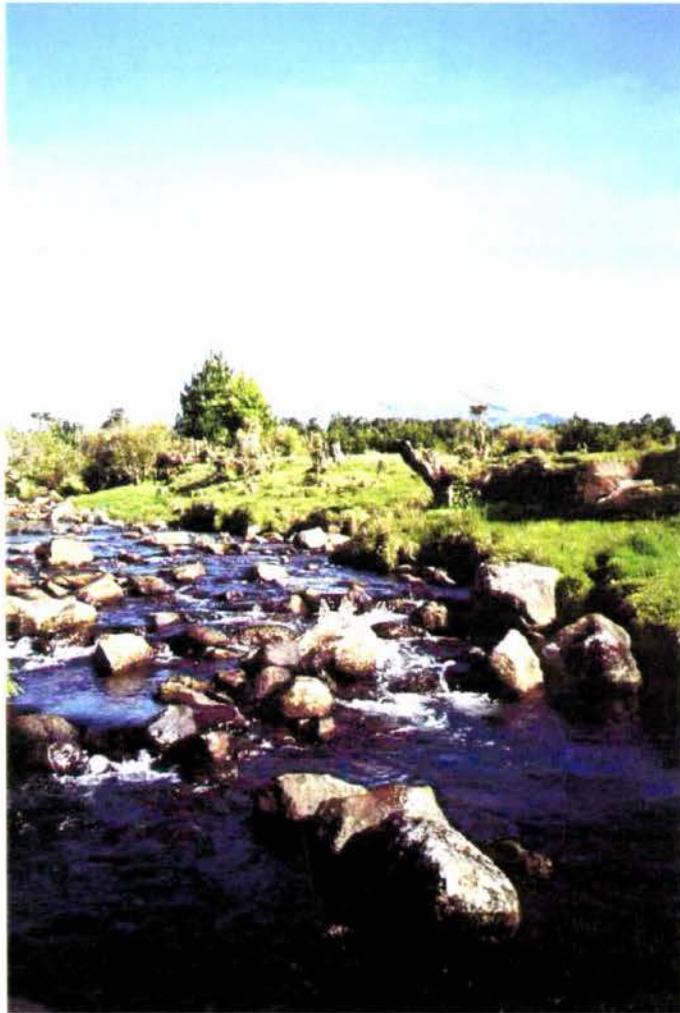


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**THE EFFECT OF SUBSTRATE STABILITY AND
CANOPY COVER ON MACROINVERTEBRATE
COMMUNITIES IN TARANAKI RING PLAIN STREAMS**



A thesis presented in partial fulfilment of the requirements for the degree
of Master of Science in Ecology
at Massey University, Palmerston North, New Zealand

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Front cover: Mt Taranaki and Kaupokonui East Stream Tributary.

ABSTRACT

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The relative effect of substrate stability and canopy cover on macroinvertebrate communities, and their possible interaction, were investigated in 10 Taranaki ring plain streams between April 1999 and March 2000. Substrate stability was examined as it is postulated to be the major influencing factor on stream invertebrates and canopy cover as it will effect periphyton, a major invertebrate food source. Invertebrate communities, periphyton biomass and stone movement were monitored at 20 sites on these streams of differing hydrological regime, a closed canopy site and an open canopy site on each stream. Macroinvertebrate species richness and periphyton grazer abundance were higher in open canopy sites than closed canopy sites and this was probably related to periphyton biomass which was higher at the open sites. Species richness displayed a strong quadratic relationship with periphyton biomass and overall macroinvertebrate community composition also appeared to be related to levels of periphyton as dictated by canopy cover. However this effect was overridden by substrate stability when disturbance levels were high.

The effect of substrate stability and cover was also examined in an experiment, in one of the 10 streams; Cold Stream, where both factors could be independently manipulated. Wire mesh substrate baskets which were subjected to either artificial disturbance or left undisturbed were used under an artificial cover. Cover was found to influence invertebrate community composition, probably via its' effect on periphyton biomass, while physical disturbance decreased both invertebrate abundance and diversity.

Keywords: substrate stability; canopy cover; disturbance; productivity; macroinvertebrates; periphyton; community structure; diversity.