally failed to improve the invertebrate fauna, implying that there are larger, overarching constraints preventing the successful re-establishment of sensitive taxa to streams where they once were found. Such constraints include the small habitat size of restored sections, as well as their isolation and fragmentation within the urban matrix.

Stormwater contamination also places major constraints on many sensitive invertebrates, especially when their food sources become contaminated by heavy metals. These constraints

are likely to continue to prevent the reestablishment of healthy communities in current urban streams. More importantly, they will begin to impinge on the biological health of rural waterways as these catchments become more urbanised. Achieving the LTCCP goal of a “sustainable natural environment” is unlikely in urban streams unless there are fundamental changes in our methods of urban design.