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Effects of disturbance and nutrient regimes on freshwater invertebrate community structure

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Abstract

Freshwater ecosystems globally are under threat from anthropogenically driven impacts including water abstraction for drinking and agriculture, exotic species invasion, eutrophication, channelization and destruction or modification of habitat. In New Zealand, eutrophication from nutrient enrichment is one of the most pervasive and detrimental impacts. High nutrient levels in waterways is detrimental not only to the species that inhabit them, but can also affect drinking and irrigation water for humans and result in loss of recreational and aesthetic values. Excess nitrogen and phosphorus can cause large amounts of periphyton to grow which in turn can impact water quality and the community composition of stream macroinvertebrates. Macroinvertebrate communities are also strongly affected by floods. More or less frequent flooding can cause changes in composition of stream invertebrate communities. Streams are usually affected by multiple stressors but the effect of those stressors are often considered in isolation for management. As macroinvertebrates are often used as indicators of ecosystem health, it is important to assess how different stressors interact and how these impacts those communities.

In this study, macroinvertebrate communities in four Taranaki streams were sampled to assess the interactive effects of nutrient enrichment and flood regime. Nutrient enrichment resulted in invertebrate communities changing markedly between upstream and downstream sites. All four streams had a similar composition at the upstream sites whereas downstream sites in most streams were very different. In two of the streams with lower disturbance regimes, nutrients were the most important driver of invertebrate community composition. In the two streams with a higher disturbance regime, the invertebrate communities were more similar between upstream and downstream sites indicating that flooding was overriding the effects of nutrient enrichment as the most important driver of community composition.

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Ko au te awa
Ko te awa ko au.

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