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- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

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Review

Production

Subscription

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- Volumes and Issues
- Contents of Issue 3
- Special Issue

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The response of macroinvertebrates to artificially enhanced detritus levels in plantation streams

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Abstract. The leaves and wood from vegetation surrounding headwater streams constitute a major food source for aquatic invertebrates, providing they are retained upon the streambed and not transported downstream. This study investigated the response of aquatic invertebrates to artificially increased detritus retention, in an effort to reproduce the naturally occurring build up of dead organic matter associated with streams in old-growth forest. The background detrital standing stock in streams in Kielder Forest (Northumberland, UK) was low, approximately 32 gm^{-2} . Two streams flowing through dense conifer plantation and one in open broadleaved woodland were manipulated by the addition of logs over a 10 m stream reach. After several months, log addition significantly enhanced detrital standing stocks in both conifer and broadleaved streams. Total invertebrate abundance, taxon richness and the numbers of certain numerically dominant families were significantly higher in experimental than reference reaches in both conifer and broadleaved streams. This response was most marked for detritivores, whilst non-detritivore groups often showed no response to the manipulation. Whilst in the short term the responses to enhanced retention may reflect a redistribution of the local fauna, it is argued that over a longer time-scale, a genuine increase in invertebrate density and diversity could occur. Allowing old-growth forest to develop in planted valley bottoms may be a viable management option for conservation. If established alongside streams, it would ensure continuous input of woody material and the fauna may benefit from the resulting increase in detritus retention.

Keywords: forestry, detritivores, old-growth conifers, river management, woody debris

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